SA and V

Q1 - 7 SA

Q 8 - Section B Q1 LW

Alg

Q 2 - Q 6 TL

Q 7 - Literacy PW

Carlingford High School

Mathematics

Year 9 Term 2 Examination

5.2 Course

2018

Name: Soln. **Class: 5.2**___

Circle your teacher's name: Mrs Lobejko Ms Wilson/Mrs Lego

Miss Aung Mr Wilson

Time allowed: 50 minutes

- Board approved calculators may be used.
- Show all necessary working.
- Marks may be deducted for careless or untidy work.
- Questions marked with an asterisk * are extension level questions.
- Complete the examination in blue or black pen.

Topic	Surface Area and Volume	Algebraic Skills	Literacy	Total
Mark	/29	/35	/8	/72
Extension*	/8	/4		/12
Total	/37	/39	/8	/84

Section A: Surface Area and Volume

1. Convert the following: (4 marks)

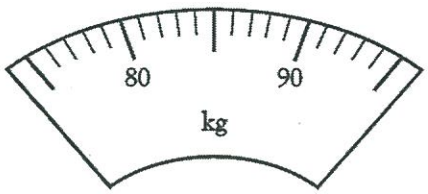
a) 410 cm = 4.1 m

b) 0.0087 KL = 8.7 L

c) 310 g = 0.310 kg

d) 7310 m^2 = 0.731 ha

2. Find the limits of accuracy for the measuring scale below: (1 mark)



± 0.5 kg

3. The roof of the Sydney Opera House is covered with 1.056 million tiles. If each tile covers 175 cm^2, what area is covered by the tiles? Circle the correct answer.

A. 184.8 m^2

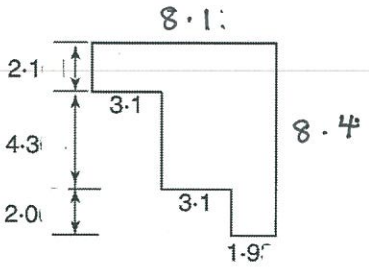
B. 18 480 m^2

C. 184 800 m^2

D. 1 848 000 m^2

4. Calculate the perimeter of the figures below. All measurements are in metres.

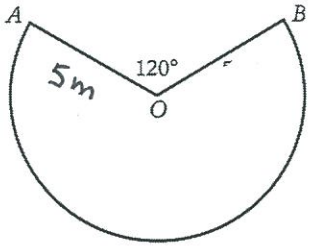
a) [2]



$(8.1 \times 2) + (8.4 \times 2)$

$= 33$ m

b) [2]



(Answer to one decimal place.)

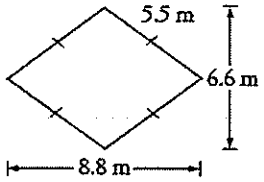
$\left(\frac{240}{360} \times 2 \times \pi \times 5\right) + 5 + 5$

$= 30.943$

$= 30.9$ m

5. Find the area of each of the shapes below.

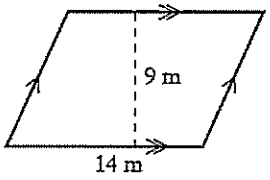
a) [2]



$A = \frac{1}{2} \times 8.8 \times 6.6$

$= 29.04\ m^2$

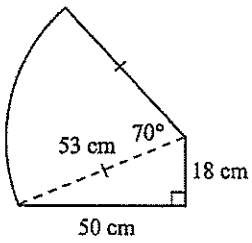
b) [2]



$A = 9 \times 14$

$= 126\ m^2$

b) [3]



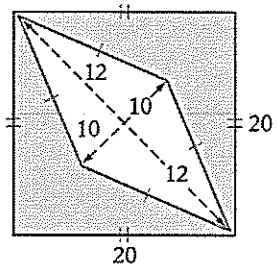
(Answer to one decimal place.)

