

Name _____

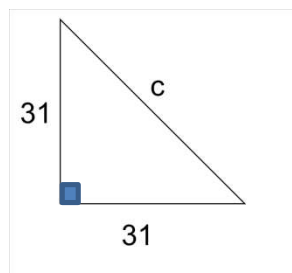
Hour _____

Pre-Algebra Semester 2 Review
Circled items are to be completed without a calculator.

1. Define rational and irrational Numbers. Provide 3 examples for each.

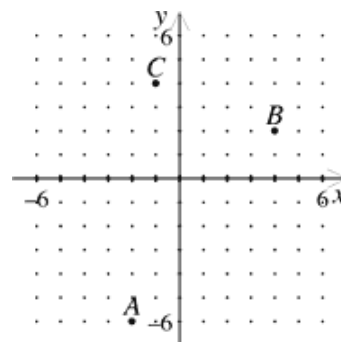
Rational Numbers	Irrational Numbers

2. Find the length of the missing side.

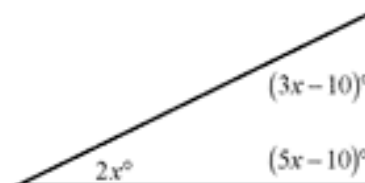


3. A carpenter built a shelf at a right angle to the wall. A support beam under the shelf forms a triangle with the edge of the shelf and the wall. The support beam is 10 inches in length and attaches to the wall 6 inches below the shelf. Explain how to find the width of the shelf.

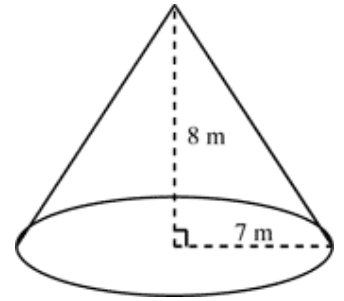
4. Find the distance from point C to point B .
Then find the slope of the line containing points C and B .



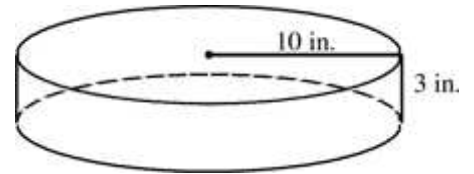
5. Find the value of x . Then classify the triangle by its angle measures.
(The figure may not be drawn to scale.)



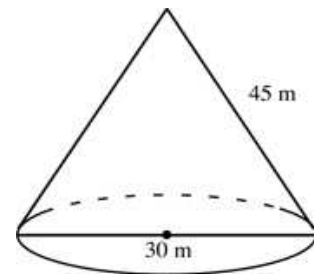
6. Find the volume of the cone. Round to the nearest tenth if necessary.
(The figure may not be drawn to scale.)



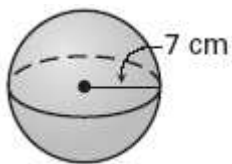
7. A concrete stepping stone is formed in the shape of a shallow cylinder as shown below.
How much concrete is used to make the stepping stone?
What is the surface area of the stepping stone?



8. Find the volume of the cone.
Round to the nearest tenth if necessary.



9. Find the volume and surface area of the sphere below.



10. A can of Pringles has a radius of 3 inches and a volume of 282.7 in^3 . What is the height of the can to the nearest inch?
11. A can of spaghetti sauce is 6 inches tall and has a diameter of 5 inches? What is the volume of the can?
Round your answer to the nearest inch.

