MAP4C Formative Test: Mortgages, Converting, Area, Volume   Name:
                                                                                 Date:

$P = PV$ $I = \Pr t$ $A = P(1+i)^n$ $FV = \dfrac{Pmt[(1+i)^n - 1]}{i}$ $PV = \dfrac{Pmt[1-(1+i)^{-n}]}{i}$

$A = FV$ $A = P + I$ $PV = A(1+i)^{-n}$

                                   $i = (1 + \frac{r}{2})^{2/p} - 1$ $Pmt = \dfrac{FV \times i}{[(1+i)^n - 1]}$ $Pmt = \dfrac{PV \times i}{[1-(1+i)^{-n}]}$

Length

Metric System	Imperial System	Equivalent
10 mm = 1 cm	12 inches = 1 foot	1 inch is approximately equal to 25.5 mm
100 cm = 1 m	3 feet = 1 yard	1 foot is approximately equal to 30.48 cm
1000 m = 1 km	1760 yards = 1 mile	1 yard is approximately equal to 0.9144 m
		1 mile is approximately equal to 1.609 km

Volume

Metric System	Imperial System (US)	Equivalent
1 mL = 1 cm³	16 fluid ounces = 1 pint	1 fluid ounce is approx. 29.574 mL
	2 pints = 1 quart	1 pint is approximately 0.473 L
1000 mL = 1000 cm³ = 1 L	8 pints = 1 gallon	1 gallon is approximately 3.785 L

Mass

Metric System	Imperial System	Equivalent
1000 g = 1 kg	16 ounces = 1 pound	1 ounce is approximately 28.35 g
1000 kg = 1 t	2000 pounds = 1 ton (US)	1 pound us approximately 0.454 kg
		1 ton(US) is approximately 0.907 t

Refer to your formula sheet for all other information.

1.   Convert the following: [7]   *3.5 in x 2.54 cm*

   a. $3\frac{1}{2}$ cm to inches **8.89** *cm* and to   *1 in*   b. $2\frac{1}{4}$ miles to yards *3,960 yd* and

        millimeters **889** *mm*   to meters *3,621 m*   *3960 yd × 0.9144 m / yd*

2.25 mi × 1760 yd / 1 mi

   c.   25 mL to fluid ounces *0.845 fd. oz.*   d.   7 pints to liters   **3.311 L**
        25 mL × 1 fd. oz. / 29.574 mL   *7 pt × 0.473 L / 1 pt*

   e.   5 kg to pounds **11.01 lbs.**
        5 kg × 1 lbs / 0.454 kg

2.   Find the perimeter. [3]   Find the perimeter.

   $P = 15 + 5 + 10 + 8 + 10 + 5 + (15+5)$ *5 m*

   $+ (5+8) + 5 + 5 + 15$ *15 m*   *10 m*

                                                        Start   *8m*

   $P = 111 \, m$
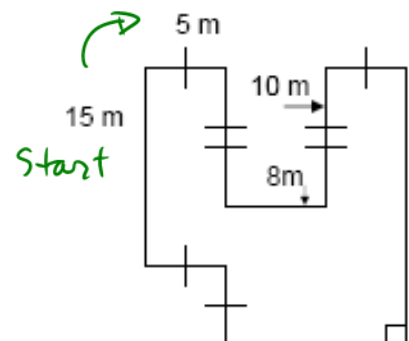
3. Determine the perimeter.   [2]

$\frac{3}{4}$ of a circle's Circumfrance

start

5 m

10 m

4 m

10.5 m

8 m

16.5 m

$P = \frac{3}{4}(\pi d) + 10 + 10.5 + 16.5 + 8 + 4$

$= \frac{3}{4}(\pi \times 5) + 49$

$= 11.781 + 49$

$= 60.8 \ m$ to one decimal
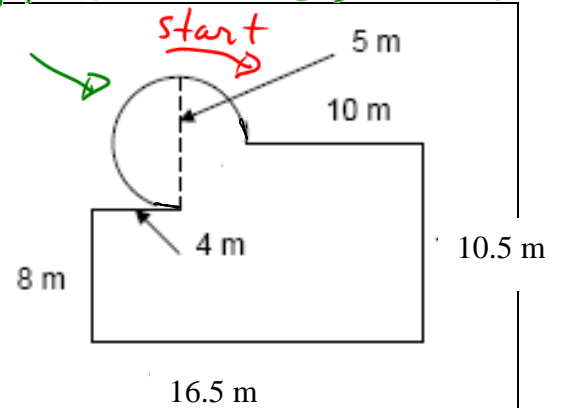
4. If it costs \$35 per meter, determine the cost of fencing the area.   [2]

