Foundation
Key Stage 4

GCSE Mathematics
Homework Booklet

Name:
The Hazeley Academy

Make 100

1	66 + _____ = 100	**2**	41 + _____ = 100	**3**	39 + _____ = 100
4	19 + _____ = 100	**5**	96 + _____ = 100	**6**	10 + _____ = 100
7	78 + _____ = 100	**8**	8 + _____ = 100	**9**	44 + _____ = 100
10	54 + _____ = 100	**11**	13 + _____ = 100	**12**	7 + _____ = 100
13	83 + _____ = 100	**14**	4 + _____ = 100	**15**	82 + _____ = 100

Times tables

1	2 × 9 = ____	**2**	2 × 8 = ____	**3**	6 × 3 = ____
4	10 × 4 = ____	**5**	3 × 5 = ____	**6**	5 × 4 = ____
7	2 × 5 = ____	**8**	7 × 3 = ____	**9**	7 × 4 = ____
10	9 × 8 = ____	**11**	10 × 6 = ____	**12**	3 × 3 = ____
13	4 × ___ = 12	**14**	5 × ___ = 25	**3**	8 × ___ = 8

Division

1	63 ÷ 9 = ____	**2**	24 ÷ 3 = ____	**3**	10 ÷ 5 = ____
4	32 ÷ 8 = ____	**5**	24 ÷ 6 = ____	**6**	21 ÷ 3 = ____
7	30 ÷ 6 = ____	**8**	6 ÷ 1 = ____	**9**	18 ÷ 3 = ____
10	5 ÷ 5 = ____	**11**	9 ÷ 9 = ____	**12**	10 ÷ 2 = ____
13	12 ÷ ___ = 4	**14**	56 ÷ ___ = 8	**3**	64 ÷ ___ = 8

EXAM QUESTION

Here is a list of numbers: 17   28   36   45   57   68   72   86
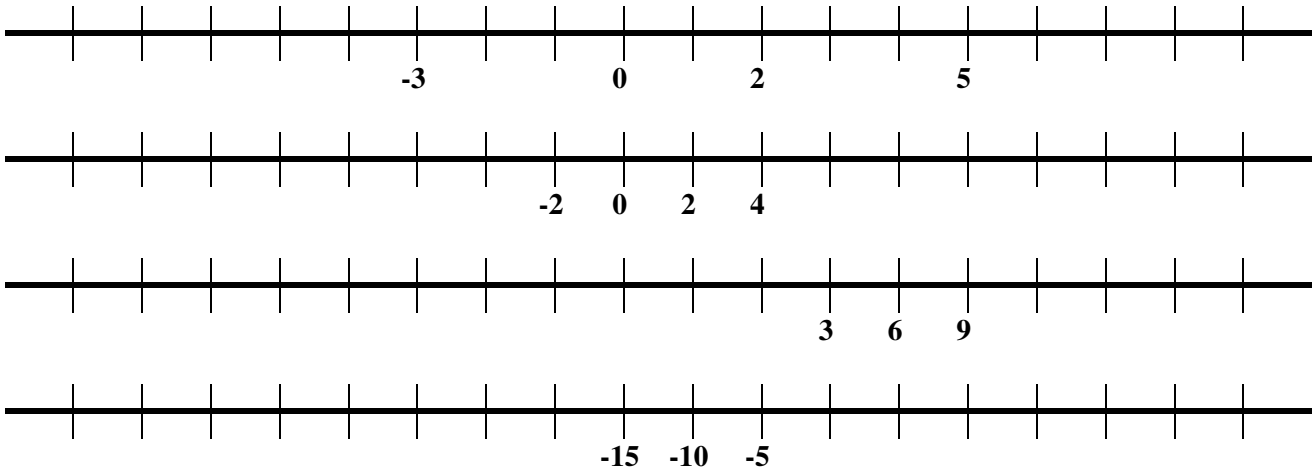
From this list, write down

(a) two numbers which have a total of 100   *(1 mark)*

(b) two numbers which have a difference of 50,   *(1 mark)*

(c) the number which is the product of 5 and 9.   *(1 mark)*

NEGATIVE NUMBERS - Complete the number lines:

-3   0   2   5

-2   0   2   4

3   6   9

-15   -10   -5

ORDERING INTEGERS – Put each list in order, smallest to biggest.

1	2	10	-12	-3	-1	-11	4	1
2	-10	12	10	-5	5	6	3	1
3	-3	0	-8	6	5	8	1	3
4	12	-11	-6	-4	10	-1	-12	-2
5	-8	23	1	-25	19	-15	-9	2
6	1	-2	22	-20	21	25	17	18
7	-25	-21	11	20	-5	5	24	-22
8	-17	-21	-10	-5	-11	-7	20	11

EXAM QUESTION

The temperature, in °C, at midday at the theme park on 6 winter days was recorded.

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Temperature	–3	–2	0	–4	–1	1

(i)   Which day was the warmest at midday?

Answer ....   *(1 mark)*

(ii)   Which day was the coldest at midday?

Answer ....   *(1 mark)*

Addition and Subtraction with negative numbers

1	3 + -1 = _____		**2**	6 + -4 = _____		**3**	4 + -1 = _____
4	9 + -5 = _____		**5**	5 + -1 = _____		**6**	1 + -4 = _____
7	2 + -4 = _____		**8**	6 + -2 = _____		**9**	2 + -5 = _____
10	2 - 9 = _____		**11**	5 - 1 = _____		**12**	2 - 7 = _____
13	5 - 10 = _____		**14**	3 - 3 = _____		**15**	4 - 6 = _____
16	2 - 5 = _____		**17**	4 - 5 = _____		**18**	5 - 9 = _____
17	-6 + 5 = _____		**20**	-5 + 1 = _____		**21**	-4 + 2 = _____
20	-6 + 3 = _____		**23**	-5 + -5 = _____		**24**	-9 + 3 = _____
23	-7 + 3 = _____		**26**	-3 + 4 = _____		**27**	-8 + 2 = _____

Multiplication and Division with negative numbers

1	7 x -2 = _____		**2**	2 x -2 = _____		**3**	8 x -1 = _____
4	4 x -2 = _____		**5**	1 x -3 = _____		**6**	7 x -4 = _____
7	8 x -1 = _____		**8**	2 x -3 = _____		**9**	1 x -4 = _____
10	-1 x 8 = _____		**11**	-5 x 7 = _____		**12**	-5 x 7 = _____
13	-21 ÷ -3 = _____		**14**	-8 ÷ -1 = _____		**15**	-80 ÷ -10 = _____
16	-10 ÷ -5 = _____		**17**	-10 ÷ -2 = _____		**18**	-5 ÷ -5 = _____
17	-30 ÷ 10 = _____		**20**	-14 ÷ 2 = _____		**21**	-36 ÷ 4 = _____
20	-4 ÷ 2 = _____		**23**	-63 ÷ 7 = _____		**24**	-27 ÷ 9 = _____

BIDMAS

Follow the correct order of operations to calculate the following:

1. $5 + 2 \times 3 = $ ___

2. $10 \div 2 + 7 = $ ___

3. $7 + 9 \div 3 = $ ___

4. $2 \times 3 + 7 \times 2 = $ ___

5. $8 \div 4 - 2 \times 1 = $ ___

6. $5 \times 10 + 9 \div 1 = $ ___

7. $2 + 4 \times 4 + 1 = $ ___

8. $(2 + 4) \times 8 = $ ___

9. $(3 - 1) \times (9 - 4) = $ ___

10. $30 - (7 + 6) = $ ___

11. $20 - (4 + 10) = $ ___

12. $(5 + 9) \div (2 \times 1) = $ ___

BRACKETS

Put brackets into the questions to make them correct.

1. $2 + 2 \times 3 = 12$

2. $4 - 1 \times 7 = 21$

3. $2 + 1 \times 1 + 2 = 9$

4. $9 \div 3 \times 2 + 1 = 9$

5. $50 \div 7 + 3 = 10$

6. $6 + 2 \times 4 + 3 = 51$

1234

Use the digits 1, 2, 3, and 4 to make correct calculations. Use brackets where appropriate.

1 = _____

2 = _____

3 = _____

4 = _____

5 = _____

6 = _____

7 = _____

8 = _____

9 = _____

10 = _____

EXAM QUESTION

(a) Work out $12 - (3 + 7)$

(b) Put brackets in each of these calculations to make them correct.

(i) $18 - 4 - 2 = 16$

(ii) $3 + 4 \times 5 = 35$

(iii) $20 \div 5 - 3 = 10$

PRIME NUMBERS

Answer TRUE or FALSE:

1.   2 is a prime number   2.   9 is a prime number   3.   15 is a prime number

4.   7 is a prime number   5.   19 is a prime number   6.   23 is a prime number

7.   21 is a prime number   8.   8 is a prime number   9.   27 is a prime number

10.   3 is the smallest prime number   11.   There are four prime numbers between 1 and 10

12.   99 is a prime number   13.   There are three primes between 20 and 30

PRIME FACTORS

Write each number as a product of its' prime factors:

1.   21   2.   12   3.   36   4.   50

5.   150   6.   54   7.   49   8.   84

RECIPROCALS

Write down the reciprocal of each number

1.   3   2.   2   3.   5   4. $\frac{1}{4}$

5. $\frac{1}{2}$ 6.   10   7. $\frac{1}{8}$ 8. $\frac{1}{9}$

9.   5   10. $\frac{2}{3}$ 11. $\frac{3}{4}$ 12.   6

EXAM QUESTIONS

1.   The letters a and b represent prime numbers.
Give an example to show that $a + b$ is **not** always an even number.

2.   Write 28 as the product of its prime factors.

3.   Write 18 as the product of its prime factors.

4.   Write 75 as the product of its prime factors.

FACTORS - Write down all the factors of each number:

1.   8   2.   12   3.   9   4.   16   5.   20

6.   15   7.   7   8.   14   9.   30   10.   36

EXAM QUESTIONS

1.   Here is a list of numbers

            6   8   11   15   25   28   30   33

      From this list, write down

       (a)   a multiple of 7,
       (b)   the two factors of 24,
       (c)   a square number,
       (d)   a prime number.

2.   Tick a box to say if each of the following statements is true or false.

                                                        True   False

      7 and 23 are both odd numbers   ☐   ☐

      The sum of 7 and 23 is an odd number   ☐   ☐

      7 is a factor of 23   ☐   ☐

      23 minus 7 is a square number   ☐   ☐

3.   From the list of numbers

            6   8   11   21   25   29   34

      write down
       (i)   two numbers with a sum of 31
       (ii)   two numbers with a difference of 26
       (iii) a multiple of 7
       (iv)   a factor of 24
       (v)   a square number

Multiples

Write down the first six multiples of each number:

1.	4	2.	3	3.	7	4.	9
5.	15	6.	12	7.	8	8.	11

Highest Common Factor

Find the Lowest Common Factor (HCF) for each pair of numbers.

1.	36 and 10	2.	50 and 30	3.	45 and 27
4.	100 and 36	5.	88 and 56	6.	36 and 32

Lowest Common Multiple

Find the Highest Common Multiple (LCM) for each pair of numbers.

1.	6 and 9	2.	5 and 15	3.	12 and 8
4.	2 and 11	5.	12 and 8	6.	5 and 9

EXAM QUESTIONS

1. (a) Write down two multiples of 4.

   Answer .... and .... *(1 mark)*

   (b) Write down two multiples of 7.

   Answer .... and .... *(1 mark)*

   (c) Write down a number which is a multiple of both 4 and 7.

   Answer .... *(1 mark)*

2. Find the least common multiple (LCM) of 28 and 42.

3. What is the least common multiple (LCM) of 12 and 18?

4. Find the Highest Common Factor (HCF) of 108 and 72.

ROUNDING

Write each number to the given degree of accuracy.

1.   128 (nearest 10)   2.   329 (nearest 100)   3.   691 (nearest 100)

4.   135 (nearest 10)   5.   750 (nearest 100)   6.   8350 (nearest 1000)

7.   725 (nearest 100)   8.   8500 (nearest 1000)   9.   790 (nearest 1000)

10.   5692 (nearest 10)   11.   5692 (nearest 100)   12.   5692 (nearest 1000)

DECIMAL PLACES

1. Write each number correct to 1 decimal place

a) 7.92   b) 16.67   c) 2.35   d) 8.251   e) 12.85

2. Use a calculator to work out the answers and write them down correct to 1 decimal place.

a) 2.2 x 8.1   b) 5.25 x 7   c) 9.12 x 9   d) 9.5 x 7.3   e) 9.13 x 7.75

3. Write each number correct to 2 decimal places

a) 5.622   b) 9.456   c) 3.126   d) 3.121   e) 9.455

EXAM QUESTIONS

1.   The populations of three towns are given below.

        Arton 15 748   **Barton** 9682   **Carton** 12 403

(a)   Write the number 15 748 to the nearest thousand.

2.   The number of spectators at a football match is 12 584.

(a)   Write the number 12 584 in words.

(b)   In the number 12 584, write down the value of

  (i)   the figure 8,

  (ii)   the figure 2.

(c)   Write 12 584 to the nearest 100.

3.

(a)   Write seven million in figures.

(b)   Write seven thousand and eighty-four in figures.

(c)   Write 8736 to the nearest 10.

4.

Round 723 to the nearest ten.

Homework 9F

ESTIMATING

Copy the lists below and match up the questions to the estimated answers. The first one has been done for you.

QUESTIONS	ESTIMATED ANSWERS
3.92 x 5.05	3
6.9 x 2.9	100
30.1 ÷ 9.91	11.4
√32	15
(8.8 + 11.11) x 4.9	40
50 ÷ 7.21	7
√103	8
4.05 x (6.9 + 2.9)	20
67 ÷ 8.12	12.2
√150	5.5

EXAM QUESTIONS

1. Kim buys 71 stamps which cost 19 pence each.

    By using suitable approximations, **estimate** the total cost of the stamps.
    You **must** show your working.

2. Estimate the cost of 20 meals at £2.97 each.

3. Liam wants to calculate $\dfrac{27.89 + 20.17}{3.91}$

    (a) Write each of the numbers in Liam's calculation to the nearest whole number.

    (b) Use your numbers from part (a) to estimate the answer to Liam's calculation.

4. Find an approximate value of $\dfrac{2987}{21 \times 49}$

    You **must** show all your working.

SIGNIFICANT FIGURES

1. Write each number correct to one significant figure.

a) 27   b) 832   c) 8.12   d) 93   e) 77   f) 13.5   g) 95

2. Use a calculator to work out the answers and write them down correct to 1 significant figure.

a) 50 x 23   b) 5.25 x 7   c) 910 x 12   d) 9.5 x 7.3   e) 93 x 77

3. Write each number correct to two significant figures.

a) 275   b) 0.03451   c) 8.12   d) 0.956   e) 7.04   f) 7.05   g) 959

ESTIMATING CALCULATIONS

By approximating each number, estimate the answers to these calculations. You must show how you reached your estimate.

1. $\dfrac{4.9+15.21}{1.9}$ 2. $\dfrac{19.89\times5.2}{1.05+9.03}$ 3. $\sqrt{4.05\times4.9\times5.09}$

EXAM QUESTIONS

1.   Find an approximate value of $\dfrac{41 \times 197}{78}$

   You **must** show all your working.

2.   Calculate the value of

$$\frac{8.4 - 3.79}{11.62 - 15.89}$$

   (a)   Write down the full calculator display.

   (b)   Give your answer to three significant figures.

3.   Hannah, Gemma and Jo use their calculators to work out the value of

$$\frac{28.78}{4.31 \times 0.47}$$

   Hannah gets 142.07, Gemma gets 14.207 and Jo gets 3.138

   Use approximations to show which one of them is correct.
   You **must** show your working.

ROUNDING IN CALCULATIONS

Give your final answer to each question correct to two decimal places.
Remember not to round during the intermediate steps of the calculation.

1. $\dfrac{6.2+3.09}{3.2\times8.91}$

2. $\sqrt{\dfrac{4.9}{1.2\times3.8}}$

3. $\dfrac{9}{2.17}+\dfrac{8.14}{0.515}$

4. $\dfrac{9.054-0.973}{6.3\times0.00462}$

5. $\dfrac{7.56^{3}}{\sqrt{3.9\times9.017}}$

6. $5+\sqrt{3.2^{2}-2.1\times9.2\times1.1}$

HIGHEST AND LOWEST

1. The length of a pencil is given as 9cm to the nearest cm.
What is the minimum length that the pencil could be?

2. The height of a door is 210cm to the nearest 10cm.
What is the maximum height that the door could be?

3. The width of a piece of paper is given as 18.4cm correct to one decimal place.
a) What is the minimum width that the paper could be?
b) What is the maximum width that the paper could be?

EXAM QUESTIONS

1. (i) Calculate $\dfrac{9.8}{6.7-1.2}$

     Answer ....

   (ii) Give your answer to an appropriate degree of accuracy.

     Answer ....

2. The scales at an airport weigh luggage to the nearest kilogram.
   What are the greatest and least possible weights of a case showing 25 kg on the scale?

   ....

     Answer Greatest .... kg

             Least .... kg

3. Calculate the value of

   $$\dfrac{8.4-3.79}{11.62-15.89}$$

   (a) Write down the full calculator display.

   (b) Give your answer to three significant figures.

DECIMAL PLACE VALUE

1. Write down the value of the underlined digits:

a)   6.2<u>4</u>   b)   7.<u>1</u>32   c)   19.45<u>6</u>   d)   3.<u>2</u>0   e)   7.0<u>9</u>1

ORDERING DECIMALS

Put each list of numbers in order from smallest to biggest.

1	6.8	6.83	6.1	6.55	6.9	6.7	6.5	6.26
2	4.28	4.8	4.66	4.4	4.57	4.7	4.77	4.9
3	1.3	1.6	1.6	1.55	1.84	1.1	1.62	1.22
4	2.61	2.1	2.83	2.45	2.35	2.31	2.11	2.9
5	9.61	9.4	9.21	9.83	9.3	9.8	9.34	9.4
6	8.7	8.82	8.77	8.86	8.27	8.45	8.3	8.5
7	7.4	7.8	7.9	7.56	7.11	7.67	7.38	7.29
8	1.41	1.3	1.39	1.8	1.6	1.96	1.11	1.71
9	2.53	2.6	2.45	2.21	2.6	2.7	2.35	2.19
10	9.77	9.19	9.81	9.39	9.5	9.19	9.3	9.1

EXAM QUESTIONS

1.   Write down a decimal number that is between 1.5 and 1.6

2.   Place the following numbers in order of size, starting with the smallest.

$2\frac{3}{5}$ 2.08 1.5^2 2.237   2.64

ADDITION (WHOLE NUMBERS)

1)
```
  5  6
  3  5
```

2)
```
  4  7
  2  9
```

3)
```
  6  8
  3  8
```

4)
```
  4  1  2
  3  7  9
```

5)
```
  6  3  8
  2  6  3
```

6)
```
  5  9  9
  3  2  3
```

7)
```
  7  1  1
  2  9  9
```

8)
```
  8  3  8
  2  7  2
```

9)
```
  5  3  9
  4  9  2
```

SUBTRACTION (WHOLE NUMBERS)

1)
```
  5  6
  3  5
```

2)
```
  4  7
  2  6
```

3)
```
  6  8
  3  9
```

4)
```
  4  8  4
  3  7  2
```

5)
```
  6  3  8
  2  2  3
```

6)
```
  5  9  2
  3  2  3
```

7)
```
  7  7  9
  2  9  9
```

8)
```
  8  5  8
  2  7  2
```

9)
```
  5  2  1
  4  3  2
```

EXAM QUESTIONS

1. Work out

    (a)   426 + 37 + 384

    (b)   800 – 472

2.

A youth club hires a disco for £70.
Tickets for the disco cost 80p each.
They sell 140 tickets.

**Friday night
DISCO
Tickets 80p**

How much profit does the youth club make?

Homework 14F

ADDITION (DECIMALS)

For each question, use a written method to calculate the answer.

1	29.7 + 24.9	**2**	25 + 45.7	**3**	36.1 + 12.7
4	20.6 + 7.7	**5**	35.7 + 2.5	**6**	18.2 + 30.9
7	20.78 + 39.2	**8**	31.3 + 4.1	**9**	8.63 + 33.9
10	8.96 + 33.6	**11**	48.5 + 38.98	**12**	22.8 + 19.4
13	21.62 + 46.9	**14**	11.5 + 14.94	**15**	40.3 + 30.39

SUBTRACTION (DECIMALS)

For each question, use a written method to calculate the answer.

1	66.7 - 44.4	**2**	75.3 - 6	**3**	59.7 - 18.1
4	68.8 - 30	**5**	60.6 - 38.6	**6**	68.5 - 8.3
7	75.95 - 16.9	**8**	61.7 - 33.3	**9**	73.3 - 26.8
10	61.14 - 8.6	**11**	69.2 - 38.36	**12**	89 - 18.4
13	65.07 - 23.5	**14**	50.9 - 32.27	**15**	73.1 - 8.65

EXAM QUESTIONS

1. Work out

    (a) $5.4 - 1.28$

2.

BURGER £1.35   FRIES 99p   DRINK 62p

    (a) (i) Arnie orders a burger and fries.
              How much does this cost?

         (ii) He pays with a £5 note.
              How much change does he get?