12. Write the expression using exponents. $14 \cdot 14 \cdot 14 \cdot 14 \cdot 14 \cdot 14$

13. Find the missing exponent. $4^? \cdot 4^3 = 4^{12}$

14. Simplify the expression. Write your answer using only positive exponents.

a. $m^{-2} \cdot m^3 \cdot m^{-7}$

b. $7^{-5} \cdot 7^{11}$

c. $x^0 \cdot x^{-11}$

15. Simplify the expression (a.) $-2x^4y^6(4x^3yz^6)$

(b.) $\frac{11k^3}{33k^2}$

(c.) $\frac{r^7}{r^4}$

(d.) $(4x^3y^6)(7x^2y^4)$

(e.) $\frac{r^8d^{11}}{r^{10}d^6}$

(f.) $3^4 \cdot 3^7$

16. Simplify the expression. Write your answer using only positive exponents.

a. $\frac{a^{-12}}{a^7}$

b. $\frac{x^{-7}}{x^9}$

17. Simplify the expression using only positive exponents.

a. $-24x^8y^{-4}$

b. $-20x^5y^{-2}$

18. Simplify the expression. 12^0

19. Simplify the expression using positive exponents.

a. $\left(\frac{-4}{q}\right)^8$

b. $(a^{-2})^7$

c. $\left(\frac{a^3}{b^{-4}}\right)^{-3}$

d. $\left(\frac{\frac{1}{2}}{4}\right)^3$

e. $(x^9y)^8$

f. $(cd^2)^6$

g. $(9^3)(9^7)$

h. $\frac{x^6y^3z^9}{x^4y^7z^8}$

i. $-15x^{-4}y^3z^{-2}$

j. $5a^5bc^3 \times 12a^4b^3c^{-2}$

k. $(121)^0$

l. $\frac{a^{-2}b^{-3}}{a^3b^{-4}}$

20. Write the following numbers in scientific notation.

a. 7,235,000

b. .0009456

c. 8,903

21. Write the following numbers in standard form.

a. 4.325×10^8

b. 0.0235×10^3

c. 2.574×10^{-7}

22. Are the numbers shown in scientific notation? Why or why not? If not, write it in correctly in scientific notation.

a. 23.4567×10^4

b. 023. 345

23. Evaluate the expression. Write your answer in scientific notation. Show your work.

a. $(6 \times 10^8)(5 \times 10^{-2})$

b. 4.5×10^5

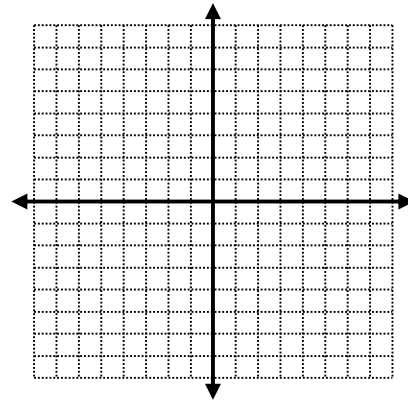
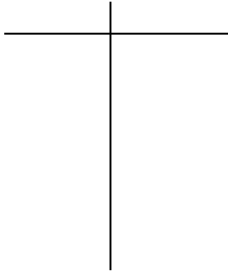
c. $(3.2 \times 10^2)^3$

d. $(23)(4.21 \times 10^5)$

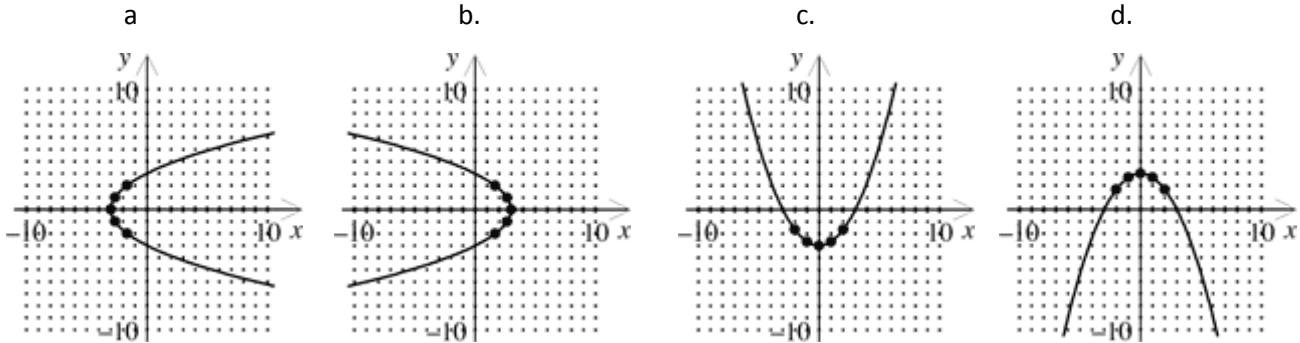
9×10^{-2}

24. Oregon has an area of approximately 2.52×10^5 square kilometers. In 2010, the population of Oregon was approximately 3.42×10^6 people. How many people were there per square kilometer in Oregon. Show your work.