$Cost = \frac{\$35}{m} \times 60.8 \ m$

$= \$2,128$

5. Determine the area.   [3]

A_1

10 m

$r = 2.5 m$

A_2 A_3

$A = A_1 + A_2 + A_3$

$= \frac{3}{4}\pi r^2 + (10 + 2.5) \times 10.5 + $
$\qquad + 4 \times 8$

$= \frac{3}{4} \times \pi \times 2.5^2 + \quad 12.5 \times 10.5 + 4 \times 8 \ = 14.73 + 131.25 + 32$

$\qquad\qquad\qquad\qquad\qquad\qquad A = 177.98 \quad \sim 178 \ m^2$
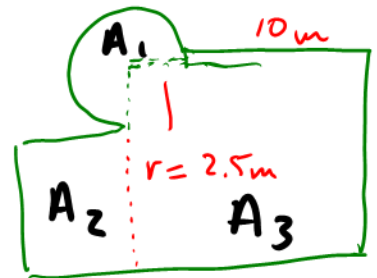
6. Determine the surface area of the figure.   [4]

5 sides

3 cm $r = 1.5 \ cm$

A_1 5 cm

A_2

8 cm

$Area = \pi d + 2\pi r \times 5 + 8 \times 8 \times 5$
$\qquad + (8 \times 8 - \pi d)$

$= \pi \times 3 + 2\pi \times 1.5 \times 5 + 8 \times 8 \times 5$
$\qquad\qquad + (8 \times 8 - \pi \times 3)$
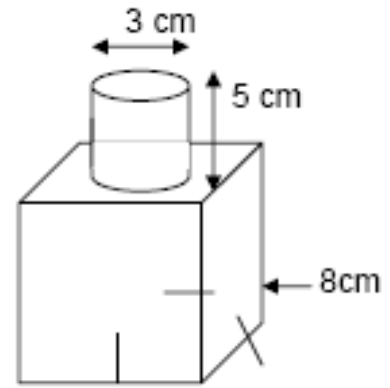
$= 9.42 + 47.12 + 320 + 54.58$

$A = 431.11 \ cm^2$
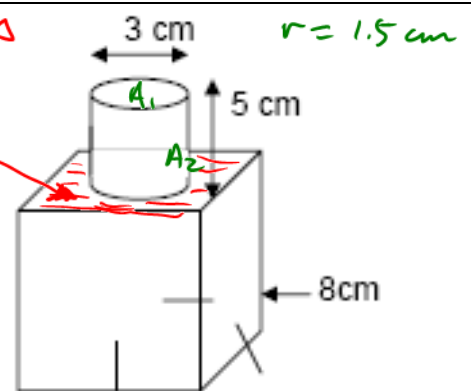
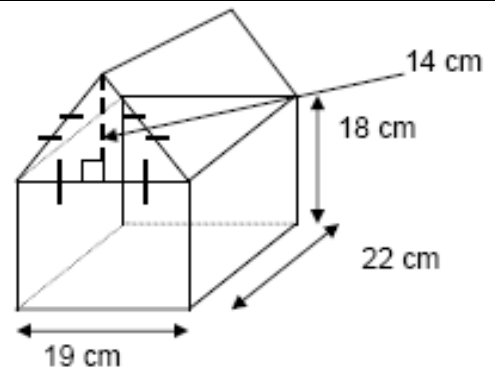Don't forget the units.

7. Determine the volume of the figure. [3]

$$V = \pi d \times 5 + 8 \times 8 \times 8$$
$$= \pi \times 3 \times 5 + 8 \times 8 \times 8$$
$$= 47.12 + 512$$
$$V = 559.12 \ \underline{cm^3}$$

← Units.