Homework 15F

MULTIPLICATION AND DIVISION (WHOLE NUMBERS)

1	14×8	2	24×3	3	31×5
4	62×9	5	39×7	6	66×4
7	26×15	8	26×16	9	63×22
10	$21 \div 7$	11	$50 \div 5$	12	$30 \div 6$
13	$115 \div 5$	14	$128 \div 8$	15	$126 \div 6$
16	$234 \div 18$	17	$396 \div 18$	18	$285 \div 19$

MULTIPLYING DECIMALS

1	1.5×6	2	7.5×4	3	2.8×5
4	4×0.6	5	4.3×3.7	6	7.7×1.5

DIVIDING WITH DECIMALS

1	$2.7 \div 3$	2	$5.4 \div 6$	3	$3.5 \div 5$
4	$24 \div 0.8$	5	$54 \div 0.6$	6	$15 \div 0.5$

EXAM QUESTION

1. 132×8

2. 0.2×0.4

3. Cans of cola are sold in packs of six.
   Each pack costs £2.18
   Sam buys eight packs of cola.

   (a) How many cans does he buy altogether?

   (b) How much does Sam pay for the eight packs?

   (c) Sam pays for the packs with a £20 note.
   How much change is he given?

4. Pens are sold in boxes of 12.
   Mr Hebson requires 250 pens.
   How many boxes does he need to order?

5. A box of pencils costs £2.50
   Mr Hebson orders 48 boxes for the Mathematics Department.
   Find the total cost.

6. $3.64 \times 2 + 13.7$

BEST VALUE - EXAM QUESTIONS

1.   The same type of crystal glasses is sold in two different packs.

Small pack	Large pack
Contents	Contents
4 glasses	12 glasses
£3.20	£10.20

Which size is the better value for money?

You **must** show your working.

2.   A garden centre has tomato plants for sale.

Tomato plants

40 pence each
or
£5 for a box of 20

Work out the cheapest price for 24 tomato plants.

3.   Two advertisements for the same type of sun oil are shown.
The sun oil is usually sold in 100 ml bottles which cost £4 each.

Holiday Shop

125 ml only £4

25% extra free

125 ml

Southern Pharmacy

Normal price £4
for 100 ml
Special offer

Buy one

100 ml

2nd HALF PRICE

100 ml

Which offer gives the better value for money?
You **must** show all your working.

SPEED, DISTANCE AND TIME - EXAM QUESTIONS

1. Alan drove 12 miles.
    The journey took 15 minutes.

    What was Alan's average speed?

2. Charles drove 132 miles at an average speed of 55 mph.
    Calculate the time taken for this journey.

    Give your answer in hours and minutes.

3. (a) An athlete runs 15 miles at an average speed of 6 miles per hour.

         How long does he take to run the 15 miles?
         Give your answer in hours and minutes.

    (b) Another athlete runs 18 miles in $2\frac{1}{4}$ hours.

         What is her average speed?

4. Sally drove 120 miles at an average speed of 50 mph.

    Calculate the time taken for this journey.
    Give your answer in hours and minutes.

5. Kristen drives 252 miles from Redcar to London in 4 hours and 30 minutes.

    Calculate her average speed in miles per hour.

6. Two towns, A and B, are connected by a motorway of length 100 miles and a dual carriageway of length 80 miles as shown.
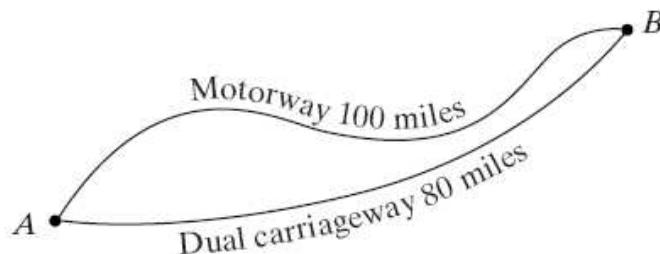
    Jack travels from A to B along the motorway at an average speed of 60 mph.
    Fred travels from A to B along the dual carriageway at an average speed of 50 mph.
    What is the difference in time between the two journeys?
    Give your answer in minutes.

NUMBER PROBLEMS 1
EXAM QUESTIONS

1.
Chris pays €18 for a meal.
The exchange rate is £1 = €1.60

What is the price of the meal in pounds?

2.
In the USA, a leather jacket costs $96.
The exchange rate is $1.60 to £1.

Find the cost of the jacket in £.

3.
In the Czech Republic, Boris pays 922 korunas for a meal.
The exchange rate is 49.1 korunas to £1.

What is the cost of the meal in pounds?

4.
Dave drives 15 miles to work.
The journey takes 20 minutes.

What is Dave's average speed in miles per hour?

5.
While in the USA, John pays $30 for a pair of trainers.
The exchange rate is $1.50 to £1.

Calculate the cost of the pair of trainers in £.

6.
Apples are sold in a farm shop at £1.76 per kilogram.

Calculate the price of 1 pound of apples.

Use the conversion   1 kilogram = 2.2 pounds

7.
In Portugal, Brian spends €2.80 on ice cream.
This price includes VAT which is 12% in Portugal.

Find the amount of VAT which Brian paid.

NUMBER PROBLEMS 2
EXAM QUESTIONS

1. Yasmin worked for $4\frac{1}{2}$ hours each day.
   In one week she worked 6 days and was paid £10 per hour.

   How much did Yasmin earn in that week?

2. Tom works from 1.45 pm to 5.30 pm every weekday.

   (a) How long does Tom work each day?

   (b) On Saturday Tom works $6\frac{1}{2}$ hours.
   He is paid £5.40 per hour.

   How much is Tom paid for Saturday's work?

3. In the summer, Nisha sells ice creams on the beach.
   She is paid £3 per hour and 5p for every ice cream which she sells.
   On one day, Nisha works 4 hours and sells 200 ice creams.

   How much is she paid for that day?

4. (a) Jake earns £4 an hour for a basic 35 hour week.
   He earns £6 an hour for overtime.
   One week he works the basic 35 hour week and 2 hours overtime.

   How much does he earn altogether?

   (b) One morning, Jake works from 0815 to 1210.

   How long does he work?
   Give your answer in hours and minutes.

5. Sara is paid £5.10 per hour.
   Each day she works $7\frac{1}{2}$ hours.
   Each week she works 5 days.

   How much does she earn each week?

NUMBER PROBLEMS 3
EXAM QUESTIONS

1. Rick buys a drink costing £1.35 and some packets of sweets costing 65 pence for each packet.
    The total cost is £3.95

    How many packets of sweets does Rick buy?

2. Nicole buys 2.3 kg of apples and 1.8 kg of plums.
    She pays £7.18 in total.
    The plums cost £2.20 per kg.

    What is the cost of 1 kg of apples?
    Show your working.

3. A trader pays £14.80 for 20 melons.

    How much does he pay for one melon?

4.

    > First class railway coaches have 28 seats.
    >
    > Standard class railway coaches have 48 seats.

    (a) A train has 3 first class coaches and 12 standard class coaches.

         How many seats are there on the train altogether?

    (b) Another train has 620 seats.
         This train has 10 standard class coaches.

         How many first class coaches does it have?

5. Mike took 400 books to sell at a Saturday market.
    By 3 pm, he had sold 310 books at 80 pence each.

    Mike then reduced the selling price of the remaining books to 50 pence each.
    He was left with 24 unsold books which he gave away.

    Find the total amount Mike received from selling the books.

Homework 21F

FRACTION – DECIMAL MATCH

Pair up the fractions and decimals from the grid.

0.1	$\dfrac{1}{2}$	0.25	0.67	$\dfrac{2}{5}$
0.2	$\dfrac{3}{10}$	0.3	$\dfrac{1}{3}$	0.75
$\dfrac{2}{3}$	$\dfrac{7}{10}$	$\dfrac{1}{5}$	0.4	$\dfrac{3}{4}$
0.33	$\dfrac{1}{4}$	0.5	$\dfrac{1}{10}$	0.7

CONVERTING DECIMALS

Change each decimal to a fraction and write it in its' simplest form

1.   0.3   2.   0.8   3.   0.12   4.   0.15   5.   0.9

6.   0.35   7.   0.24   8.   0.04   9.   0.124   10.   0.125

CONVERTING FRACTIONS

1. Use a calculator to change each fraction to a decimal. Write down the full calculator display.

a) $\dfrac{3}{8}$ b) $\dfrac{5}{12}$ c) $\dfrac{4}{25}$ d) $\dfrac{7}{9}$ e) $\dfrac{3}{20}$ f) $\dfrac{9}{16}$ g) $\dfrac{17}{40}$

EXAM QUESTIONS

1. (a) Write 0.25 as a fraction.

    (b) Write three-fifths as a decimal.

    (c) Write $\dfrac{9}{100}$ as a decimal.

2. (a) Write $1\frac{1}{8}$ as a decimal.

    (b) Place the following numbers in order of size, starting with the smallest.

$$1\tfrac{1}{8} \qquad 1.08^2 \qquad 1.09 \qquad 1.112 \qquad 1.18$$

EQUIVALENT FRACTIONS
1. Write down five fractions that are equivalent to:

a) $\frac{1}{4}$ b) $\frac{1}{8}$ c) $\frac{3}{8}$ d) $\frac{3}{4}$

2. Fill in the missing numbers:

a) $\frac{1}{2} = \frac{}{10}$ b) $\frac{1}{3} = \frac{5}{}$ c) $\frac{2}{3} = \frac{10}{}$ d) $\frac{2}{7} = \frac{}{21}$

e) $\frac{2}{5} = \frac{}{20}$ f) $\frac{10}{30} = \frac{1}{}$ g) $\frac{15}{20} = \frac{3}{}$ h) $\frac{12}{24} = \frac{1}{}$

SIMPLIFYING FRACTIONS
Write each fraction in its' simplest form.

1. $\frac{3}{9}$ 2. $\frac{8}{40}$ 3. $\frac{9}{12}$ 4. $\frac{12}{18}$ 5. $\frac{15}{35}$

ORDERING FRACTIONS

1. Copy the questions and circle the fraction that is the largest?

a) $\frac{1}{3}$ or $\frac{1}{4}$ b) $\frac{1}{3}$ or $\frac{1}{6}$ c) $\frac{1}{3}$ or $\frac{2}{7}$

d) $\frac{1}{2}$ or $\frac{1}{3}$ e) $\frac{5}{8}$ or $\frac{3}{4}$ f) $\frac{6}{7}$ or $\frac{7}{9}$

g) $\frac{1}{2}$ or $\frac{1}{5}$ h) $\frac{2}{7}$ or $\frac{3}{8}$ i) $\frac{4}{6}$ or $\frac{2}{5}$

2. Write each list in order from smallest to biggest.

a) $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{10}$, $\frac{1}{5}$ e) $\frac{1}{8}$, $\frac{1}{5}$, $\frac{1}{2}$, $\frac{1}{10}$

b) $\frac{1}{3}$, $\frac{1}{2}$, $\frac{1}{8}$, $\frac{1}{4}$ f) $\frac{3}{8}$, $\frac{1}{5}$, $\frac{2}{4}$, $\frac{9}{10}$

d) $\frac{1}{2}$, $\frac{1}{10}$, $\frac{1}{3}$, $\frac{1}{5}$ h) $\frac{2}{7}$, $\frac{1}{5}$, $\frac{2}{3}$, $\frac{2}{9}$

f) $\frac{3}{8}$, $\frac{1}{5}$, $\frac{2}{4}$, $\frac{9}{10}$ j) $\frac{2}{7}$, $\frac{1}{4}$, $\frac{3}{9}$, $\frac{3}{8}$, $\frac{2}{5}$

EXAM QUESTION

1.   What fraction of this shape is shaded?
       Give your answer in its simplest form.
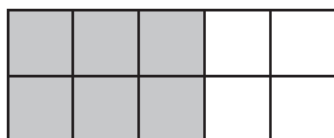
2.   Which **two** of these fractions are equivalent to $\frac{1}{4}$?

       $\frac{2}{8}$ $\frac{5}{16}$ $\frac{6}{24}$ $\frac{11}{40}$

Homework 23F

FRACTIONS OF AMOUNTS

Work out all these fractions of 60

| **1/2** | **1/3** | **1/4** | **2/4** | **1/6** |

| **1/12** | **3/12** | **6/12** | **2/6** |

60

| **2/12** | **4/12** | **4/10** | **3/6** |

| **1/10** | **2/10** | **5/10** | **1/5** | **2/5** |
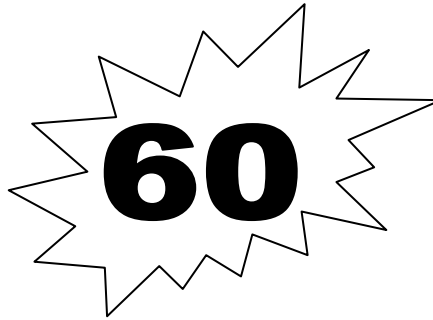
EXAM QUESTIONS

1. Tom works 12 hours each week.
   He earns £4 per hour.
   Tom saves $\frac{1}{3}$ of his earnings each week.
   How many weeks does it take Tom to save £80?
   You **must** show all your working.

2. Find $\frac{7}{10}$ of £50

3. $\frac{3}{4}$ of 200

4. Beth picks 400 roses and takes them to a local market.

   Beth sells $\frac{4}{5}$ of the roses.

   How many roses does Beth sell?

5. There are 800 pupils at a school.

   Of these 800 pupils, $\frac{1}{10}$ are under 12, and $\frac{1}{5}$ are over 16.

   (a) How many pupils are **not** under 12 **and** are **not** over 16?

<u>ADDING AND SUBTRACTING FRACTIONS</u>

1. Fill in the boxes by adding the fractions.

+	$\dfrac{1}{3}$	$\dfrac{2}{5}$	$\dfrac{3}{8}$	$\dfrac{2}{7}$
$\dfrac{1}{2}$				
$\dfrac{2}{3}$				

2. Work out each question <u>without</u> a calculator. Show your working and write your answer in its' simplest form.

a) $\dfrac{1}{4}+\dfrac{3}{5}$ b) $\dfrac{3}{5}-\dfrac{1}{3}$ c) $\dfrac{1}{9}+\dfrac{1}{10}$ d) $\dfrac{3}{4}-\dfrac{1}{6}$

3. Work out each question <u>with</u> a calculator.

a) $\dfrac{3}{4}+\dfrac{3}{15}$ b) $\dfrac{7}{10}-\dfrac{2}{3}$ c) $\dfrac{7}{9}+\dfrac{7}{10}$ d) $\dfrac{13}{15}-\dfrac{9}{20}$

<u>EXAM QUESTIONS</u>

1. Heather is revising fractions for her homework.
   This is how she answers one of the questions.

   $$\frac{1}{2} + \frac{1}{3} = \frac{2}{5}$$

   Heather is wrong.
   Show the correct way to work out $\frac{1}{2} + \frac{1}{3}$

2. Work out $\frac{1}{2} + \frac{1}{5}$

3. Tom has £2 200.
   He gives $\frac{1}{4}$ to his son and $\frac{2}{5}$ to his daughter.
   How much does Tom keep for himself?
   You **must** show all your working.

4. Work out $\frac{3}{5} - \frac{1}{3}$

5. Calculate $\frac{5}{8} - \frac{1}{4}$

6. $\frac{3}{4} - \frac{1}{5}$

7. Work out the value of $\frac{2}{5} + \frac{1}{4}$

Homework 25F

MULTIPLYING FRACTIONS

Fill in the boxes by multiplying the fractions.

✗	$\dfrac{1}{3}$	$\dfrac{2}{5}$	$\dfrac{3}{8}$	$\dfrac{2}{7}$
$\dfrac{1}{2}$				
$\dfrac{2}{3}$				

MIXED NUMBERS

1. $1\dfrac{1}{2}+2\dfrac{3}{5}$

2. $3\dfrac{2}{5}-1\dfrac{1}{2}$

3. $2\dfrac{2}{3}\times3\dfrac{1}{4}$

DIVIDING WITH FRACTIONS

1. $\dfrac{1}{2}\div\dfrac{1}{4}$

2. $\dfrac{2}{5}\div\dfrac{1}{10}$

3. $\dfrac{3}{4}\div\dfrac{3}{8}$

4. $\dfrac{3}{10}\div\dfrac{1}{5}$

5. $\dfrac{7}{9}\div\dfrac{3}{4}$

EXAM QUESTIONS

1. Linda uses $\frac{3}{5}$ of a tin of paint to paint a fence panel.

   What is the **least** number of tins she needs to paint 8 fence panels?

2. On Monday Joe drinks $2\frac{1}{3}$ pints of milk.
   On Tuesday he drinks $1\frac{3}{4}$ pints of milk.
   Work out the total amount of milk that Joe drinks on Monday and Tuesday.

3. $\frac{2}{5}\times\frac{1}{4}$, $\frac{1}{3}\times\frac{4}{5}$

4. Work out $\frac{3}{7}\times28$

5. Work out $\frac{3}{5}\div6$

6. Fill in the boxes to make these statements correct.

   (i) $\frac{1}{5}\times\boxed{}=1$

   (ii) $\frac{3}{4}\times\dfrac{\boxed{}}{\boxed{}}=1$

7. Work out $4\frac{1}{3}-1\frac{2}{5}$ Work out $2\frac{4}{5}+3\frac{2}{3}$

POWERS AND ROOTS 'COLLECT A LETTER'

START	1000	8	32	49	64
P	O	U	E	T	A
2^3	9^2	5^2	7^3	6^3	2^4

27	121	36	100	1	125
E	D	L	N	H	I
4^3	2^5	5^3	10^3	6^2	0^2

216	16	343	0	25	81
I	C	R	S	T	R
10^2	1^5	END	7^2	3^3	11^2

1) $\sqrt{25}$ 3^2 $\sqrt{36}$ 2^3 $\sqrt{100}$

2) $\sqrt{100}$ 4^2 2^2 $\sqrt{81}$ $\sqrt{121}$

3) 5^2 $4^2 + 2^2$ $\sqrt{144}$ $\sqrt{25} + \sqrt{36}$ $1^3 + 3^3$

4) $\sqrt{36} - \sqrt{4}$ $4^2 - 2^2$ $1^3 + 2^3$ $\sqrt{100} - 3^2$ $1^3 + 1^2$

EXAM QUESTIONS

1.   Write down the values of

    (a) 4^2

    (b) $\sqrt{81}$

2.   Work out the value of 10^5

3.

    (a)   Work out 3.7^2

    (b)   Work out the cube of 4

    (c)   Work out $3 \div 0.7^2$

       (i)   Write down the full calculator display.

       (ii)   Give your answer to the nearest whole number.

4.   (a)   Calculate $2.7^2 + \sqrt{3.5}$

    (b)   Calculate the cube of 4.2

INDEX LAWS

1. Write each of these as simply as possible using indices.

a) 2x2x2x2x2

b) y x y x y x y x y

c) 9x9x9

d) 8x8x8x8x8x8x8

2. Write down the value of the missing index.

a) $2^2 \times 2^3 = 2^x$

b) $3^8 \times 3^x = 2^{12}$

c) $5^2 \times 5^x = 5^9$

d) $2^x \times 2^3 = 2^7$

e) $(2^2)^4 = 2^x$

f) $(2^6)^x = 2^{18}$

g) $\dfrac{3^9}{3^2} = 3^x$

h) $\dfrac{4^8}{4^x} = 4^5$

3. State whether each equation is TRUE or FALSE.

a) $7^2 \times 7^6 = 7^8$

b) $\dfrac{8^3}{8} = 8^2$

c) $(5^4)^2 = 5^6$

EXAM QUESTIONS

1.   Simplify

   (a) $c \times c \times c \times c$

   (b) $d^3 \times d^2$

2.   Simplify

   (a) $w^6 \times w^2$

   (b) $x^3 \div x^5$

3.   Simplify

   (b) $d^3 \times d^2$

4.   Simplify

$$x^5 \times x^{-2}$$

MULTIPLYING AND DIVIDING BY POWERS OF 10

1	891.8	x	10	21	73.66	÷	10
2	59.15	x	100	22	70.07	÷	10
3	63.51	x	100	23	47.5	÷	100
4	3.107	x	100	24	261.6	÷	10
5	0.7303	x	10	25	0.1987	÷	10
6	0.7146	x	1000	26	1.914	÷	10
7	5.638	x	1000	27	0.8249	÷	10
8	539.7	x	100	28	552.5	÷	100
9	757.8	x	100	29	105.6	÷	10
10	2.023	x	100	30	695	÷	100
11	970.9	x	0.1	31	756	÷	10
12	942.3	x	0.1	32	54.6	÷	100
13	181.8	x	0.01	33	398	÷	10
14	0.7792	x	0.1	34	9364	÷	1000
15	0.7353	x	0.01	35	391	÷	10
16	558.6	x	0.1	36	34010	÷	1000
17	51.95	x	0.01	37	627100	÷	1000
18	0.9222	x	0.1	38	626000	÷	1000
19	359.6	x	0.1	39	77400	÷	1000
20	849.7	x	0.1	40	86.19	÷	1000

EXAM QUESTIONS

1. $0.3 \times 100 + 2.4 \times 10$

2. Magazines are stored in piles of 100.
   Each magazine is 0.4 cm thick.
   Calculate the height of one pile of magazines.

3. Jane says,

   "To multiply a number by 10, put a zero on the end."

   She uses her rule to write these examples.

   A $53 \times 10 = 530$

   B $0.53 \times 10 = 0.530$

   C $530 \times 10 = 5300$

   D $5.3 \times 10 = 5.30$

   (a) State which of Jane's examples are incorrect.

   (b) Choose one of Jane's incorrect examples.

   Write the example in the box below with the correct answer.

   .... $\times 10 =$ ....