$\left(\frac{70}{360} \times \pi \times 53^2\right) + \left(\frac{1}{2} \times 50 \times 18\right)$

$= 2165.920...$

$= 2165.9\ cm^2$

6. Calculate the shaded area. Measurements are in mm. (3 marks)



$A = (20 \times 20) - \left(\frac{1}{2} \times 20 \times 24\right)$

$= 160\ mm^2$

*7. Calculate the dimensions of a cube that has a surface area of 338 cm^2. Answer correct to one decimal place. (3 marks)

$SA = 338$

$\therefore A = 338 \div 6$

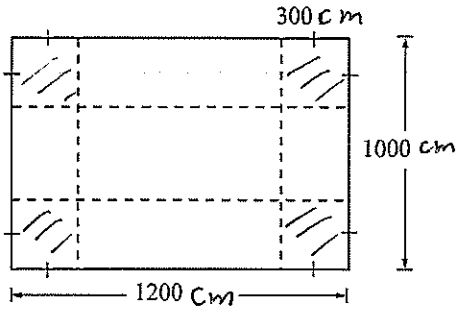
$= 56.33...$

$\therefore S = \sqrt{56.33...}$

$= 7.505...$

$= 7.5\ cm.$

8. A sheet of cardboard 1200 cm by 1000 cm has squares of side-length 300 mm cut from each corner. The sides are folded up to form an open rectangular box.



a) Calculate the surface area of the rectangular box. [2]

$SA = (1200 \times 1000) - (300 \times 300 \times 4)$

$= 840000 \text{ cm}^2$

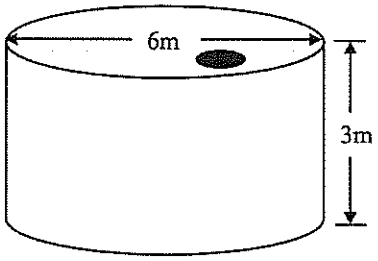
*b) Jen wants to paint the outside of the box blue. If two coats of paint are required and a 2 L can of paint covers 82000 cm^2, calculate how many tins of paint are needed. [2]

$840000 \times 2 = 1680000 \text{ cm}^2$

$1680000 \div 82000 = 20.48..$

$\therefore$ 21 tins.

9. The diagram of a closed metal water tank is shown below. The tank has a hole in the top to allow rainfall in. The area of this hole is 0.6 square metres.



*a) Calculate the amount of metal used to construct the tank. Answer to one decimal place. [3]

$A = [(\pi \times 3^2) - 0.6] + (\pi \times 3^2) + (2 \times \pi \times 3 \times 3)$

$= 112.497...$

$= 112.5 \text{ m}^2$

b) Find the volume of the tank in cubic metres. Answer to three decimal places. [2]

$V = \pi \times 3^2 \times 3$

$= 84.82300...$

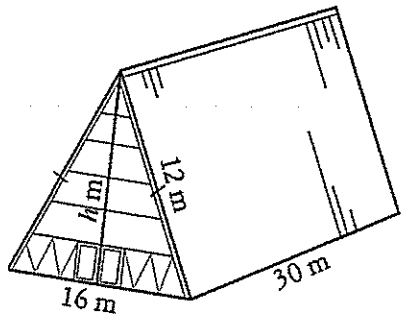
$= 84.823 \text{ m}^3$

c) What is its capacity, correct to the nearest litre, when full. [2]

$1 \text{ m}^3 = 1000 \text{ L}$

$84.823 = 84823 \text{ L}.$

10. A triangular prism has a width of 16 m, a length of 30 m and a slant height of 12 m, as shown in the diagram below.



a) Find the perpendicular height, h, of the prism, correct to one decimal place. [1]

$h = \sqrt{12^2 - 8^2}$

$= 8.944...$

$= 8.9\text{ m}$

b) Find the volume of the triangular prism. [2]