3 cm

5 cm

8cm

8. Calculate the volume of the solid below. [4]

$$V = \left(\begin{array}{c}\text{Area of}\\ \text{tri.}\end{array}\right) \times l + \text{rectangular prism.}$$
$$= \tfrac{1}{2} \text{base} \times \text{height} \times l + l \times w \times h$$
$$= \tfrac{1}{2} \times 19 \times 14 \times 22 + 18 \times 22 \times 19$$
$$= 2926 + 7524$$
$$= 10,450 \ cm^3$$

14 cm
18 cm
22 cm
19 cm

PART B   Mortgage Problems.
1.   Chase is buying a house for $189,000.00. He estimates his lawyer fees will be $2200.00.
The land transfer tax is 1.2% of the purchase price. His CMHC costs are $5,000.00. He is
making a down payment of 10%.. Chase is going to take a 20 year mortgage and pay
monthly. He takes a 3 year term. His mortgage is 5% with monthly payment.
a. Calculate the land transfer tax. [1]   1.2% of 189,000

His Ltt is $2,268 $= 0.012 \times 189\,000 = \$2268$

b. Calculate the down payment. [1]   10% of 189 000 $= 0.10 \times 189000$
Chase puts $= \$18,900$
$18,900 down

c. Calculate the mortgage amount. [1]   90% of 189 000 $= 0.90 \times 189\,000$
Mortgage is for $= \$170,100$
$170,100

d. Calculate **the total amount** of money Chase will need on the closing date. [2]

$$\text{Total} = 2200 + 2268 + 5000 + 18,900$$
$$\text{Total} = \$28,368$$

e. What is the percentage required before a High Ratio mortgage is not applicable? Is this a high ratio mortgage? [2] *You need to put down 25% or more to avoid a high Ratio mortgage. This is a high ratio mortgage which means he*

f. Determine the equivalent interest rate. [2] *will need default insurance.*

$$i = \left(1 + \frac{r}{2}\right)^{2/P} - 1$$

$$= \left(1 + \frac{0.05}{2}\right)^{2/12} = 0.004123915$$

g. Determine his payment. [3]   *The payment is $1,117.77*

$$Pmt = \frac{P.V. \times i}{[1 - (1+i)^{-n}]}$$

$$= \frac{170,100 \times 0.004123915}{[1 - (1.0041239 5)^{-12 \times 20}]} = \$1,117.77$$

h. Determine the balance owing at the end of his 3 year term. Hint: Use a time line to help. [3]

17 years

$$n = 17 \times 12$$
$$= 204$$

0   3 years   20 years.

$$PV. = \frac{Pmt[1 - (1+i)^{-n}]}{i} = \frac{1117.77[1 - (1.004123915)^{-204}]}{0.00412395}$$

i. Determine the amount of principal paid in the first 3 years. [2] $P.V. = \$153,978.37$

$$Pple = 170100 - 153,978.37$$
$$= \$16,121.63$$ *Chase has paid off $16,121.63* Balance owing.

j. Determine the interest paid at the end of his 3 year term. [2]

$$Int. = 3 \times 12 \times 1117.77 - 16,121.63$$
$$= \$24,118.09$$

The interest paid is $24,118.09

Using the graphing calculator, answer the following question.

2. Brandon buys a $275,000 house. He puts down 25% . He can get 5.6% for a 4 year term on a 20 year mortgage. Determine [4] *He pays bi-monthly.*

   bal(___, 2)

a. The payment.

Payment is $2,852.44

ΣPrn(___,___,2)

b. The balanced owing at the end of his 4 year term.

$$bal(6 \times 4, 2) = \$180,982.69$$

ΣInt(___,___,2)

c. The principal paid off at the end of his 4 year term.

$$\Sigma Prn(1, 6 \times 4, 2) = \$125,267.31$$

d. The interest paid by the end of his 4 year term.

$$\Sigma Int(1, 6 \times 4, 2) = \$43,191.25$$

To two decimals

From 1ST compounding period   *To the 24th compounding period.*