Homework 29F

FRACTIONS, DECIMALS AND PERCENTAGES

1. Copy and complete the table.

Fraction	Percentage	Decimal
$\dfrac{4}{10}$		
	10%	
$\dfrac{2}{5}$		
		0.80
	25%	
$\dfrac{3}{20}$		
	20%	
		0.10
	5%	
$\dfrac{1}{4}$		
		0.05

2. Change each fraction to a percentage:

a) $\dfrac{1}{2}$ b) $\dfrac{7}{10}$ c) $\dfrac{9}{20}$ d) $\dfrac{3}{4}$

3. Change each decimal to a fraction:
a) 0.4   b) 0.9   c) 0.35   d) 0.65

4. Change each percentage to a fraction:
a) 60%   b) 15%   c) 12%   d) 32%

EXAM QUESTIONS

1. Complete the table below.

Fraction	Decimal	Percentage
$\frac{1}{2}$	0.5	
	0.7	70%
$\frac{3}{100}$		3%

2. This diagram is made from equilateral triangles.
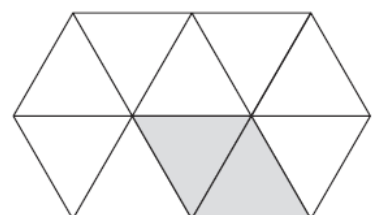
(i) What percentage of the diagram is shaded?

Homework 30F

PERCENTAGES OF AMOUNTS

	300	220	140	260	360	500	800	90	130
5%									
10%									
15%									
20%									
25%									
30%									
40%									
45%									
50%									
60%									
70%									
90%									

WHAT PERCENTAGE?

1. What percentage of 50 is 5?
2. What percentage of 20 is 8?
3. What percentage of 90 is 27?
4. What percentage of 70 is 35?
5. What percentage of 80 is 48?
6. What percentage of 60 is 42?

EXAM QUESTIONS

1. Kath knows a quick way to work out 15% of any amount of money.

   To work out 15% of £160

   10% of £160 = £16
   So 5% of £160 = £8
   So 15% of £160 = £24

   Use Kath's method to work out 15% of £420.

2.

60% of £40	$\frac{2}{5}$ of £55

   Which is the larger amount?
   You **must** show your working.

3. Find 30% of 200 metres.

4. 10% of £6.50

Homework 31F

PERCENTAGE INCREASE AND DECREASE

1. Increase £90 by 10%

2. Increase £110 by 50%

3. Increase £120 by 5%

4. Decrease £40 by 20%

5. Decrease £700 by 30%

6. Decrease £320 by 5%

7. Increase £620 by 25%

8. Decrease £180 by 60%

EXAM QUESTIONS

1. Miss Evans earns £240 per week.
She is awarded a pay rise of 3.5%.
How much does she earn each week after the pay rise?

2. Mr and Mrs Smith are buying a washing machine.

SALE
15% OFF
Washing Machine
Was £380
Save £

How much do they pay for the washing machine?

3. During 2003 the number of people out of work in Barnsley fell by 8%.
At the end of the year there were 2576 people out of work in Barnsley.
How many people were out of work at the beginning of the year?

4. John also buys an ink cartridge which costs $25.
He has to pay a tax of 6% which is added onto this cost.

Calculate the total cost of the ink cartridge in $.

EXAM QUESTIONS

1. Four melons cost £4.28

   How much will five melons cost?

2. Bob and Mary win £250 on the Premium Bonds.
   They share the money in the ratio 1 : 4

   (a) How much money does each person receive?

   (b) What percentage of the £250 does Mary receive?

3. The table shows the amounts needed to make 36 mince pies.

Ingredient	Amount for 36 pies	Amount for 48 pies
Plain Flour	330g	
Lard	75g	
Butter	75g	
Mincemeat	720g	

   Calculate the amounts needed to make 48 mince pies.
   Put your answers in the table.

4. The town of Axon has 35 600 houses.
   The ratio of detached houses to other types of houses is 1 : 4
   How many detached houses are there?

5. A short necklace has 32 gold beads and 8 black beads.
   A long necklace has a total of 60 beads.
   Both necklaces have the same ratio of gold beads to black beads.

   How many black beads are on the long necklace?

6. Liz has 40 postage stamps.
   The ratio of the number of first class stamps to the number of second class stamps
   is 1 : 4.

   How many second class stamps does Liz have?

7. Andy scores 12 goals in 10 football matches.
   Ben scores 21 goals in 15 football matches.

   Which player scores the greater number of goals per match?
   You **must** show your working.

EXAM QUESTIONS

1. Simplify the following

    (a) $3x + 2x - x$

    (b) $5x + 3y - 2x + 4y$

    (c) $3 \times a \times 4$

2. Simplify $2x + 3y + 5x - 2y - 4x$

3. Factorise $4c + 12$

4. Expand and simplify

    $$5(2a - c) + 4(3a + 2c)$$

5. Expand and simplify $4(2x - 1) + 3(x + 6)$

6. (a) Factorise $2x + 6$
    (b) Expand $3(4y + 1)$

7. Natalie writes $-5(a + 2) = -5a - 3$

    Explain why Natalie is wrong.

8. Factorise fully $2x^2 - 50y^2$

9. Factorise completely $2a^2 - a$

10. Multiply out $s(s^2 + 6)$

11. Multiply out and simplify

    $4(x - 2) + 3(x + 2)$

EXAM QUESTION

Complete this table of values for $y = (2 + x)(3 - x)$

x	-2	-1	0	1	2	3	4
y		4	6	6	4	0	

On the grid, draw the graph of $y = (2 + x)(3 - x)$ for values of x from -2 to $+4$.

Homework 1F
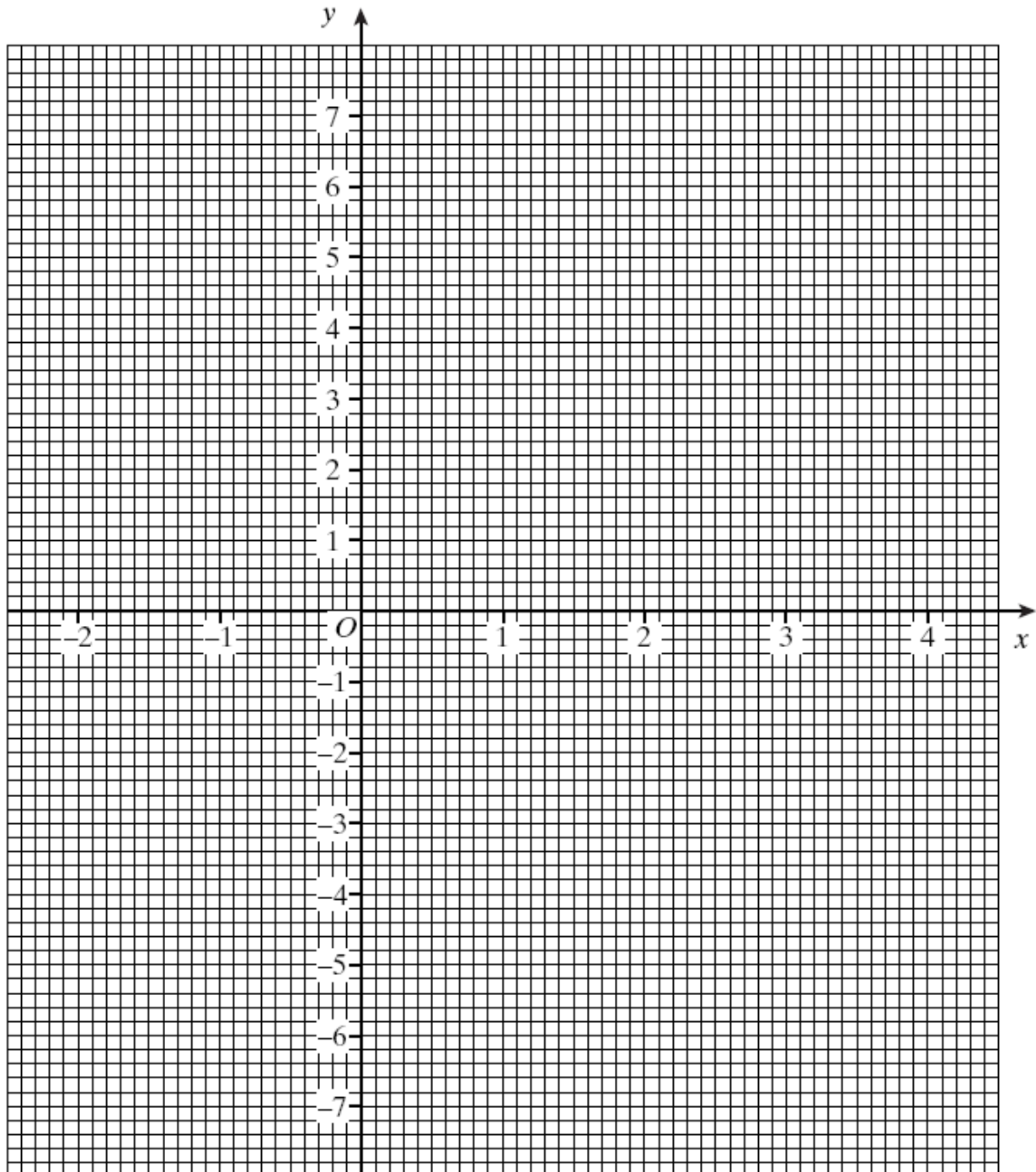
Exam questions

1. The number of cars parked in an office car park is recorded in the tally chart below.

Day	Number of cars Tally	Frequency
Monday	ЖГ ЖГ II	12
Tuesday	ЖГ III	
Wednesday	ЖГ I	
Thursday	ЖГ ЖГ ЖГ I	
Friday	ЖГ ЖГ	

(a) Complete the frequency column.   *(1 mark)*

(b) Calculate the total number of cars parked during these five days.

2. Michelle wants to find out if students buy lunch in the college restaurant, bring a packed lunch or go out of college for lunch.

(a) (i)   Design an observation sheet for Michelle to record the data.

(ii)   Complete your observation sheet by inventing data for 20 students.

(b) Michelle decides to stand outside the college restaurant at 12 noon to collect her data.

Give a reason why this is **not** a suitable place to carry out this survey.

3. A questionnaire contained the following question.

> Don't you agree that spending time using a computer is better for a child's education than spending time watching TV?

Give **one** reason why this question is not suitable for the questionnaire.

4. The distances, to the nearest mile, that 20 people travel to work are recorded below.

5	2	4	14	19	6	21	28	3	14
44	12	18	4	7	32	16	8	13	9

(a) Complete the tally and frequency columns in the chart below.

Distance (miles)	Tally	Frequency
1 - 10		
11 - 20		
21 - 30		
31 - 40		
41 - 50		

(2 marks)

(b) How many people travel between 11 and 20 miles to work?

Homework 2F

BAR CHARTS
Exam questions

1. The dual bar chart shows the maximum temperatures in England and in Spain over four months.
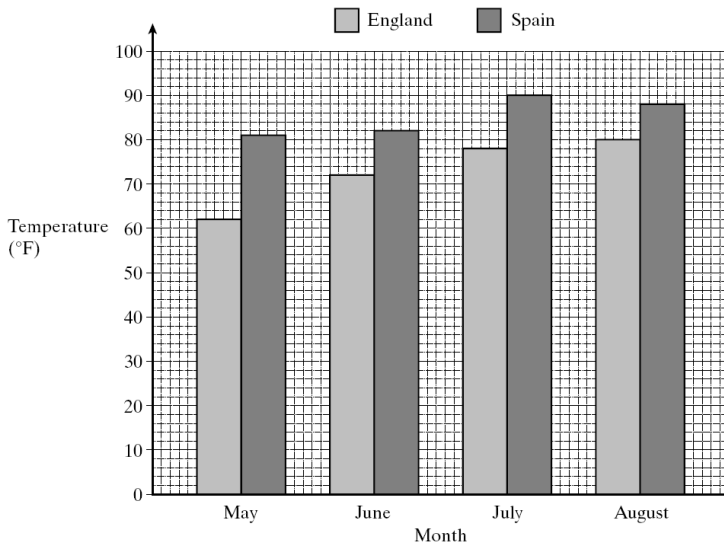
(a) What was the maximum temperature in England in June?

(b) Which of these months had the highest temperature in Spain?

(c) What was the difference in the maximum temperature between England and Spain in August?

(d) Which of these months shows the largest difference in the maximum temperature between England and Spain?

2. The bar chart shows the numbers of boys and girls who went to the cinema each day last week.
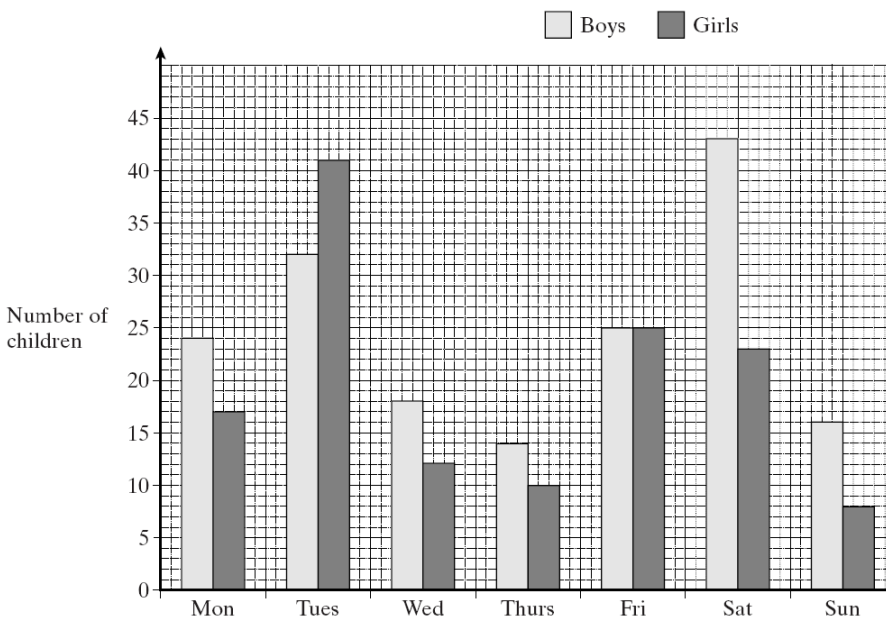
(a) How many boys went to the cinema on Monday?

(b) On which day did most girls go to the cinema?

(c) On which day was the number of boys equal to the number of girls?

(d) How many more boys than girls went to the cinema on Wednesday?

(e) Kirk says, "On Sunday twice as many boys as girls went to the cinema."
Is he correct?
Explain your answer.
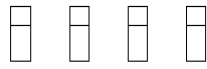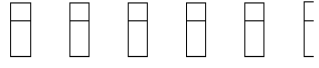
Exam questions

1. The table shows the number of cars parked in three hospital car parks at 2 pm on one afternoon.

Car park	Number of cars
Staff (S)	40
Visitors (V)	70
Casualty (C)	65

(a) Draw a bar chart to show this information.

(b) Work out how many more cars were parked in the Visitors car park than in the Staff car park.

2. The pictogram shows the number of mobile phones owned by the students in some tutor groups at a college.

Key ▯ = 2 mobile phones

Tutor group		Frequency
A	▯ ▯ ▯ ▯	
B	▯ ▯ ▯ ▯ ▯	
C	▯ ▯ ▯ ▯ ▯ ▮	
D		7

(a) Complete the frequency column.   *(2 marks)*

(b) Complete the pictogram for tutor group D.   *(2 marks)*

(c) How many mobile phones were owned altogether?

3. The bar chart shows the total number of mobile phones owned by the male and the female staff at the college.
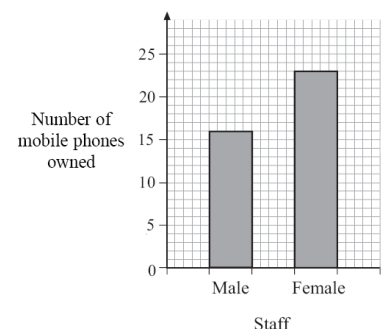
How many more mobile phones are owned by the female staff than the male staff?

DRAWING PIE CHARTS
Exam questions

1. There are 240 houses on a housing estate.
   The table shows the total number of each type of house.

Type of house	Frequency
Semi-detached	30
3 bedroom detached	60
4 bedroom detached	68
Terraced	82

   Draw and label a pie chart to represent the information in the table.

2. The table shows the type of heating used in 80 houses.

Type of heating	Number of houses
Gas	36
Electricity	30
Oil	10
Coal	4

   Draw and label a pie chart to represent this information.

3. The number of water birds on a nature reserve lake is summarised in the table.

Water birds	Frequency
Herons	4
Geese	6
Swans	10
Ducks	25

   Draw and label a pie chart to represent the data in the table.

4. There are 240 houses on a housing estate.
   The table shows the total number of each type of house.

Type of house	Frequency
Semi-detached	30
3 bedroom detached	60
4 bedroom detached	68
Terraced	82

   Draw and label a pie chart to represent the information in the table.

Homework 5F

INTERPRETING PIE CHARTS
Exam questions

1. This pie chart shows the destinations of 180 boys after leaving school.

Boys
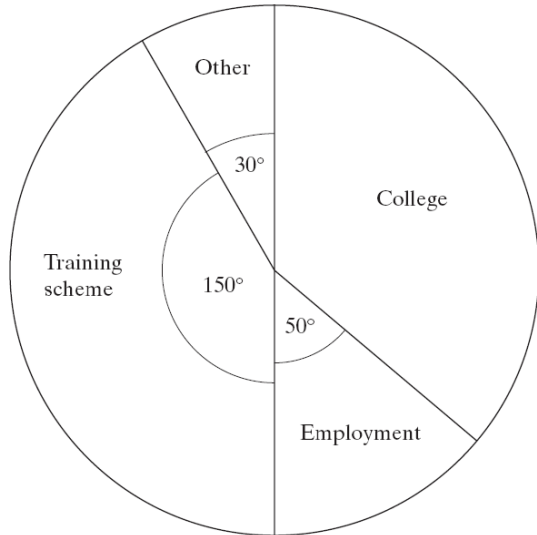
How many boys went to college?

2. Louise asks the children in her year group what type of house they live in
   The results are shown in the pie chart.
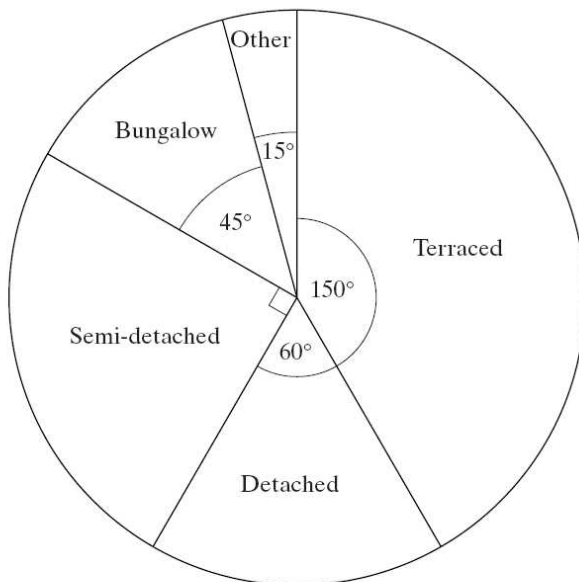
(a) There are 12 children who live in detached houses.

   How many children live in semi-detached houses?

(b) Calculate how many children Louise asked.

STEM AND LEAF DIAGRAMS
Exam questions

1. The stem and leaf diagram shows the number of miles travelled by a salesman each day for 14 days.

Key   5 | 2 represents 52 miles

```
1 | 2 3
2 | 3 6
3 | 5 7 7 8
4 | 1 3 4 8
5 | 2 5
```
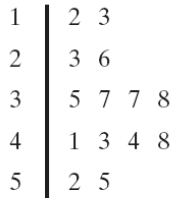
On how many days did the salesman travel between 25 and 50 miles?

2. The number of cars passing through a set of traffic lights each time they are on green is recorded.

12   15   23   20   18   16   27   9   10

19   22   26   14   11   8   4   12   23

(a) Complete the stem and leaf diagram, including the key, to represent the data.

Key | ...... | ...... represents ....

```
0 | .........................................................................
1 | .........................................................................
2 | .........................................................................
```

3. A number of people were asked how many driving lessons they had taken.

The results are shown in the stem and leaf diagram.

Key: | 4 | 1   represents 41 lessons

```
0 | 8
1 | 2  4  4  7  8
2 | 0  1  2  4  4  5  9
3 | 2  5  8
4 | 1
```

(a) How many people were asked?

(b) What was the median number of driving lessons?

(c) Work out the range of the number of driving lessons.

FREQUENCY DIAGRAMS Exam questions

1. A manager recorded how long each customer spent in his shop.
    The table shows his results.

Time, t (minutes)	Frequency
$0 < t \leqslant 10$	4
$10 < t \leqslant 20$	22
$20 < t \leqslant 30$	18
$30 < t \leqslant 40$	12

    (a)   Draw a frequency diagram to represent this data.

2. ear 9 girls in a school were asked how long they spent using a computer one day.
    ɪne results are shown in the table.

Time, h (hours)	Number of girls
$0 \leqslant h < 1$	30
$1 \leqslant h < 2$	46
$2 \leqslant h < 3$	14
$3 \leqslant h < 4$	5

    (a)   Draw a frequency polygon for this data.

    (b)   The frequency polygon below shows the number of hours spent using a computer by
    the Year 9 boys on the same day.