25. Use a table of values to graph the function. $y = x^2 - 4x$



26. Match the graph of the equation $y = -\frac{1}{3}x^2 + 3$



27. Which function represents: $y = 2(2.8)^x$, $y = -2x - 4$, $y = 2x^2 + 3x + 2$, or $y = 2(0.8)^x$

a. Exponential growth? Explain.

b. Exponential decay? Explain.

28. A population of rabbits doubles each month. If there are 4 rabbits in a field, how many rabbits will there be in 8 months?

29. The value of Mr. Spencer's Dodge truck depreciates by 7% each year. If the original cost of the truck was \$29,900 what is the value of the truck after 5 years?

30. Mrs. Cook purchased stock for \$12,000 as part of her investment portfolio. Her stock is increasing at a rate of 4.5% each year. What will be the value of her portfolio when she retires in 12 years?

31. For an account that earns interest compounded annually, find the balance of the account.

a. $P = \$1410$, $r = 8\%$, $t = 6$ years

b. $P = \$350$, $R = 4\%$, $t = 18$ months

32. Identify if the function given in the table below is linear, quadratic, or exponential (growth or decay).

a.

x	y
-2	16
-1	4
0	0
1	4
2	16

b.

x	y
-2	2
-1	3
0	4
1	5
2	6

c.

x	y
-2	1/16
-1	1/4
0	1
1	4
2	16

d.

x	y
-2	4
-1	2
0	1
1	1/2
2	1/4

33. Identify each situation below as exponential growth, exponential decay, linear increase, or linear decrease.

Write an equation to represent the situation.

a. Advanced Middle School has 850 students and is adding 50 students each year.

b. FedEx delivers 7.2 million packages a year and their business is growing by 12% a year.

c. Julie has a bank account with a balance of \$13,000. Each month, she spends 5% of the balance.

d. Mrs. Smith's pool has 10 feet of water in it. The pool has a leak and the water is going down by 3 inches a day.

34. Solve each system (and check)

a. $x - y = 10$
 $x + y = 12$

b. $2x + 3y = 18$
 $y = 2x - 2$

c. $6x + 5y = 19$
 $2x + 3y = 5$

Solve each system - continued

d. $3x - 4y = -15$
 $5x + y = -2$

e. $2x + 3y = 4$
 $5x + 4y = 3$

f. $3x + 5y = 9$
 $9x + 2y = -12$

35. On Saturday, Katie earned \$51 for mowing 3 lawns and weeding three gardens. On Sunday, she earned \$25 for mowing 1 lawn and weeding 3 gardens. How much does she earn for each lawn she mows and for each garden she weeds?

36. The school that Stefan goes to is selling tickets to a choral performance. On the first day of ticket sales the school sold 3 senior citizen tickets and 1 child ticket for a total of \$38. The school took in \$52 on the second day by selling 3 senior citizen tickets and 2 child tickets. Find the price of a senior citizen and child's ticket.

37. Describe a system with the solution shown below. Also describe the graph of the solution.

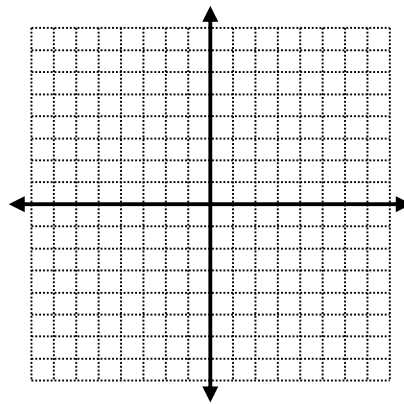
a. Has infinitely many solutions

b. Has no solution

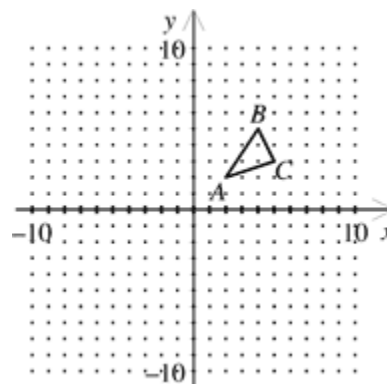
b. Has one solution

38. What is the image of $(-2, -3)$ under the translation $(x, y) \rightarrow (x + 3, y + 7)$?

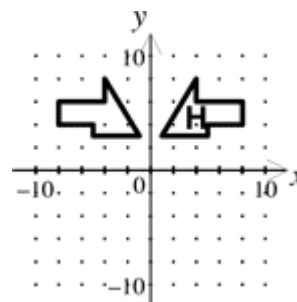
39. Graph the polygon with the vertices below.
Then graph its image using a reflection in the x -axis.
 $T(-6, 3)$, $U(-3, 3)$, $V(-4, 8)$;