$V = \left(\frac{1}{2} \times 8.9 \times 16\right) \times 30$

$= 2136\text{ m}^3$

Section B: Algebraic Skills

1. Simplify fully: (1 mark each)

a) $5a + 2b - 3a + b =$ $2a + 3b$

b) $5p^2 + 2p - 3p^2 =$ $2p^2 + 2p$

c) $5a \times 6f =$ $30af$

d) $-6x \div 18xy =$ $-\frac{1}{3y}$

e) $\frac{63k^2}{-7k} =$ $-9k$

f) $10p^2 \times 4c \div 5ap =$ $\frac{8pc}{a}$

g) $(-2x) \times (-3x) \times 7 =$ $42x^2$

h) $20z - 14z \div 2 =$ $13z$

2. Simplify fully:

a) $\frac{3x}{5} + \frac{2x}{5} = \frac{5x}{5} = x$ [1]

b) $\frac{5}{g} - \frac{2}{g} = \frac{3}{9}$ [1]

c) $\frac{4x}{6} - \frac{x}{3} = \frac{4x}{6} - \frac{2x}{6} = \frac{2x}{6} = \frac{x}{3}$ [2]

3. Write an algebraic expression, in simplest form, for each of the following.

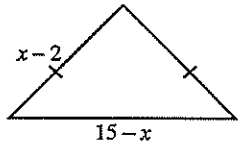
a) If Sue travelled x km in 2 hours, and then y km in the next three hours, how far has Sue travelled altogether? [1]

$(x+y)$ km

or

$x+y$

b) Write an expression for the perimeter of the rectangle below. [2]



$P = (x-2)+(15-x)+(x-2)$

$= x+11$

4. Evaluate each of the following if $m = -6$ and $n = 3$. Answer to one decimal place, where necessary.

a) $16-m+n =$ $16-(-6)+3$ [1]

$= 25$

b) $\sqrt{m^2+5n} =$ $\sqrt{(-6)^2+5(3)}$ [2]

$= 7.1$

5. Simplify the following fully:

a) $\frac{3\cancel{b}}{\cancel{2}} \times \frac{\cancel{4}^{2}}{5\cancel{b}} = \frac{6}{5}$ [1]

$= 1\frac{1}{5}$

b) $\frac{8a}{3b} \div \frac{2a}{9b} = \frac{4\cancel{8a}}{\cancel{3b}} \times \frac{\overset{3}{\cancel{9}}\cancel{b}}{\cancel{2a}}$ [2]

$= 12$

6. Expand and fully simplify each expression:

a) $9(r-2) =$ $9r-18$ [1]

b) $3y(2x-5y) =$ $6xy-15y^2$ [1]

c) $-(7-2m) =$ $-7+2m$ [1]

d) $7n-4+3(n-1) =$ $7n-4+3n-3$ [2]

$= 10n-7$

*e) $3x(2x-1)-x(2x+2)-5x$ [2]

$= 6x^2-3x-2x^2-2x-5x$

$= 4x^2-10x$

7. Expand and simplify completely the following binomial products. a) $(c+2)(c+3) =$ $c^2 + 5c + 6$ [1] b) $(y+1)(y-5) =$ $y^2 - 4y - 5$ [1] c) $(10r-1)(r-10) =$ $10r^2 - 101r + 10$ [2]	*9. Simplify the following expression fully: $\frac{15w}{7x} \div \frac{40y}{9x} \times \frac{16xy}{45w}$ [2] $= \frac{15w}{7x} \times \frac{9x}{40y} \times \frac{16xy}{45w}$ $= \frac{12x}{70}$ $= \frac{6x}{35}$
8. Factorise the following expressions completely: (1 mark each) a) $3f + 6 =$ $3(f+2)$ b) $24x + 30 =$ $6(4x+5)$ c) $6t^2 + 27t =$ $3t(2t+9)$ d) $a(a-3) + 6(a-3) =$ $(a-3)(a+6)$ e) $(y-6) - y(y-6) =$ $(y-6)(1-y)$	.

11

Literacy: (8 marks)

Use the following words to complete the following sentences.

capacity	substitution	approximations
volume	exact	pronumerals
area	like	perimeter

1. All measurements are only approximations. No measurement is ever exact.
2. In algebra, letters of the alphabet are used to represent numbers. Such letters are called pronumerals
3. Substitution involves replacing the pronumeral in an algebraic expression with one or more numbers.
4. Terms that have identical pronumeral parts are called like terms.
5. The area of a shape is the amount of surface covered by the shape.
6. The volume of a solid is the amount of space it occupies.
7. The capacity of a container is the amount of fluid it holds

End of Exam