Boys

Time, h (hours)

quency
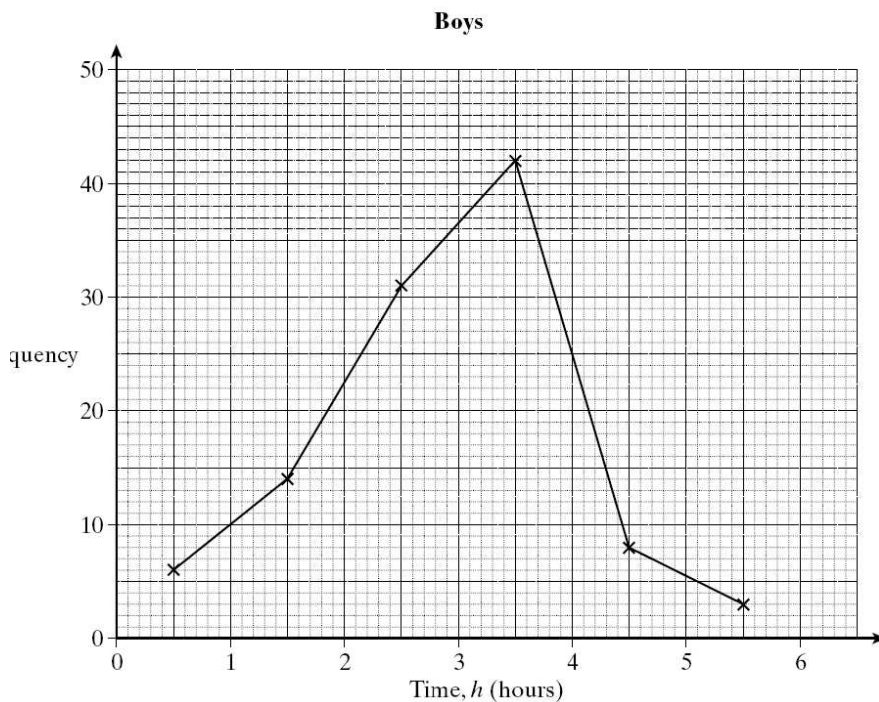
Write down **two** comparisons between the time spent using a computer by the boys
and the girls.

THE MEAN AND RANGE
Exam questions

1.   The number of aircraft landing at an airport each hour is shown below.

         2   3   8   5   6   10   4   9   4   11   4

     a) Work out the range of these numbers.

     b) Calculate the mean of these numbers.

2.   The table shows some information about the cars for sale at a garage.

Make	Colour	Price (£)	Mileage
Rover	Silver	7000	21 000
Ford	Black	2 999	63 000
Honda	Green	1 500	124 000
Ford	Black	950	89 000
BMW	White	11 000	25 000
Vauxhall	Red	2 750	55 000
Citroen	Black	895	94 000

     Calculate the mean and range for the mileage of the seven cars

3.   Emma is carrying out a survey on pets.
     She asks ten of her friends how many pets they have.
     The replies are

         2   1   4   1   3   0   1   2   0   3

     Calculate the mean and range of these numbers.

4.   The list shows how many minutes each of ten patients spent with their doctor.

         10   12   3   5   12   14   10   7   3   4

     (a) Work out the range of these numbers.

     (b) Calculate the mean of these numbers.

5.   Gill asks each of her friends to record how many text messages they receive one day.
     Here are the results.

         1   2   1   0   4   36   3   0   2   1

     (a) Work out the range of these numbers.

     (b) Calculate the mean of these numbers.

THE MODE
Exam questions

1. The number of aircraft landing at an airport each hour is shown below.

    2   3   8   5   6   10   4   9   4   11   4

 Write down the mode of these numbers.

2. The table shows some information about the cars for sale at a garage.

Make	Colour	Price (£)	Mileage
Rover	Silver	7000	21 000
Ford	Black	2999	63 000
Honda	Green	1 500	124 000
Ford	Black	950	89 000
BMW	White	11 000	25 000
Vauxhall	Red	2 750	55 000
Citroen	Black	895	94 000

 (i) Which colour of car is the mode?

3. Dave and Todd go fishing one day.
 The table shows the total number of each type of fish they caught.

Type of fish	Total number caught
Perch	6
Roach	8
Eels	5

 Which type of fish is the mode?

4. Gill asks each of her friends to record how many text messages they receive one day.
 Here are the results.

    1   2   1   0   4   36   3   0   2   1

 Write down the mode.

5. Chloe records the number of goals scored by her favourite football team in each of 40 matches.

Number of goals	Frequency
0	7
1	15
2	13
3	2
4	2
5	1

 Write down the mode of the number of goals scored.

THE MEDIAN
Exam questions

1. The number of aircraft landing at an airport each hour is shown below.

    2   3   8   5   6   10   4   9   4   11   4

    Find the median of these numbers.

2. Gill asks each of her friends to record how many text messages they receive one day. Here are the results.

    1   2   1   0   4   36   3   0   2   1

    Find the median of these numbers.

3. Sophie counts the number of letters in each word of the first sentence of a newspaper.

    These are her results.

    9   2   3   6   5   7   6   3   7   9   8   4   8   7
    Find the median of these numbers.

4. Eleven pupils took part in a sponsored basketball match.
    The amount collected, in pounds, by each pupil is shown below.

    5   1   6   8   8   8   4   2   3   7   5
    Find the median of these numbers.

5. The list shows the number of cartons of popcorn sold at a local cinema each hour one Saturday.

    5   7   3   7   9   3   2   7   4   8
    Find the median of these numbers.

6. The Year 11 team played nine matches.
    The number of goals scored in each match is shown below.

    8   4   8   3   9   1   8   3   7

    Work out the median number of goals scored.

AVERAGES FROM TABLES

Exam questions

1. Chloe records the number of goals scored by her favourite football team in each of 40 matches.

Number of goals	Frequency
0	7
1	15
2	13
3	2
4	2
5	1

   Calculate the mean number of goals scored per match.

2. A telephone company collected data about the number of telephones in each of 60 households.
   The table shows the results.

Number of telephones	Number of households
0	2
1	15
2	12
3	10
4	8
5	7
6	5
7	0
8	1

   (a) Calculate the total number of telephones in these 60 households.

   (b) Calculate the mean number of telephones per household.

3. The table shows the times taken by a group of ramblers to complete a five mile walk.

Time, t (minutes)	Number of ramblers
$100 \leqslant t < 110$	6
$110 \leqslant t < 130$	7
$130 \leqslant t < 150$	8
$150 \leqslant t < 200$	4

   Calculate an estimate of the mean time taken by these ramblers to complete the walk.

SCATTER DIAGRAMS AND CORRELATION

Exam questions

1.   Six pupils revise for a test.
      The table shows the time each pupil spent revising and their mark in the test.

Time (hours)	2	3	5	7	8	10
Mark	30	26	34	38	45	48

   (a)   Plot the data as a scatter graph

   (b)   Draw a line of best fit on the scatter graph.   (1 mark)

   (c)   Use your line of best fit to estimate the mark of a pupil who revised for 4 hours.

2.   The table shows the school year and the reaction time of eight people who took part in the
      same test.

School year	5	7	8	9	10	11	11	13
Reaction time (seconds)	6	5	4.8	4.5	4	4.2	3.5	3

   (a)   Draw a scatter graph of these data.
   (b)   Draw a line of best fit on your scatter graph.
   (c)   Describe the relationship shown by your scatter graph.

3.   The time, in minutes, that seven teenagers spent using their computer and spent watching
      TV on one day is recorded in the table.

Time spent using computer (minutes)	10	20	30	40	45	55	60
Time spent watching TV (minutes)	50	40	45	40	30	30	20

   (a)   Plot these data as a scatter graph

   (b)   Draw a line of best fit on your scatter graph.

   (c)   Describe the relationship shown in the scatter graph.

PROBABILITY SCALES
Exam questions

1.   A fair six-sided dice is thrown once.

      The probabilities of the following events have been marked on the probability scale below.

      A: An even number is thrown.

      B: A '7' is thrown.

      C: A number less than 5 is thrown.

      0   1
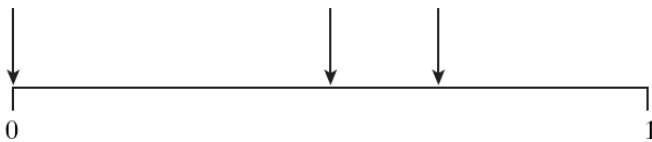
      Copy the scale and label each arrow with the letter to show which event it represents.

2.   A fair coloured spinner has six equal sections.
      One section is red, two sections are yellow and three sections are blue.

      The arrow is spun.

      (a)   Which is the least likely colour that the arrow will land on?
      (b)   What is the probability that the arrow lands on yellow?
      (c)   Label the probability scale to show the probability of the arrow landing o

         (i)   Blue

         (ii) Red.

      0   1
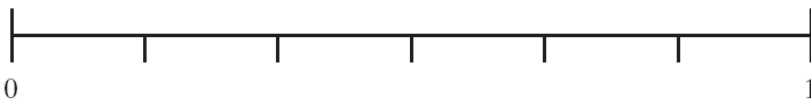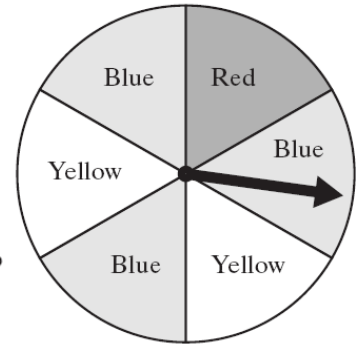
3.   A standard fair dice numbered 1 to 6 is thrown once.
      The probability of one of the following events is marked with an arrow on the scale below.

      A   The dice lands showing an odd number.
      B   The dice lands showing a number greater than two.
      C   The dice lands showing the number five.

      0   1
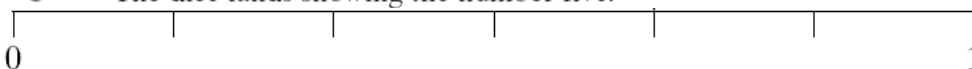
      Copy, mark and label the scale to show the probabilities of these events.

PROBABILITY – LISTING OUTCOMES
Exam questions

1. Ashraf is playing a game with a fair coin and a fair triangular spinner with sections numbered 2, 3 and 4.

    He flips the coin and then spins the spinner.
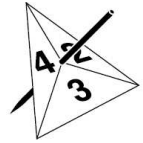
    If the coin shows heads, his score is the number on the spinner **multiplied** by 3
    If the coin shows tails, his score is the number on the spinner.

    (a) Complete the table to show all the possible scores that Ashraf can get.

    <table>
    <tr><td></td><td></td><td colspan="3">Spinner</td></tr>
    <tr><td></td><td></td><td>2</td><td>3</td><td>4</td></tr>
    <tr><td rowspan="2">Coin</td><td>Heads</td><td></td><td></td><td></td></tr>
    <tr><td>Tails</td><td></td><td></td><td></td></tr>
    </table>

    (b) Write down the probability that Ashraf gets a score of

        (i)   9,

        (ii) 6 or less.

2. Imran is playing a game.
    He has a blue bag containing four discs numbered 1, 2, 3 and 4.
    He has a red bag containing four discs numbered 1, 2, 3 and 4.
    He chooses, at random, a disc from each bag.
    He adds the numbers on the two discs chosen to get his score.

    (a) Complete the table to show the possible scores that Imran can get.

    **Number on the disc
    from the red bag**

    <table>
    <tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
    <tr><td>1</td><td></td><td></td><td></td><td></td></tr>
    <tr><td>2</td><td></td><td></td><td></td><td></td></tr>
    <tr><td>3</td><td></td><td></td><td></td><td></td></tr>
    <tr><td>4</td><td></td><td></td><td></td><td></td></tr>
    </table>

    **Number on the disc
    from the blue bag**

    (b) Write down the probability that Imran gets a score of 8.

PROBABILITY
Exam questions

1.   Alan, Bob and Colin play a game of darts.
      There is only one winner.
      The probability that Alan wins the game is 0.3
      The probability that Bob wins the game is 0.5

      (a)   What is the probability that Alan or Bob wins the game?
      (b)   Alan, Bob and Colin play 20 games of darts.

            How many games would you expect Colin to win?

2.   Susan and Jill play a game.

      (a)   Susan has a box containing 3 red, 4 yellow and 2 blue counters.
            She picks a counter at random.

            What is the probability that Susan picks a yellow counter?

      (b)   Jill has a box containing 18 counters of which 8 are yellow.
            She picks a counter at random.

            What is the probability that Jill does **not** pick a yellow counter?

      (c)   Who is more likely to pick a yellow counter?
            Tick the correct box.
            Explain your answer.

            ☐   ☐   ☐
          Susan   Jill   Neither

3.   A biased spinner has sections numbered 1, 2, 3, 4 and 5.
      The table shows the probabilities of the spinner landing on some of the numbers.

Number	1	2	3	4	5
Probability	0.04		0.43	0.23	0.12

      (a)   Calculate the missing probability in the table.

      (b)   Calculate the probability that the spinner lands on a number greater than 2.

4.   A scout group organises a game to raise money.
      200 people each pay £2 to play the game.

      The probability that a person wins is $\frac{1}{10}$.

      The winners each receive £5 and there are no other prizes.

      Calculate how much profit the scout group makes from this game.

Question 1:

a) Measure and write down the size of the angle *p*.

b) Write down what type of angle it is.

p
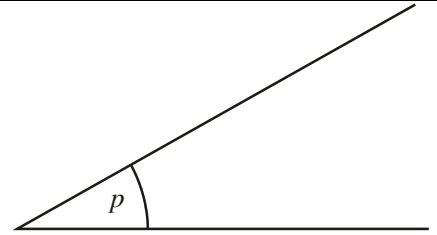
Question 2: Here is a list of words connected with angles.
Acute, Full-Turn, Obtuse, Reflex, Right, Straight

Choose the correct word to describe each of these angles.

a)

b)

c)

d)
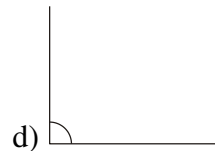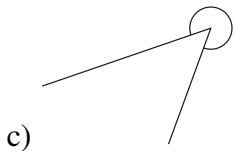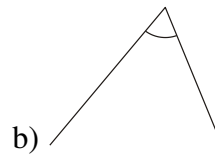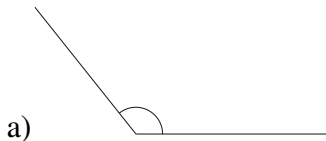
Question 3:

PQ and *RS* are straight lines.

b)

R

Q

Not drawn accurately

125°   *y*

34°

P

S

78°
x
144°
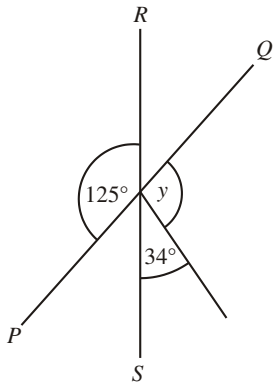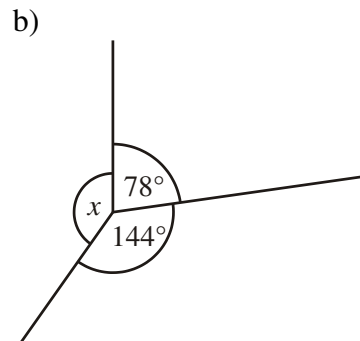
Not drawn accurately

i)   What types of angle are 78° and 144°?

ii) Work out the value of *x*.

a) Work out the value of *y*.

Question 4:

Angle *ABC* = 100°
Angle *DBC* = 13°

a) What type of angle is *ABC* ?

b) What type of angle is *DBC* ?

c) Work out the size of angle *ABD*.
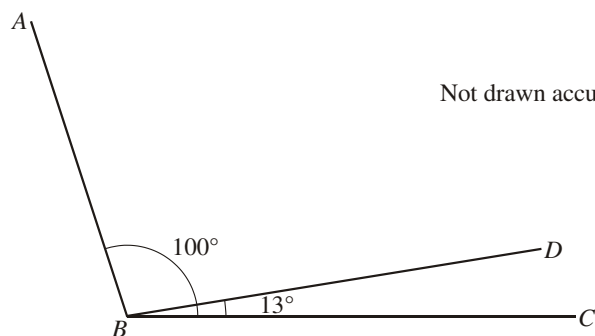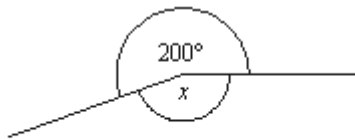
A

Not drawn accurately

100°

13°

D

B   C

Question 5:

200°

x

Not drawn accurately

200°

y 78°

Not drawn accurately
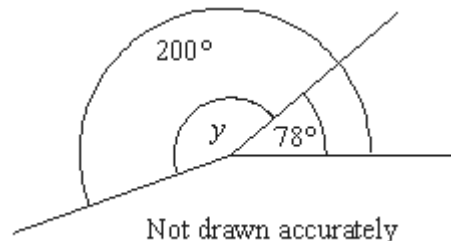
Work out the value of x

Work out the value of y

Question 6:

a) The diagram shows 3 angles on a straight line *AB*.

Not drawn accurately

70°

60° x^o

A ———————— B
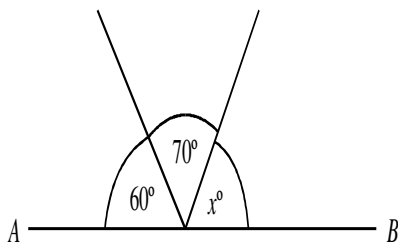
Work out the value of *x*.

b) The diagram shows 3 angles meeting at point.

Not drawn accurately

110°

130° y^o
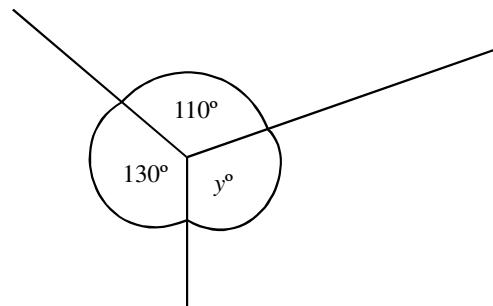
Work out the value of *y*.

Question 7:

Work out the bearing of
a) B from P
b) P from A

N

A

64°

138°

P
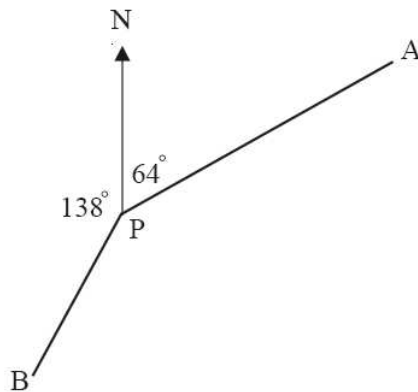
*Diagram NOT
accurately drawn.*

B

The lines *AB* and *CD* are parallel.

a) State the value of *x*. Give a reason for your answer.

b) Write down the value of *y*

A ——————————— B

x

y

C ——————— 20° ——————→ D
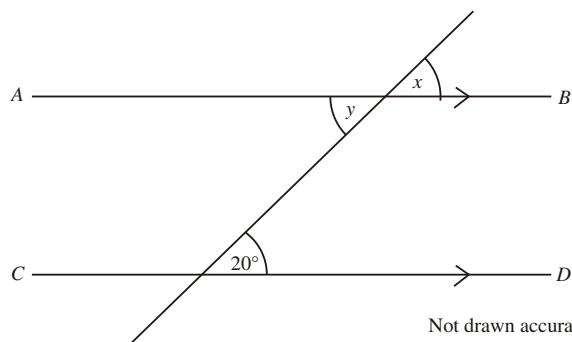
Not drawn accurately

Question 1:

a) Which **two** of these shapes are congruent?
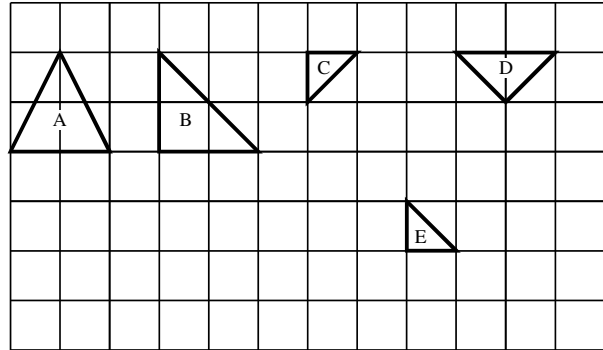
b) This triangle has two equal sides.

b) What name is given to this type of triangle?

c) Find the values of *a* and *b*.
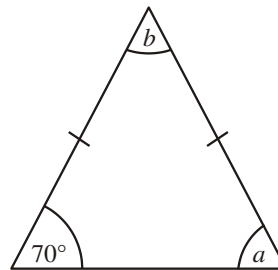
Not drawn accurately

Question 2:

a) *ABC* is an isosceles triangle with *AB = BC*

b) *PQR* is any triangle.
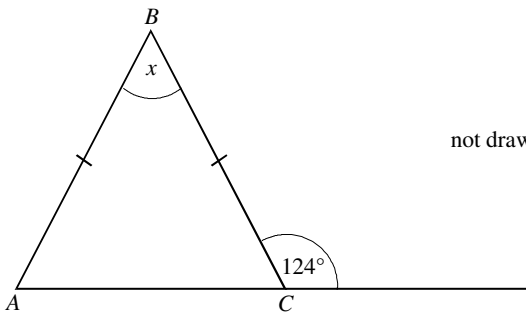
not drawn accurately

Calculate the size of the angle marked *x*.
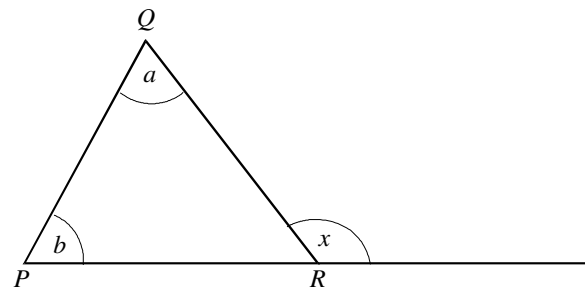
Explain why   *x = a + b*

Question 3:

ABC is a triangle.
D is a point on *AB* such that *BC = BD*

a) Work out the value of *x*.

b) Work out the value of *y*.
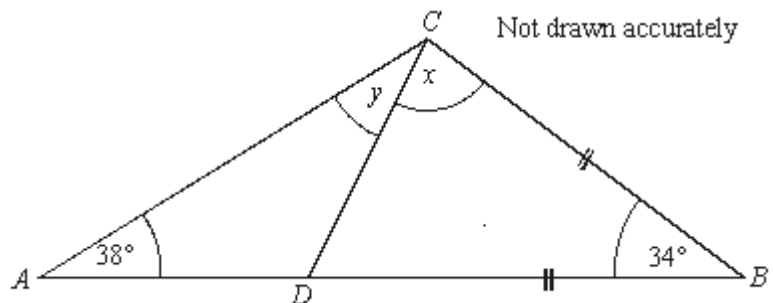
Not drawn accurately

Question 4:

a) ABC is a right-angled triangle.