40. Reflect the polygon in the x -axis, then translate the image using $(x, y) \rightarrow (x - 8, y + 10)$.

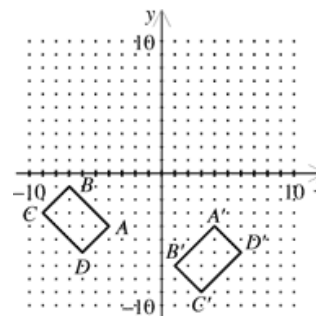


41. Tell whether the transformation of the polygon containing a letter onto the polygon without a letter is a rotation about the origin.
If so, give the angle and direction of rotation.



42. Which describes the relationship between the figures shown below?

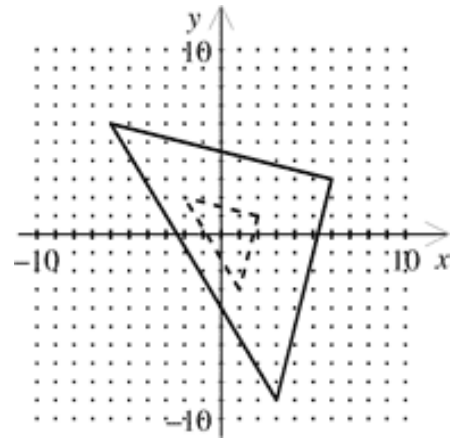
- Figure $A'B'C'D'$ is the image of figure $ABCD$ under a 90° rotation clockwise about the origin.
- Figure $A'B'C'D'$ is the image of figure $ABCD$ under a 45° rotation counterclockwise about the origin.
- Figure $A'B'C'D'$ is the image of figure $ABCD$ under a 180° rotation about the origin.
- Figure $A'B'C'D'$ is the image of figure $ABCD$ under a 90° rotation counterclockwise about the origin.



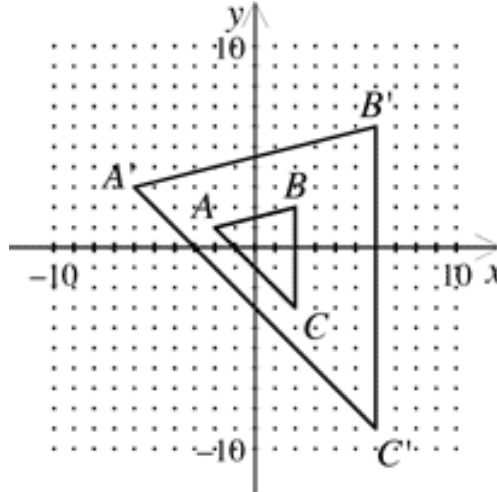
43. Identify the coordinates of the point $(2, -5)$ after a rotation of 180° clockwise around the origin.

44. In a dilation, if the image is smaller than the original figure, then the dilation has a scale factor that is a number $__?$

45. The dashed triangle is the image of the solid triangle formed by a dilation centered at the origin. Find the scale factor of the dilation.

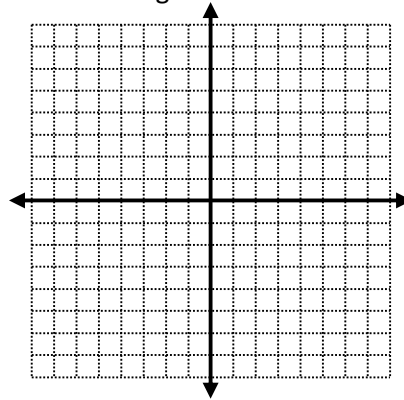


46. Find the scale factor of the dilation.



47. The vertices of a polygon are given. Draw the polygon. Then find the coordinates of the vertices of the image after a dilation having the given scale factor, and draw the image.

$$R(4, 8), S(-8, 4), T(-4, -8), U(8, -4); k = \frac{1}{4}$$



48. The length of one side of an original figure is 16 units. The length of the corresponding side of the image figure has the measurement of

- 8 units - what is the scale factor of the dilation?
- 64 units – what is the scale factor of the dilation?
- 1,600 units – what is the scale factor of the dilation?