A

52°

x

B   C Not drawn accurately
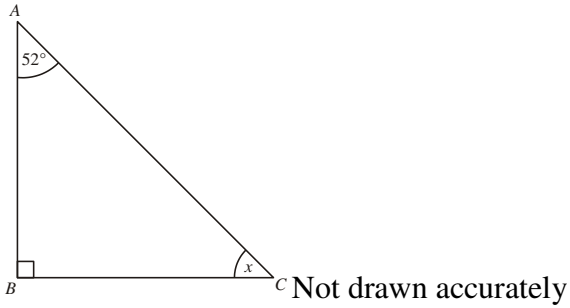
Work out the value of *x*.

b) ABC is a right-angled triangle.
Angle *A* = 29°

A   29°   B

Not drawn accurately

C
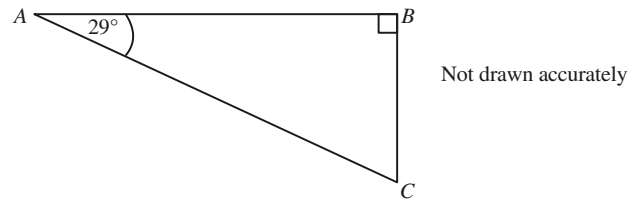
Work out the size of angle *C*.

Question 5:

The diagram shows a triangle inside a rectangle.

3x   2x
4x

y

Not drawn accurately

i) Work out the value of *x*.
ii) Work out the value of *y*.

EXAM QUESTION

The diagram shows an isosceles triangle *ABC*.
Angle *BAC* = 112°

A

112°

y   z

B   C
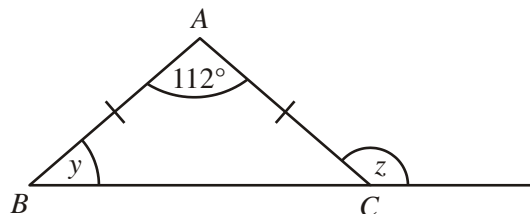
a) Calculate the size of angle *y*.

b) Write down the size of angle z.

Homework 3F

Question 1:
Simplify the following,

a) $2x + 3y + 5x - 2y - 4x$

b) $3x + 2x - x$

c) $5x + 3y - 2x + 4y$

d) $3p + 5q - p + 3q$

e) $2x + 8 + 4x - 3$

f) $3d - 5e + 4d + e$

Question 2:

a) Simplify $a^3 \times a^3$

b) Simplify $3x^2y \times 4xy^3$

a) Simplify $3d + e - d + 4e$

b) Simplify $3x^2 - x^2$

c) Simplify $5t + 8d - 2t - 3d$

d) Simplify $4t \times 2q$

Question 3:

Expand the following,

a) $4(m - 1)$

b) $p(p + 3)$

c) $3(4y + 1)$

d) $4(r - 3)$

e) $-5(p - 4)$

f) $4x(x^2 + 5)$

g) $4(3x + 7)$

h) $x^2(4 - 2x)$

Question 4:

Expand and simplify,

a) $4(3d - 2e)\ (2d - 5e)$

b) $5(2a - c) + 4(3a + 2c)$

c) $4(2x - 1) + 3(x + 6)$

d) $5(2x + 1) - 3(x - 4)$

Question 5:

Factorise

a) $4c + 12$

b) $x^2 + 5x$

c) $2x + 6$

d) $4x - 8$

e) $y^2 + 2y$

f) $10a + 5$

g) $c^2 - 4c$

h) $-3x - 9$

EXAM QUESTIONS

Question 1:

Simplify
a) $x^4 \times x^2$

b) $\dfrac{y^8}{y^3}$

c) $4(2t + 1) - 3(t - 3)$

Question 2:

a) Simplify,

$x^3 \times x^7$

c) Simplify ,
$y^2 \div y$

d) Simplify fully,
$\dfrac{18x^5 y^2}{12x^2 y}$

e) Factorise fully

$18x^5 y^2 - 12x^2 y$

PERIMETERS AND AREAS OF RECTANGLES

Question 1:

a) The length of a rectangle is 9 cm.
The perimeter of the rectangle is 28 cm.

Calculate the width of the rectangle.

not to scale

← 9 cm →
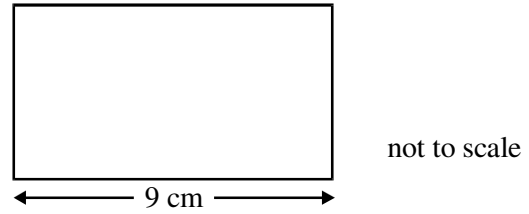
b) A rectangle has length 7.1 cm and width 3.6 cm.

← 7.1 cm →

Not to scale

Calculate the area of the rectangle.
Give your answer to 1 decimal place.

3.6 cm
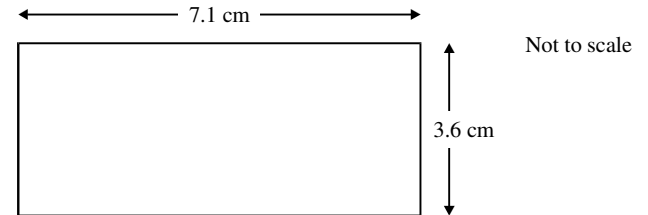
Question 2:

This diagram shows a different parallelogram of length 11.5 cm, height 4.9 cm and slant height 5.3 cm.

← 11.5 cm →

4.9 cm

5.3 cm

Not to scale
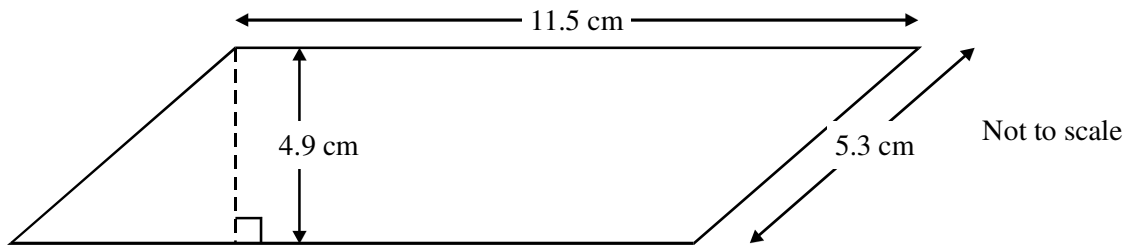
Calculate the area of this parallelogram

Question 4:
Calculate the areas of the following triangles

(a)

6 cm

8 cm

(b)

5 m

7 m

(c)

12 cm

8 cm

(d)

40 mm

30 mm
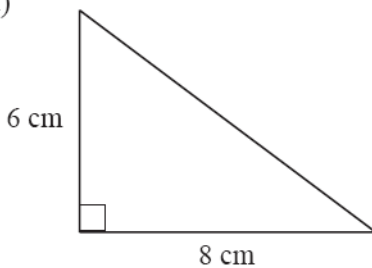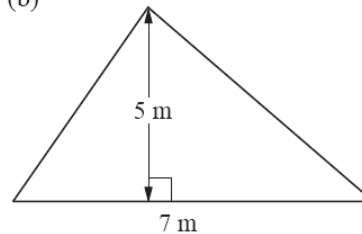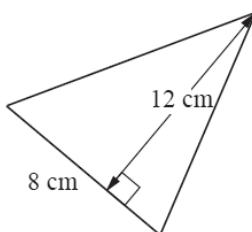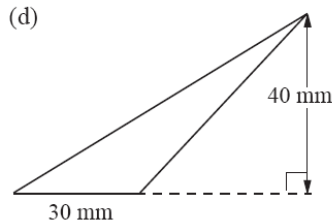
COMPOUND SHAPES

Question 5:

The letter H shape is drawn on a centimetre
     square grid.

   (a)   Write down the perimeter of the shape.

   (b)   Write down the area of the shape.
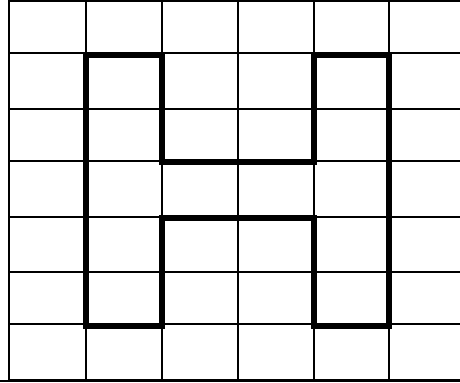
Question 6:

A shape has dimensions as shown. Calculate the shaded area.

4 cm

5 cm

Not to scale

5 cm   2 cm

10 cm
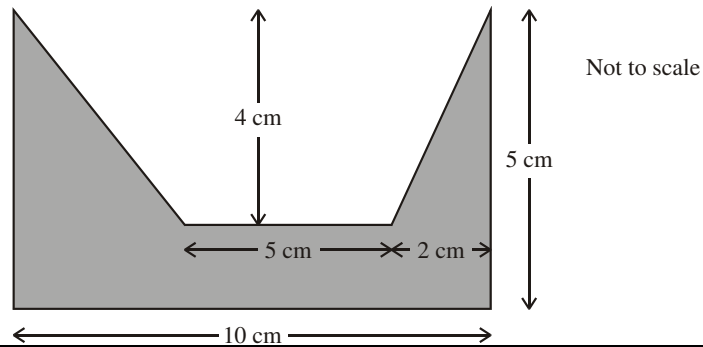
EXAM QUESTION

A shop sells square carpet tiles in two different sizes.

Small

30 cm

30 cm

Large

2500 cm²

Not to scale
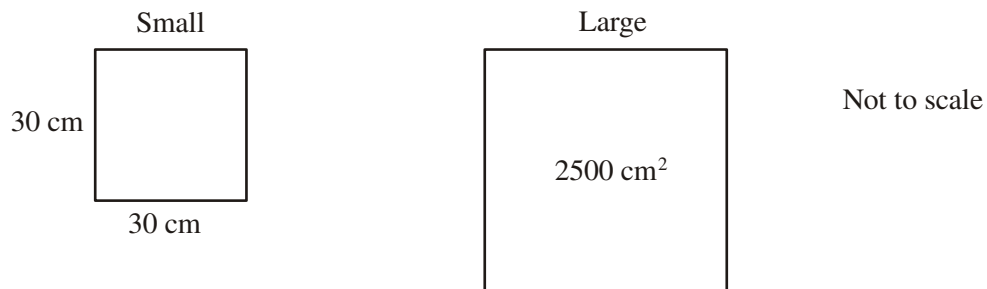
   (a)   What is the area of a small carpet tile?

   (b)   What is the length of a side of a large carpet tile?

   (c)   The floor of a rectangular room is 300 cm long and 180 cm wide.
       How many **small** tiles are needed to carpet the floor?

CIRCUMFERENCES OF CIRCLES

Question 1:
Calculate the circumference of the following circles,

a)

6 mm

b)

10 mm

c)

19 mm

d)

16 mm

e)

5 mm

f)

17 mm
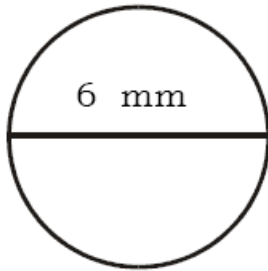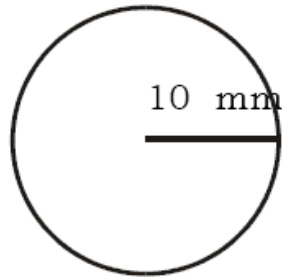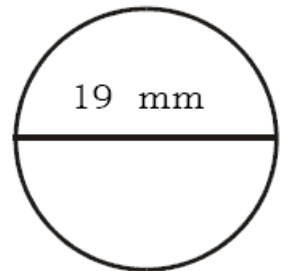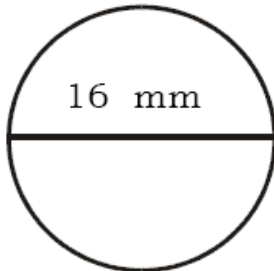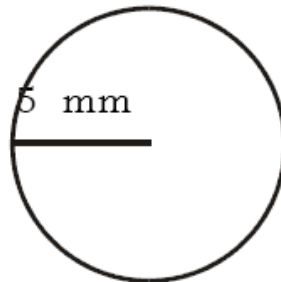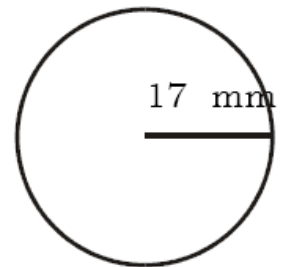
AREAS OF CIRCLES

Question 2:
Calculate the areas of the following circles.

a

10 m

b

4.5 m

c

200 cm

d

6.5 m

e

4 m

f

12.5 m
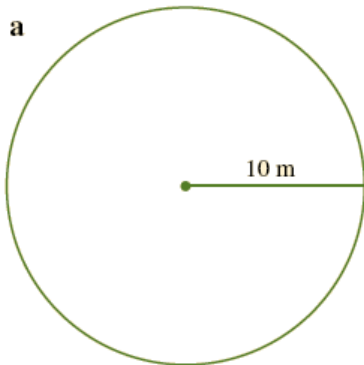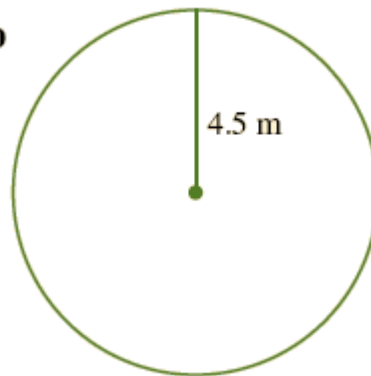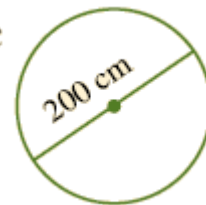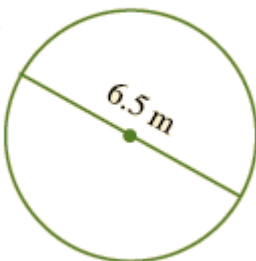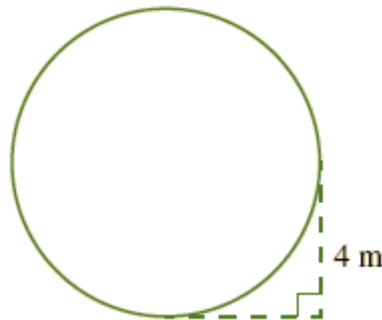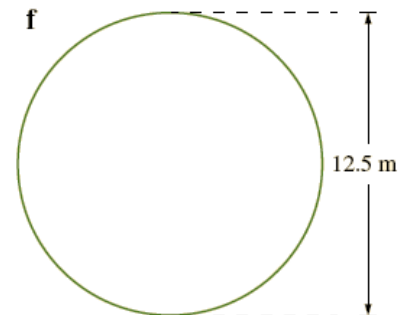
Question 3:
Copy and complete the following table,

Radius	Diameter	Circumference	Area
	24 cm		
1 cm			
	6 mm		
	9 m		
	23 km		

EXAM QUESTIONS
Calculate the areas of the following composite shapes.

a)

b)

c)

24 cm

d)

10 cm
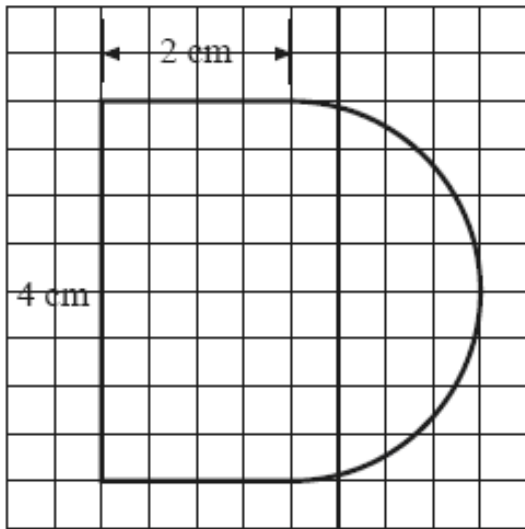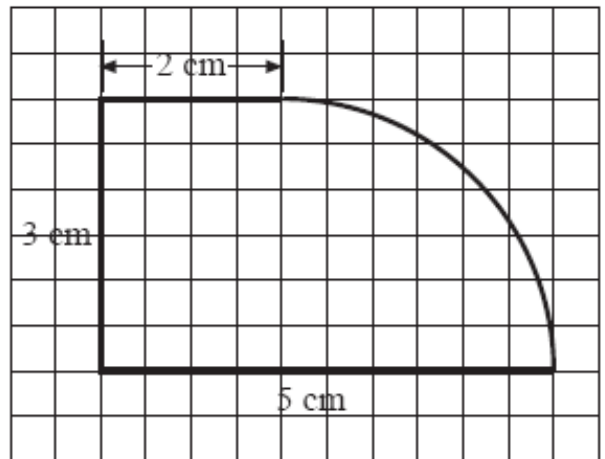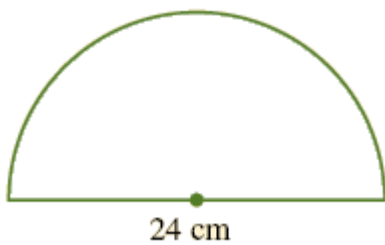
Question 1:
Draw and label the following quadrilaterals
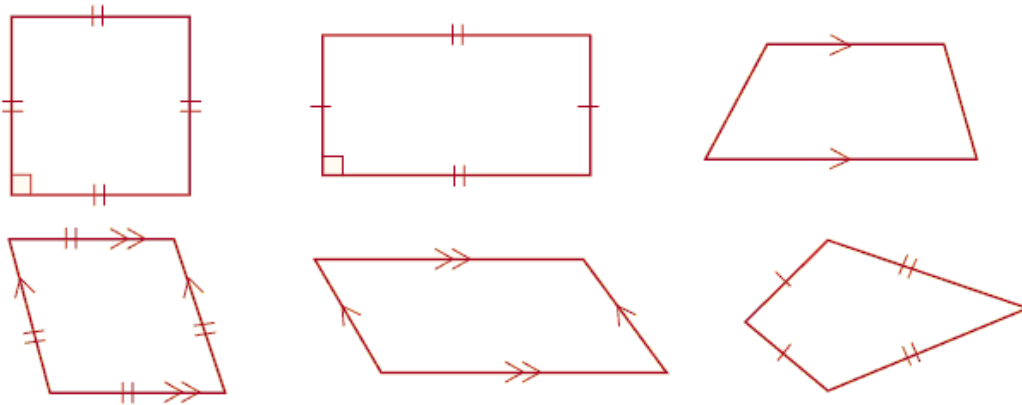
Question2:
Find the value of the pronumerals and give reasons,

a

110° *a* 120° 50°

b

b 70°

c

50° 130° 70° *c*

d

e *d* 100°

e

50° 30° *f* 40°

f

g 76°
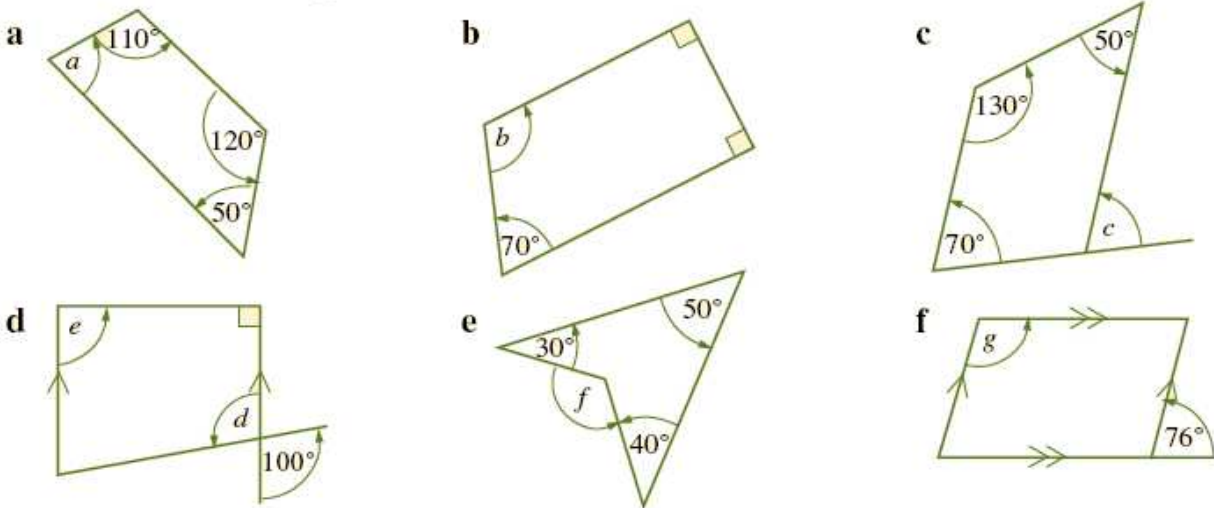
Question 3:
Find the value of ∠*ABC* and give reasons for each.

a

B C 85° 110° 80° E A D

b

C B F 64° D A E

c

D C 40° B E A

d

C 70° B D 40° A

e

B 48° D A C E

f

B C 70° D A 72° F 114° E
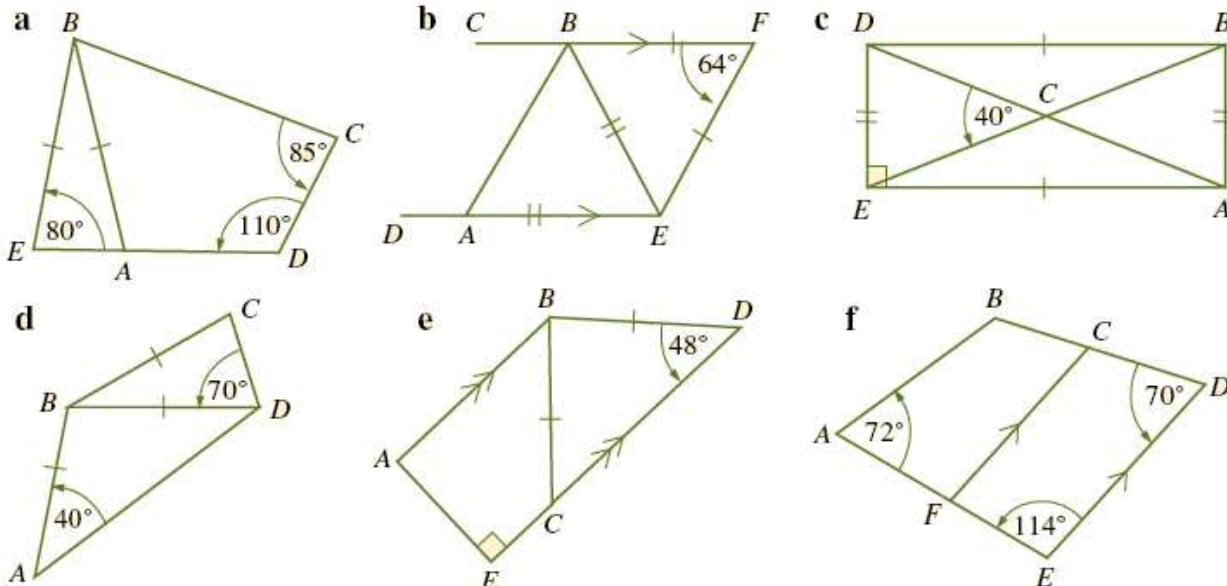
Question 4:
Calculate the value of a in the following regular polygons,
a)   b)   c)
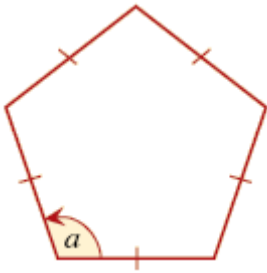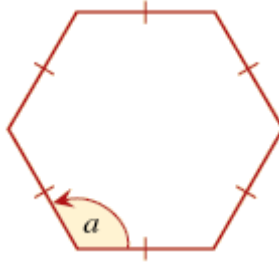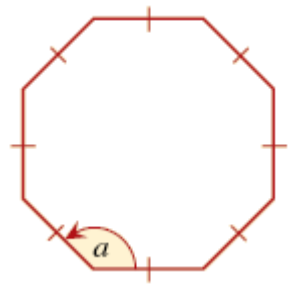
EXAM QUESTIONS

(a)   *ABCD* is a quadrilateral.

The side *DC* is extended to *E.*
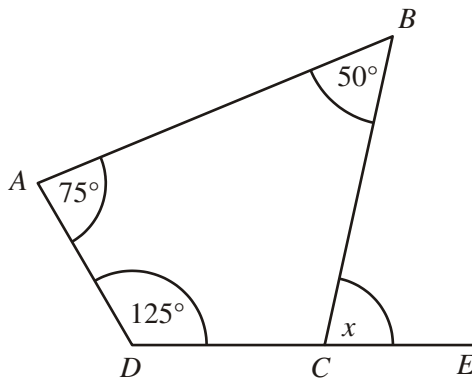
Not drawn accurately

Work out the value of *x*.

(b)   Calculate the size of the exterior angle of a regular hexagon.
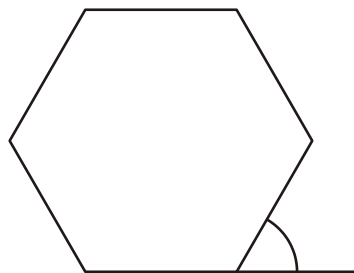
Not drawn accurately

Question 1:
Copy and complete these patterns by writing the next three terms each time.
Write a rule in words which explains each pattern.

a) 15, 17, 19, _, _, _

b) 21, 24, 27, _, _, _

c) 2, 4, 8, 16, _, _, _

d) 87, 82, 77, _, _, _

e) 3, 15, 75, _, _, _

f) 100, 89, 78, _, _, _

g) 5, 10, 20, 40, _, _, _

h) 4, 14, 24, _, _, _

i) 5, 0.5, 0.05, _, _, _

j) 1, 2, 3, 5, 8, _, _, _

k) 7, 21, 63, 189, _, _, _

l) 88, 44, 22, _, _, _

m) 1, 2, 2, 4, 8, _, _, _

n) 3, 4, 7, 11, 18, _, _, _

o) 3200, 32, 0.32, _, _, _

Question 2:
Rockets. The diagram shows the first two rocket stages.
a) Draw the first five rockets and Copy and complete the following table

stage 1 rocket   stage 2 rocket

Number of stages (S)	Number of toothpicks (T)
1	
2	
3	
4	
5	
7	
9	
...	95
50	
100	

b) In words, write the rule connecting the number of stages to the number of toothpicks.

c) Copy and complete the following rule written as a formula:
    Number of toothpicks = ? x number of stages + ?

    or: $T = \_\_ \times S + \_\_$

Question 3:

These are the nth terms of a number of sequences.
For each sequence write out the first 5 terms.

a).   n + 4   b).   n - 1   c).   n + 3   d).   n + 12

e).   7n   f).   3n   g).   n ÷ 2   h).   15n

i).   2n + 6   j).   3n - 2   k).   4n + 7   l).   3n + 10

Question 4:

a) A sequence of numbers begins 40, 37, 34, 31,........

(i) What is the next number in the sequence?

(ii) Describe in words the rule for continuing the sequence.

b) The rule for another sequence is

Next number = Multiply the previous number by 3 then subtract 3

(i) A sequence begins 2, 3, 6, 15, ...   What is the next number in the sequence?

(ii) Another sequence, using the same rule, starts with 4.
What is the next number in this sequence?

(iii) Another sequence, using the same rule, starts with –6.
What is the next number in this sequence?

EXAM QUESTIONS

Question 1:
Here are the first four terms of a number sequence.
2, 9, 16, 23, ….
a) Write down the next term of the sequence
b) Find an expression, in terms of n, for the n th term of the sequence.
c) Calculate the 100 th term of the sequence.

Question 2:
Dots are used to make a sequence of patterns. The first three patterns are shown.

Pattern 1   Pattern 2   Pattern 3   Pattern 4
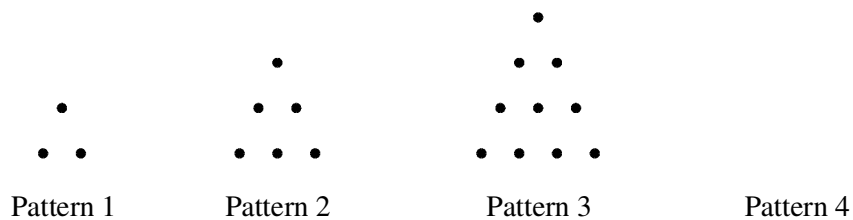
a) Draw pattern 4.
b) Complete the table showing the number of dots in each pattern.

Pattern number	1	2	3	4	5
Number of dots	3	6	10		

c) Describe in words the rule for continuing the sequence of the number of dots.

COORDINATES IN FOUR QUADRANTS

Question 1:
Write down the coordinates of the points A-H
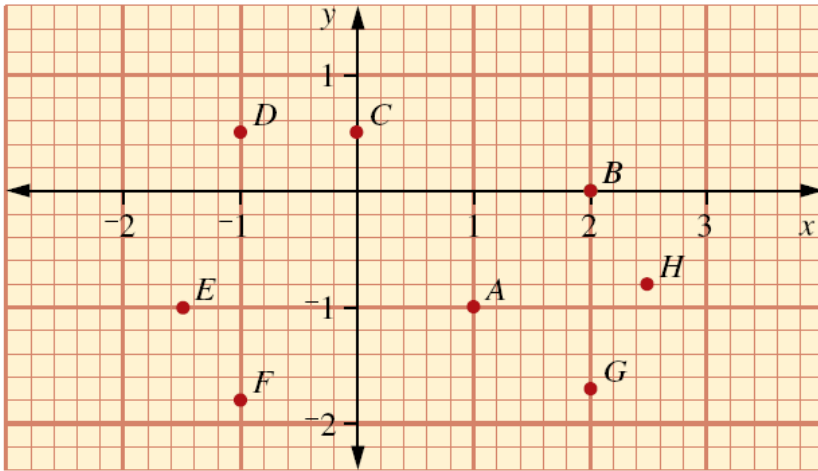
Question 2:

Two sides of a parallelogram are drawn on the grid below.
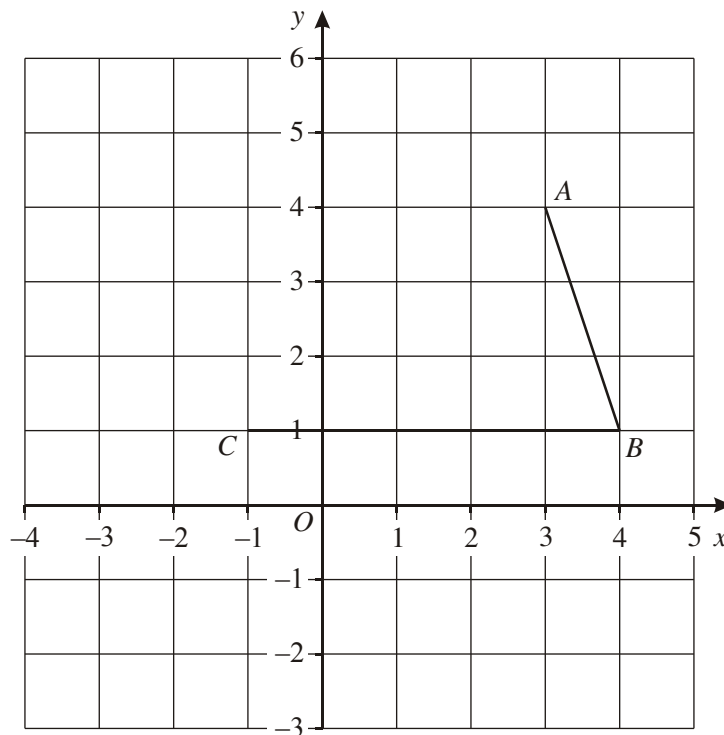
a) Write down the coordinates of point A.

b) Write down the coordinates of point C.

c) (i) Draw two more lines to complete the parallelogram *ABCD*.
   (ii) Write down the coordinates of *D*.

EQUATIONS OF STRAIGHT LINES

Question 3:

Find the equations of the lines A, B and C on the axes below,
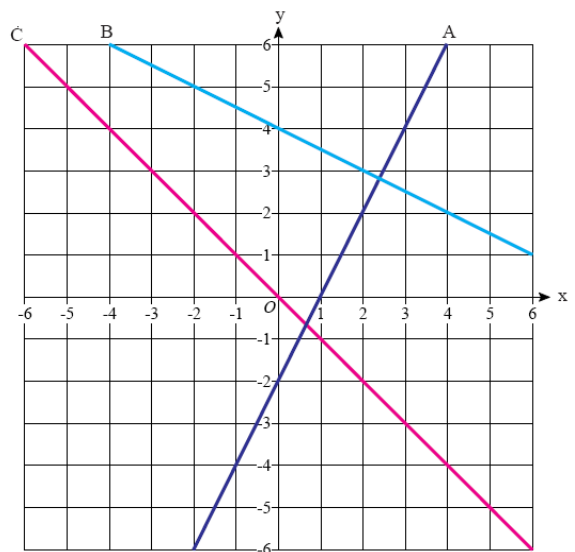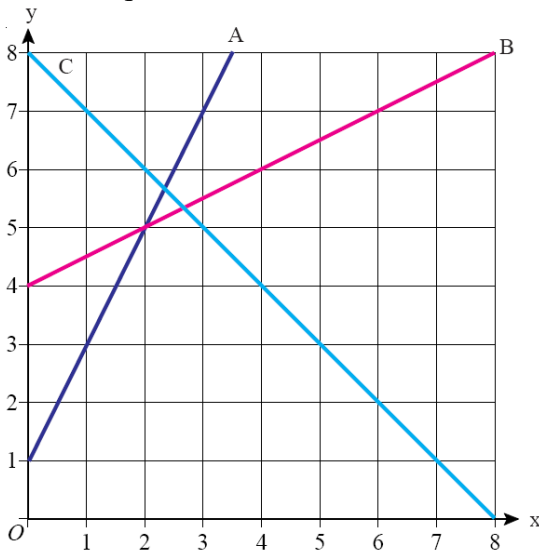
Question 4:

a) Draw an axis -4 to 4 on the x axis and -7 to 7 on the y axis.

Draw and label the lines $y = -4$ and $y = 2x + 1$

b) Write down the coordinates of the point where the lines $y = -4$ and $y = 2x + 1$ cross.

Question 5:

a) Complete the table of values for $y = 3x + 1$

x	0	1	2	3	4
y	1		7		13

b) On grid paper draw the graph of $y = 3x + 1$ for values of x from 0 to 4.

c) Use your graph to solve $5.5 = 3x + 1$

EXAM QUESTIONS

a) Complete the table of values for the graph of $x + y = 4$

x	0	1	2	3	4
y	4			1	

b) On a grid, draw the graph of $x + y = 4$

c) P is a point on the line $x + y = 4$
David says, "the x coordinate of P is one greater than the y coordinate of P".

Write down the coordinates of P.

THE MIDPOINT OF A LINE SEGMENT

Question 1:

a) Write down the coordinates of A and B

b) Write down the coordinates of the midpoint of
   the line AB
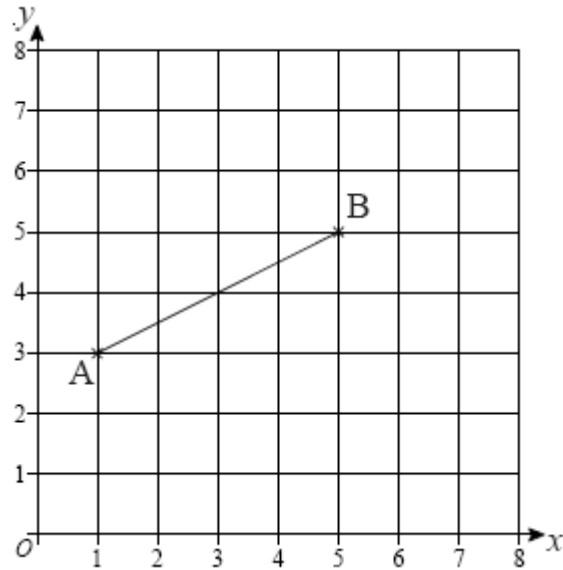
Question 2:
Using an axes, -5 to 5 on the x and y axis.

   a) Plot the points A(2,0) and B(5,2)
   b) M is the midpoint of the line segment AB. What are the coordinates of M.

Question 3:
The diagram shows the points *P* (0, –4) and *Q* (5, 2).
Find the coordinates of the mid-point of the line segment *PQ*.
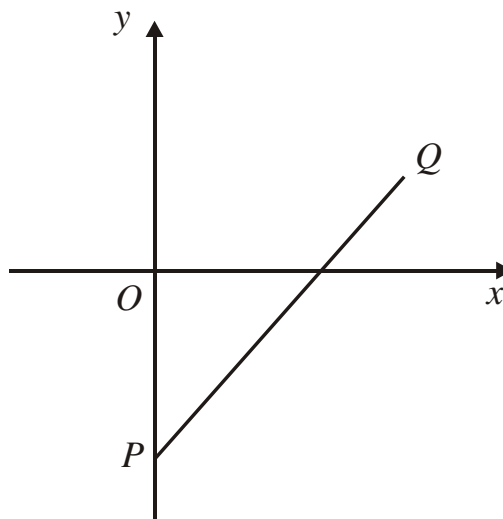
COORDINATES IN 3 DIMENSIONS

Question 4:
A cuboid lies on the coordinate axes . The point Q has coordinates (5,3, 4).

a)Write down the coordinates of the point P
b) Write down the coordinates of the point T
c) Write down the coordinates of the point S
d) Write down the coordinates of the point R
e)Write down the coordinates of the point U
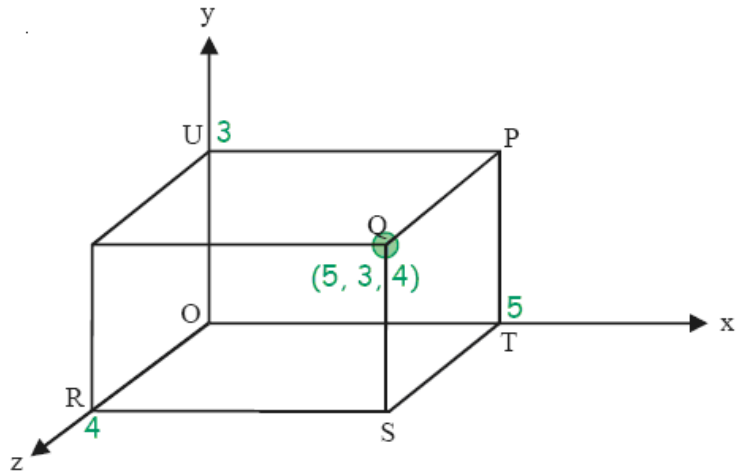
Question 5:
Point P lies halfway between A and B and has coordinates (3, 4, 5)

a) Write down the coordinates of B.
b) Write down the coordinates of C.

A cuboid lies on the coordinate axes.
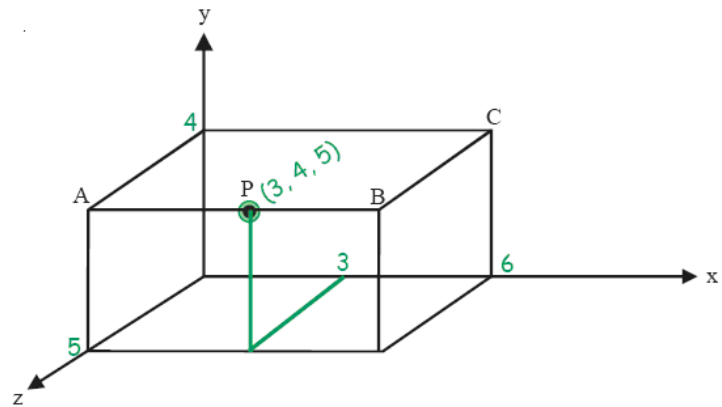
EXAM QUESTION

The points *A* and *M* are shown on the grid.

a) Write down the coordinates of *A* and *M*.

b) *M* is the mid-point of a line *AB*. Work out the coordinates of *B*.

Homework 10F
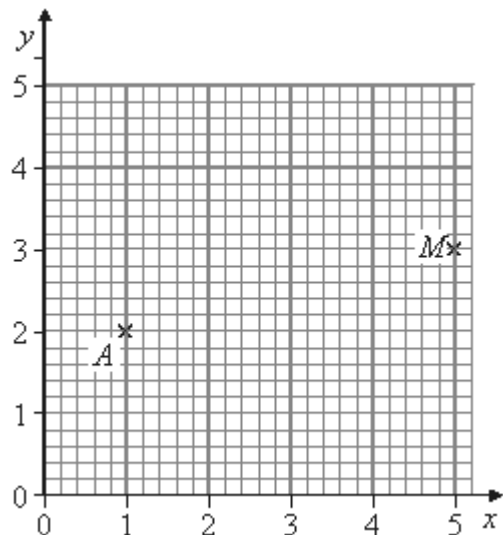
Question 1:
Calculate the volumes of the following cuboids and prisms.

a   6 cm   7 cm   18 cm

b   4 m   2 m   3 m

c   2 cm   15 cm   12 cm

d   5 cm   6 cm   14 cm

e   3 cm   4 cm   10 cm

f   12 cm   8 cm   2 cm

Question 2:
Calculate the volumes of the following,

12 cm   Area of end = 195 cm²

24.4 cm   Area of end = 253 cm²
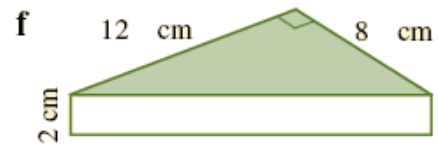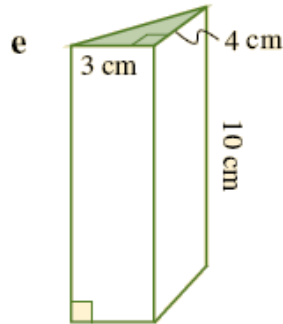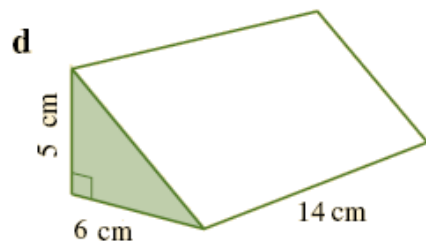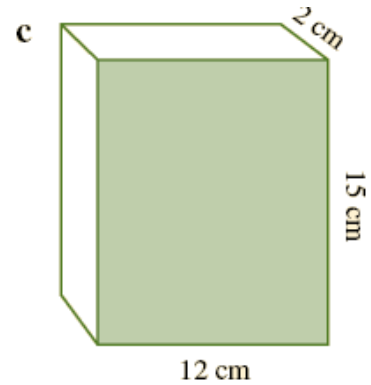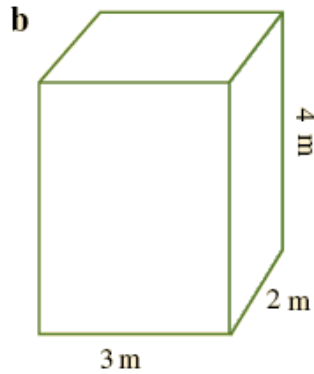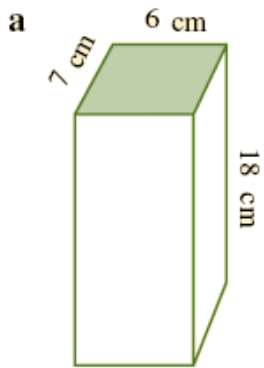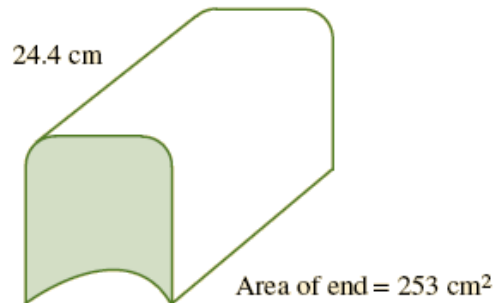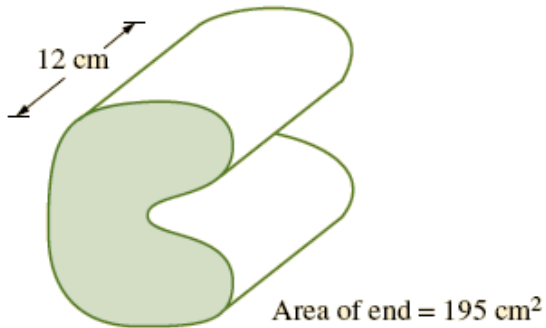
Question 3:
Calculate the volumes of the prism and cylinder.

6 m   8 m   5 m

20 cm   Radius of end = 5 cm
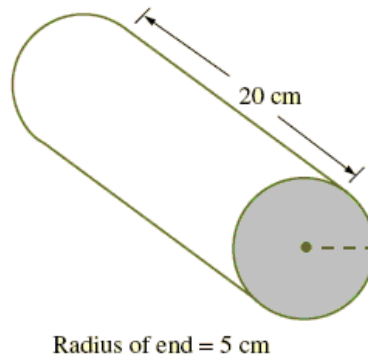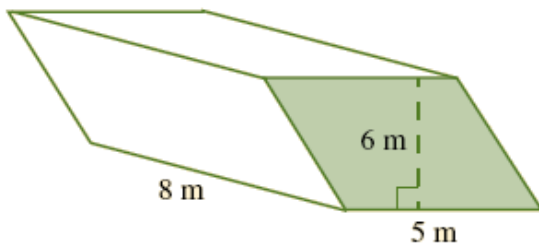
Question 4:
Using the nets shown below, calculate the surface area of each of the solids,

a

4 cm

b

14 cm

11 cm

11 cm

6 cm

c

5 cm

20 cm
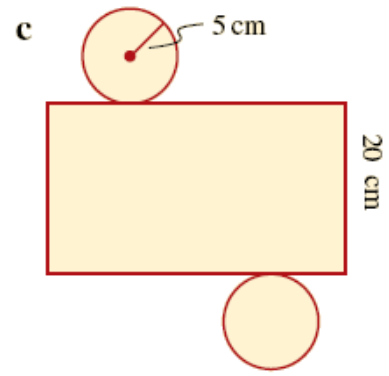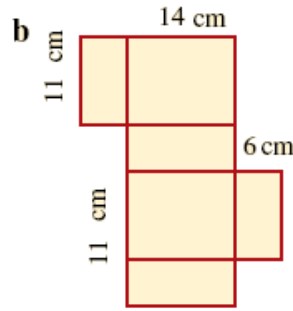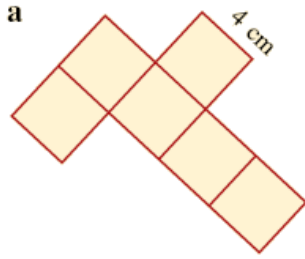
Question 5:
Calculate the surface area of the following,

a

12 cm

|← 10 cm →|

b

6 cm

8 cm   8 cm
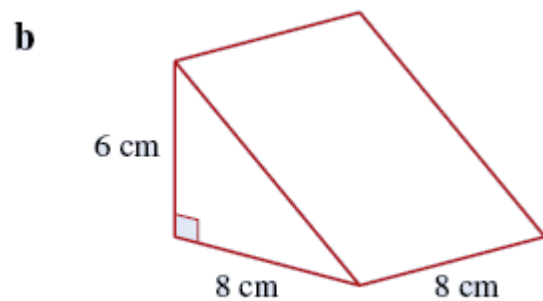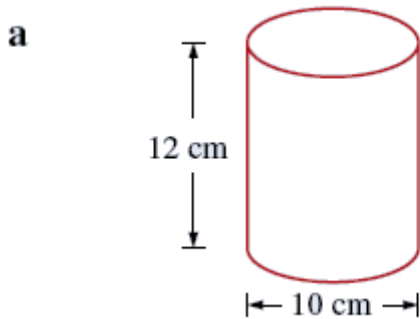
EXAM QUESTION

A school hall is in the shape of a cuboid.

Not to scale

4 m

12 m

30 m
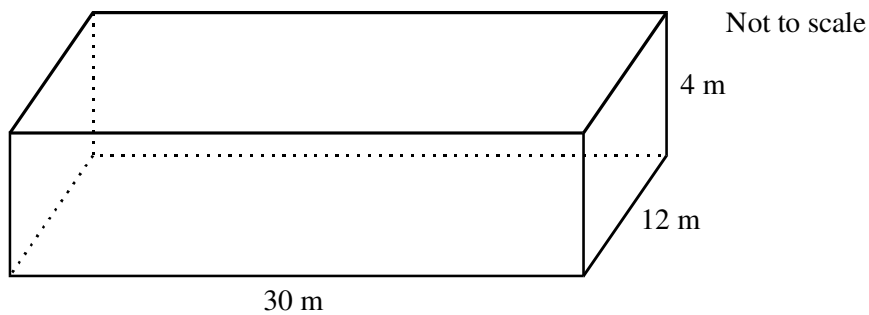
a) The school hall is 30 m long, 12 m wide and 4 m high.
Calculate the volume of the hall.

b) The school buys **ten** 5 litre tins of paint to paint the hall.

The area to be painted is 279 m^2.

Each tin covers 30 m^2.
Calculate the percentage of paint used.

Question 1:
Solve the following equations,
a) $x + 3 = 7$
b) $m + 17 = 10$
c) $5 + x = 12$
d) $x - 6 = 13$
e) $x + 5 = 0$
f) $5 - x = -2$
g) $x - 3 = 3$
h) $x - 3 = -3$
i) $x + 3 = -3$

Question 2:
Write all the steps required to solve the following equations and check your answers.
a) $3x + 5 = 17$
b) $2x + 7 = 17$
c) $4x + 4 = 16$
d) $5x - 3 = -13$
e) $5 + 2x = 17$
f) $6 - 3x = 9$
g) $6x - 7 = -19$
h) $9 - 8x = 33$
i) $7 - 2x = 1$

Question 3:
Solve the following for x,

a) $\dfrac{x}{2} - 7 = -5$
b) $\dfrac{x}{5} + 2 = 6$
c) $\dfrac{x}{4} + 4 = 8$

e) $\dfrac{x}{3} - 8 = -5$
f) $\dfrac{x}{2} + 6 = 13$
g) $\dfrac{x}{3} + 4 = 3$

Question 4:
Solve the following for x,

a) $x - 4 = 3x - 8$
b) $x + 6 = 6x - 9$
c) $x - 3 = 4x - 9$
d) $x - 8 = 5x + 4$
e) $2x - 13 = 11x - 4$
f) $5x - 2 = 7x - 12$

Question 5:
Solve the following word problems by first writing the information as an equation.
a) If 3 is added to a number N, the result is 10. Find N.
b) If 5 is added to 4 times a number N, the result is 17. Find N.
c) If a number N is subtracted from 5, the result is −2. Find N.
d) If twice a number N is subtracted from 20, the result is 10. Find N.
e) If 8 is added to twice a number N, the result is 4. Find N.

Question 6:
Solve the following for x,
a $2(x + 3) = 10$
b $3(2x - 4) = 18$
c $4(x - 5) = 28$
d $2(3x - 4) = 10$
e $2(x + 6) = 6$
f $5(2x + 9) = 15$

Question 7

a $\dfrac{2x}{5} - 6 = 2$
b $\dfrac{4x}{3} + 5 = 9$
c $\dfrac{3x}{7} - 5 = {}^-2$
d $\dfrac{9x}{5} - 4 = 5$

d $\dfrac{x + 7}{3} = 4$
e $\dfrac{x + 5}{2} = 1$
f $\dfrac{x + 8}{4} = {}^-1$

<u>Inequalities</u>

Question 8:

Draw a separate number line to show each of the following inequalities.

a $x > 3$ b $x \leqslant {}^-2$ c $x > {}^-5$ d $x < {}^-3$

e $x > 0$ f $x \leqslant {}^-1$ g $x \leqslant 0$ h $x > 5$

Question 9:

Solve the following inequalities

a $3x \leqslant 12$

b $8x > 56$

c $5x < {}^-15$

d $2x \geqslant {}^-24$

e $3x + 1 < 7$

f $3x - 1 \geqslant {}^-10$

g $5x - 3 > 17$

h $7x + 12 \leqslant {}^-9$

i $\dfrac{3x}{5} \geqslant 15$

j $\dfrac{2x}{5} \leqslant {}^-10$

k $\dfrac{x}{2} + 1 > 4$

l $\dfrac{x}{5} - 7 \leqslant {}^-10$

m $\dfrac{3x}{4} + 5 > 17$

n $\dfrac{2x}{7} + 19 < 15$

o ${}^-21 + \dfrac{3x}{5} > {}^-27$

<u>EXAM QUESTIONS</u>

Question 1:

Solve the equations,

a) $5x = 35$

b) $x - 7 = 35$

c) $3x = 12$

d) $y + 7 = 13$

e) $8z - 5 = 11$

f) $3(w - 2) = 9$

g) $5y + 11 = 3(y + 7)$

h) $3t + 4 = 19 - 2t$

<u>Question 2:</u>

Solve the inequality $3x + 7 \geq 4$

Question 1:
Copy the shapes and draw any axes of symmetry on each shape.

a

b

c

d

e
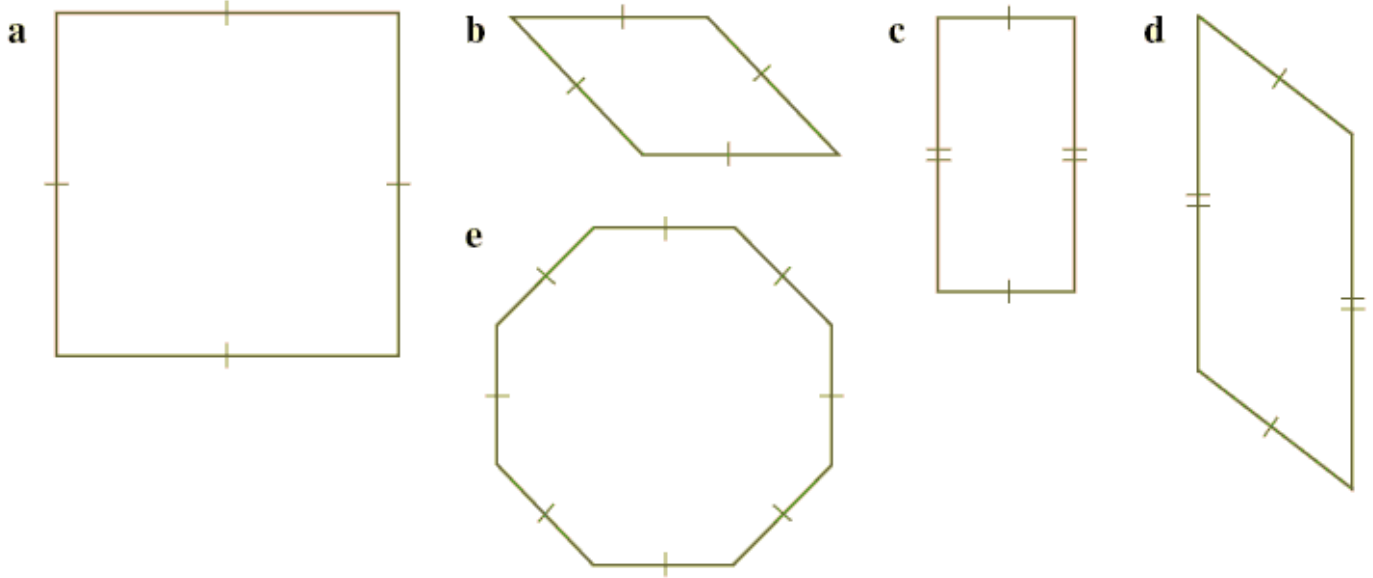
Question 2:
On graph paper, copy the axes and reflect these shapes across the mirror lines.

a

b

c

d
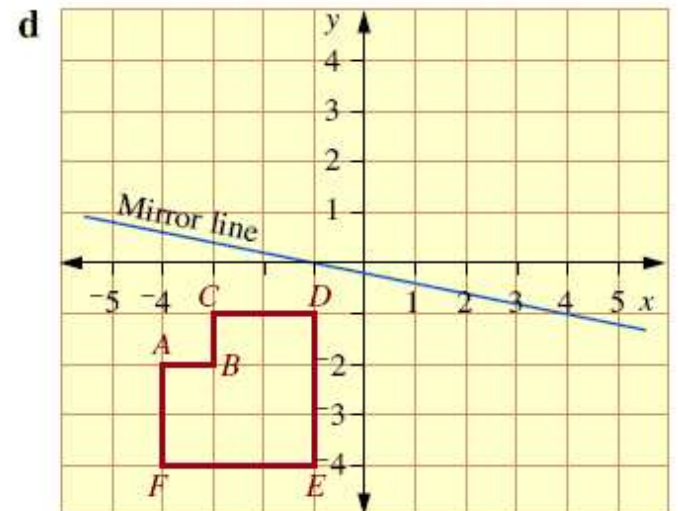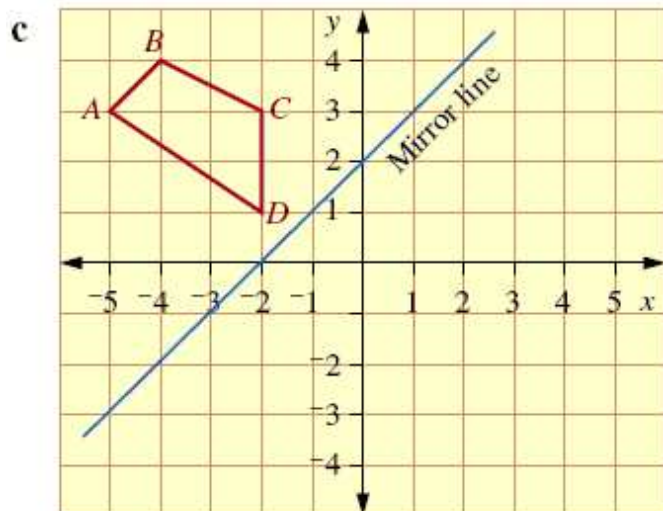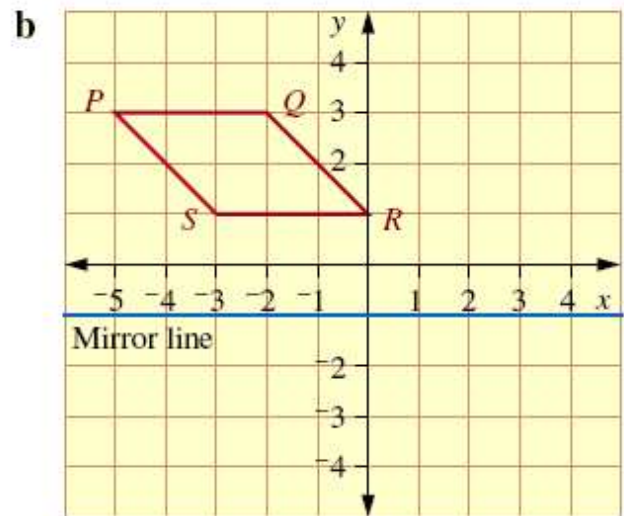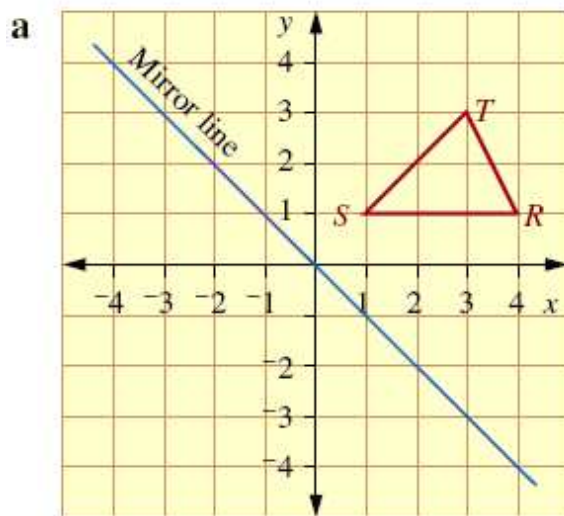
Question 3:
On graph paper, copy the axes and reflect these shapes across the mirror lines.

a

b

c

d
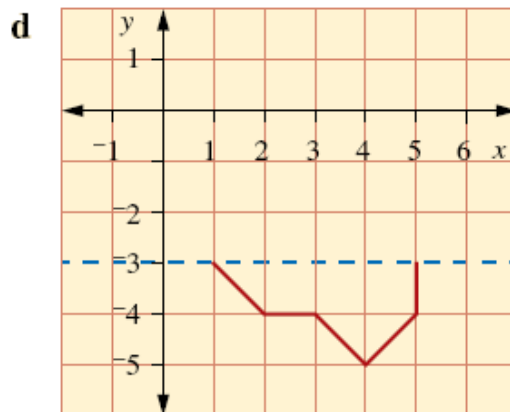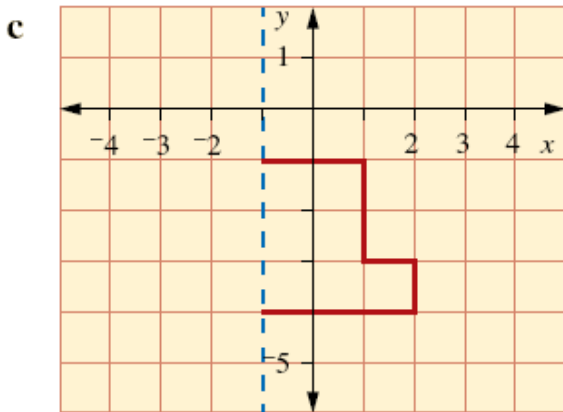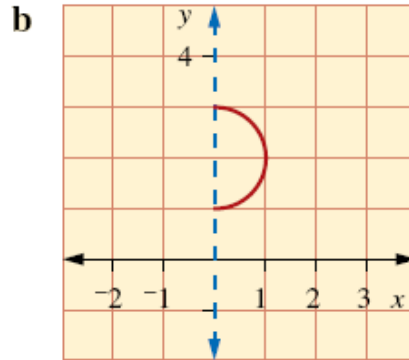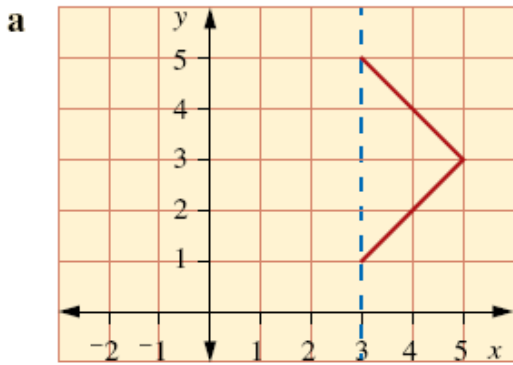
Question 1:
Reflect the shape using the dotted line as the mirror line.
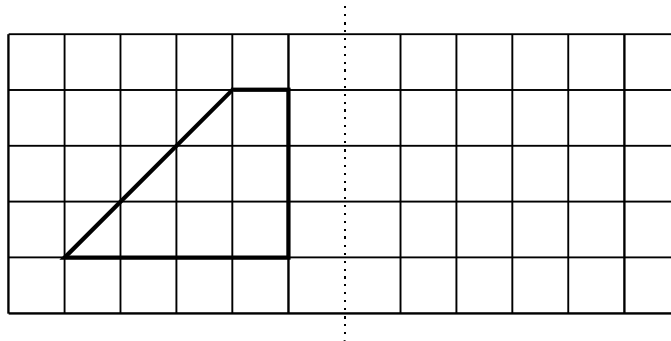
Question 2:
A pattern has four lines of symmetry. Part of the pattern is shown below. Complete the pattern.

Homework 12F
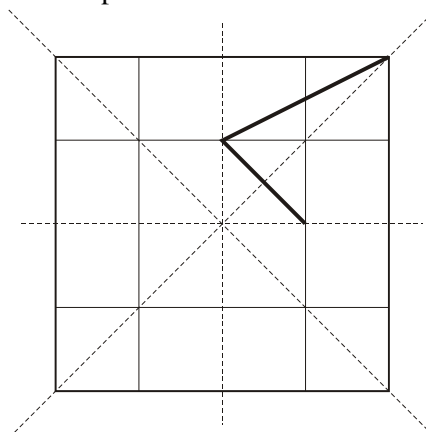
Question 1 :
State the degree of rotational symmetry the following shapes have,

a

b

c
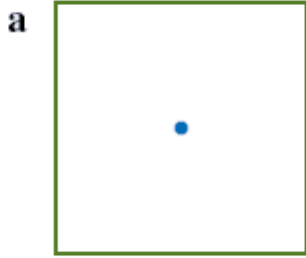
Question 2 :
Consider the five regular polygons shown. Copy and complete the table to record information about their rotational symmetry.

a   b   c   d   e
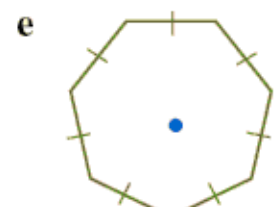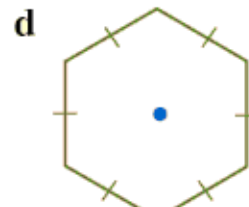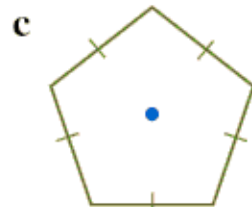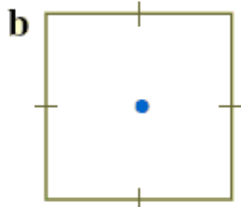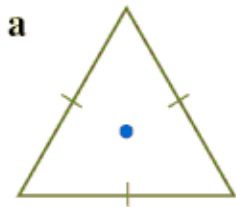
	Shape	No. of sides	Order of rotation	Angle of rotation to obtain next superimposition
a	Triangle			
b	Square			
c	Pentagon			
d	Hexagon			
e	Heptagon			

Question 3:
Draw an *x–y* co-ordinate plane from -8 to ☐8 on both axes. Show the rotations of the following points by plotting the images.
a) (4, 3) rotated 90°☐ clockwise about (0, 0)
b) (4, 3) rotated 90°☐ anticlockwise about (0, 0)
c) (-3, 4) rotated 90°☐ anticlockwise about (0, 0)
d) (3, 4) rotated 90°☐ clockwise about (0, 0)

Question 4:
On graph paper draw the shape and their images as described,

a Point of rotation: (0, 0)
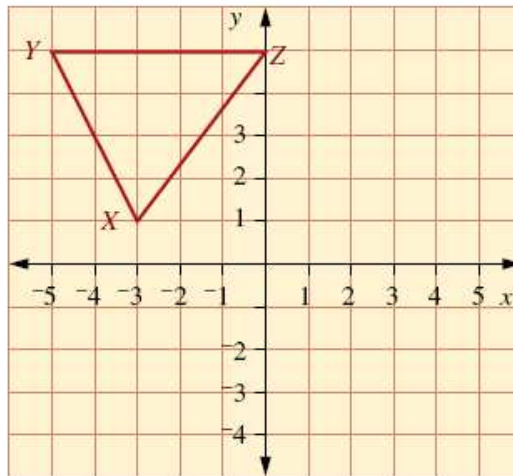Angle of rotation: 90°
Direction: clockwise
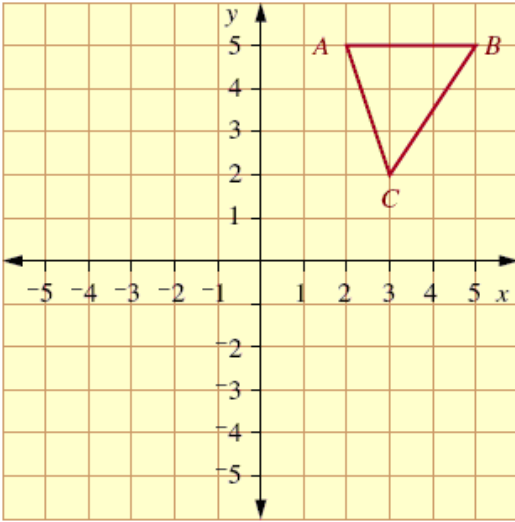
b Point of rotation: (0, 0)
Angle of rotation: 180°
Direction: clockwise
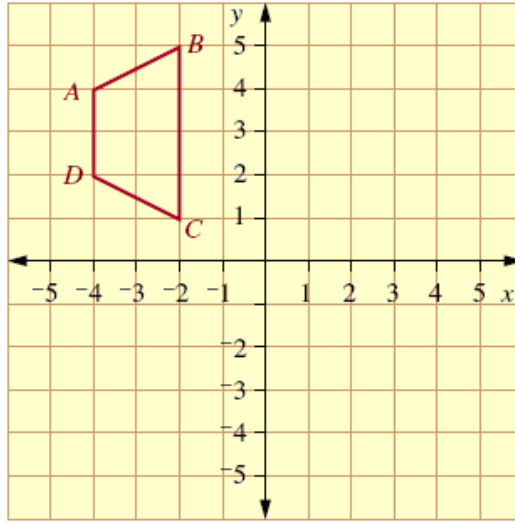
c Point of rotation: (0, 0)
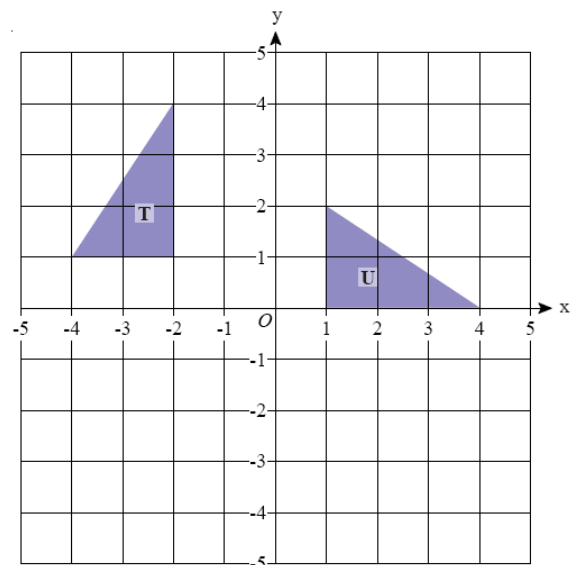Angle of rotation: 90°
Direction: anticlockwise
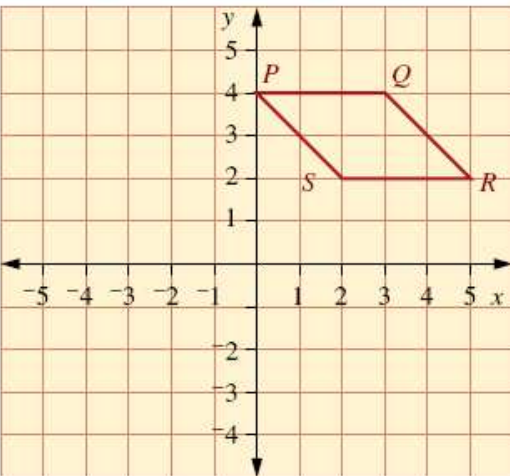
d Point of rotation: (0, 0)
Angle of rotation: 180°
Direction: anticlockwise

EXAM QUESTION
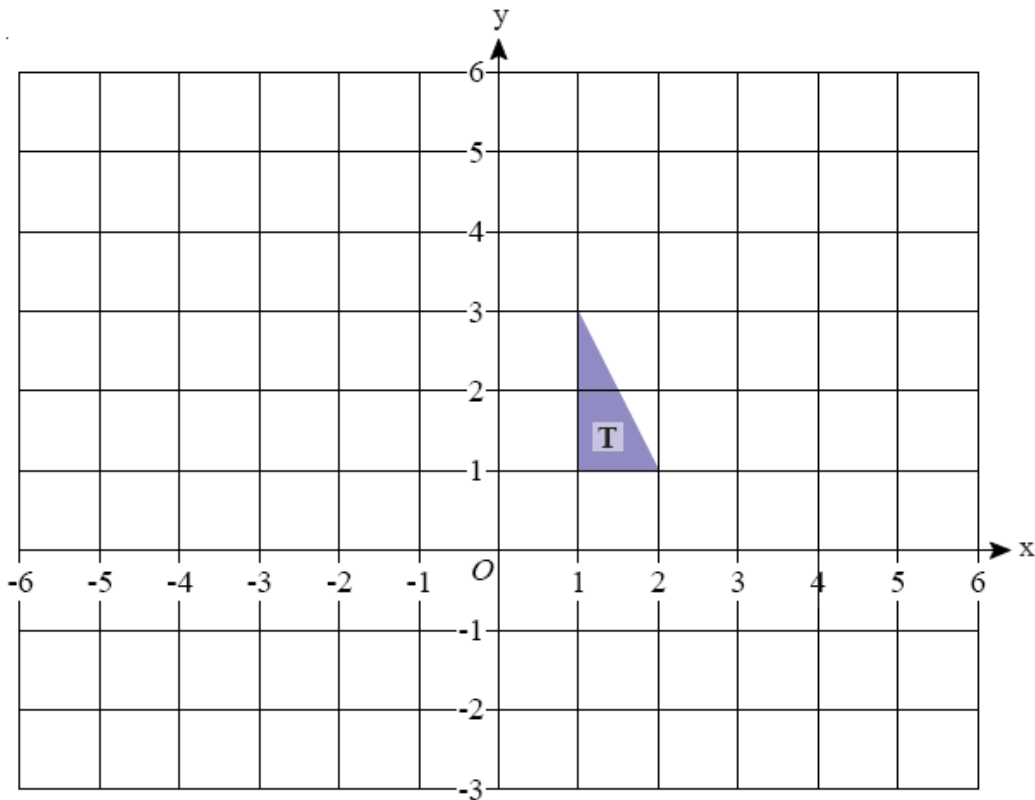
Describe fully the single transformation that maps triangle T to triangle U

Question 1 :
Draw a co-ordinate plane from -6 to □6 on both the *x*- and *y*-axes. Show the translations of the point:
a) (3, 2) translated 2 units horizontally

b) (3, 2) translated -4 units horizontally

c) (3, 2) translated 2 units vertically

d) (3, 2) translated -6 units vertically a -4 units horizontally

e) (3, 2) translated 2 units horizontally and -3 units vertically

Question 2:

a) Translate triangle T by vector $\begin{bmatrix} -4 \\ 2 \end{bmatrix}$ and label it U

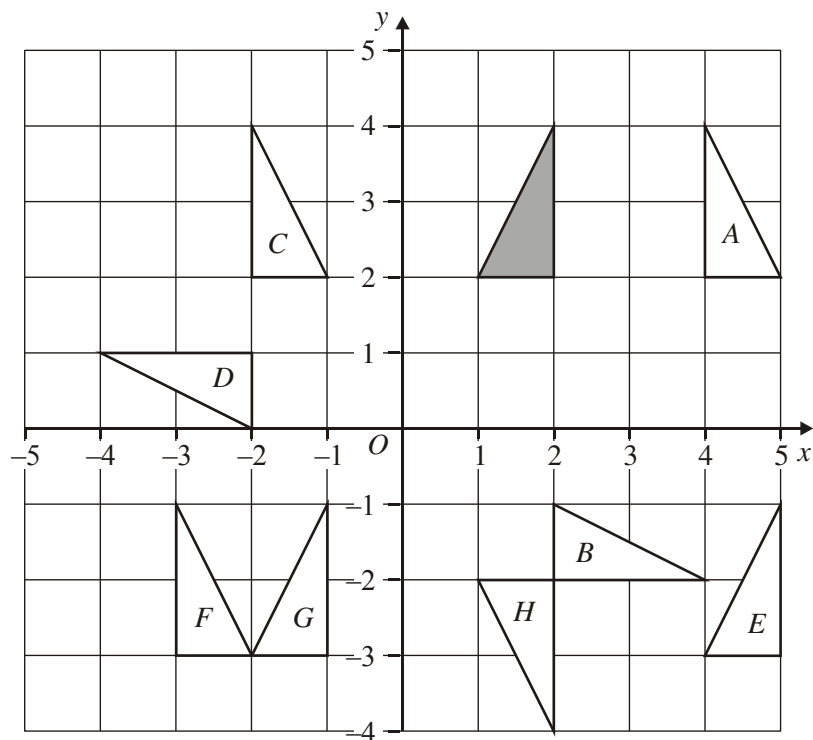b) Translate triangle T by vector $\begin{bmatrix} 3 \\ -2 \end{bmatrix}$ and label it V

Question 3:

a) Describe fully the single transformation which maps triangle A to triangle B.

b) Describe fully the single transformation which maps triangle A to triangle C.
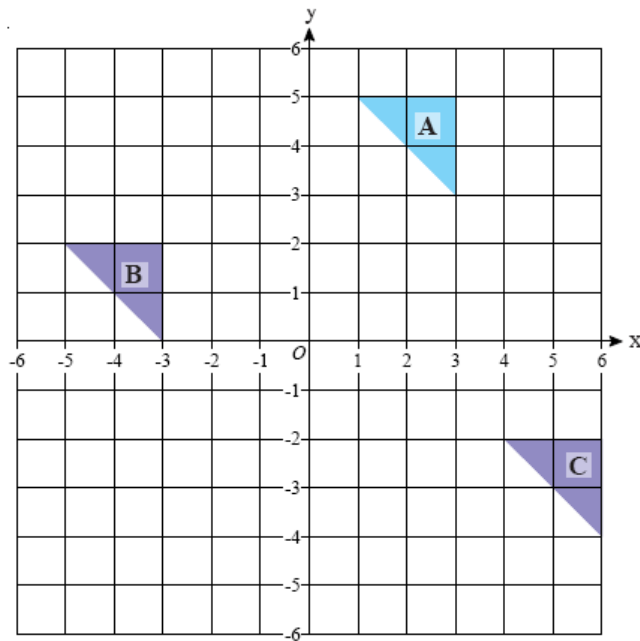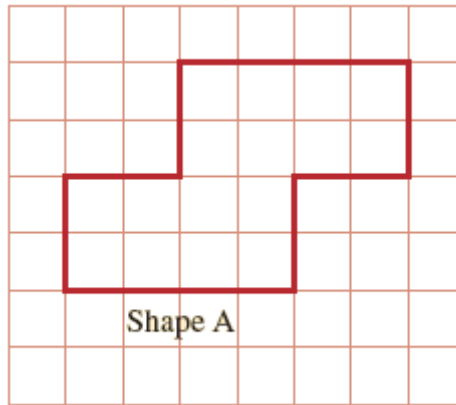

EXAM QUESTION

The grid shows several transformations of the shaded triangle.

Write down the letter of the triangle after the shaded triangle is translated by 3 squares to the right and 5 squares down,

Homework 15F

Question 1:
Enlarge the following shapes by a scale factor of 2 and 3

Shape A

Question 2:
Copy the following shapes onto graph paper, then transform them by the scale factors given, for centres of dilation at the origin. Make sure you leave sufficient room for the transformations in parts **a** and **b**.

a) by a scale factor of 3

b by a scale factor of $\dfrac{1}{2}$

c) by a scale factor of 2

d) by a scale factor of $\dfrac{2}{3}$
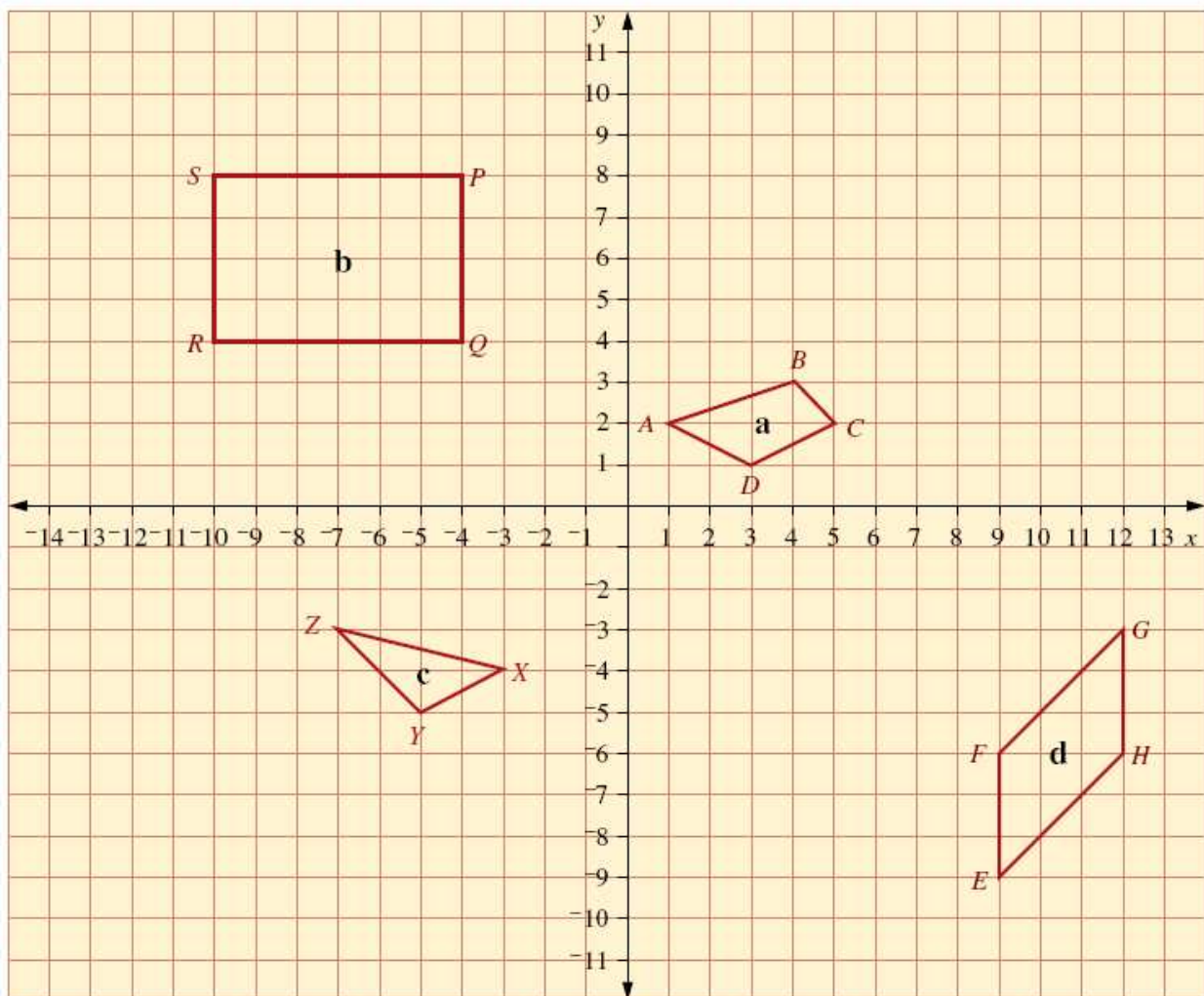
Question 3:
Draw axes from -15 to □15. Plot the given points and join them to form a shape. Then perform the given enlargements with centre (0,0)

a) Scale factor 3

A(1, 1)
B(1, 4)
C(4, 4)
D(4, 1)

b) Scale factor 4

P(1, -1)
Q(1, -2)
R(3, -2)
S(3, -1)

c) Scale factor $\frac{1}{2}$
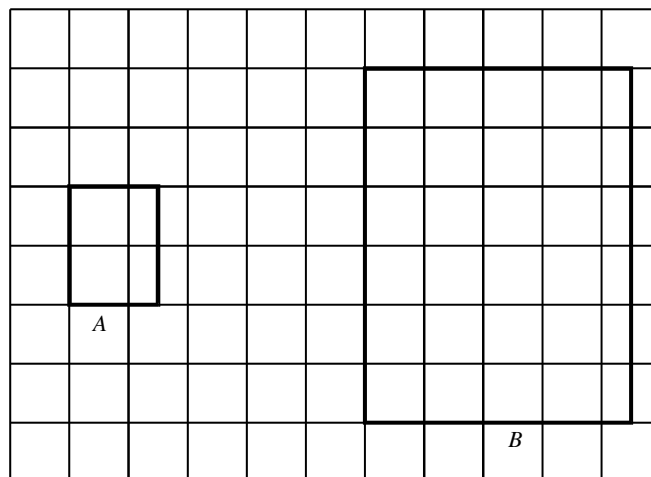
F(6, 0)
G(10, 0)
H(10, 4)
J(6, 10)

d) Scale factor $\frac{1}{3}$

X(3, -9)
Y(9, -6)
Z(9, -9)

EXAM QUESTIONS

Question1:
Rectangle *A* is enlarged to give rectangle *B* on the centimetre grid.

a) What is the scale factor of the enlargement?

b) **Rectangle B** is enlarged by scale factor 5 to give rectangle *C*. Write down the length and width of rectangle *C*.

Question 2:

Triangle *H* is an enlargement of triangle *G*.

State the scale factor of the enlargement.