Carlingford High School

SA + Vol
* Q1-7 = TL
* Q8-10 = KC

Lin. Rel
* Q1-5 = GF
* Q6-10 = AG

Mathematics

Year 9 5.2 Term 2 Examination 2019

Name: Sample Solutions + Marking Criteria

Circle your teacher's name:

Miss Aung/Mr Cheng Ms Lobejko

Mrs Blakeley/Mr Fardouly Mr Gong

Time allowed: 50 minutes

- Show all necessary working.
- Answer all questions in the spaces provided.
- 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 & Volume	Linear Relationships	Total
Mark	/ 36	/ 32	/ 68

Surface Area and Volume

1) Rearrange the words in **bold** below to form a sentence. Remember to add a capital letter at the beginning, and a full stop at the end, of the sentence. **[1]**

solid of amount volume the of occupies a space is the it

The volume of a solid is the amount of space it occupies.

✓ with capital letter and full stop

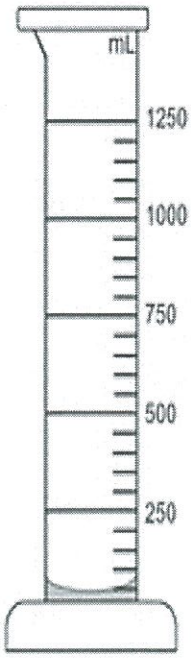
2) Convert: **[1 mark each]**

a) $5.2\ km =$ 5200 ✓ m

b) $172{,}800\ s =$ 2 ✓ $days$

c) $400\ cm^3 =$ 0.4 ✓ L

3)



For the measuring device on the left, find:

a) The size of one unit. **[1]**

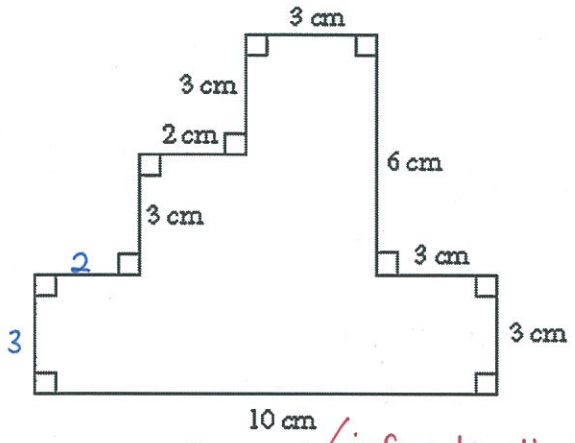
50 ✓ mL

b) Its limit of accuracy **[2]**

± ✓ 25 ✓ mL

* deduct mark once for not including units

4) Find the **perimeter** of the shape below. **[2]**



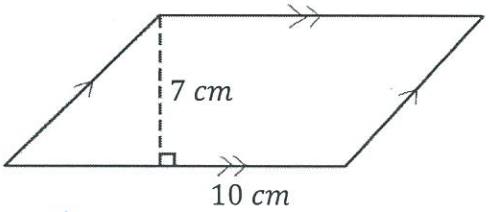
✓ infers length of unknown sides

$P = 2(10+9)$

$= 38$ cm ✓

5) Calculate the **area** of each of the following.

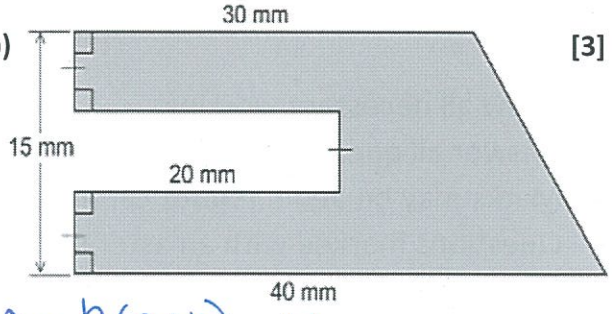
a) **[1]**



$A = 7 \times 10$

$= 70\ cm^2$ ✓

b) **[3]**



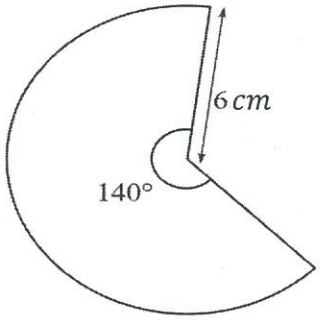
$A = \frac{h}{2}(a+b) - bh$

$= \frac{15}{2}(30+40) - 5 \times 20$ ✓

$= 525 - 100$ ✓

$= 425$ ✓ mm^2

6) For the sector below, calculate its:



a) Exact **area** **[2]**

$A = \pi \times 36 \times \frac{140}{360}$ ✓

$= 14\pi \ cm^2$ ✓ exact value

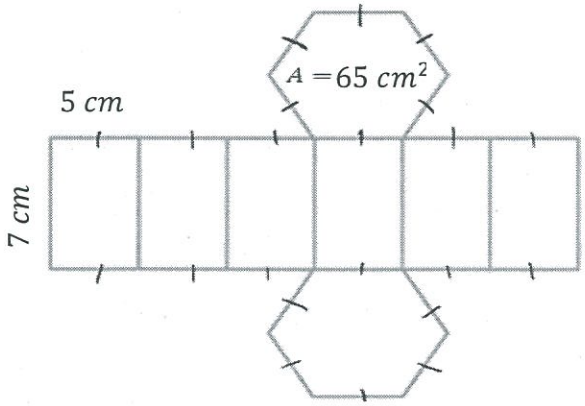
b) **Perimeter**, to one decimal place **[2]**

$P = \left(2\pi \times 6 \times \frac{140}{360}\right)$ ✓ $+ 6 + 6$

$= 26.66076572$

$= 26.7 \ cm$ ✓

7) The following is the net of a solid.



a) Calculate the **volume** of the solid. **[1]**

$V = 65 \times 7$

$= 455 \ cm^3$ ✓

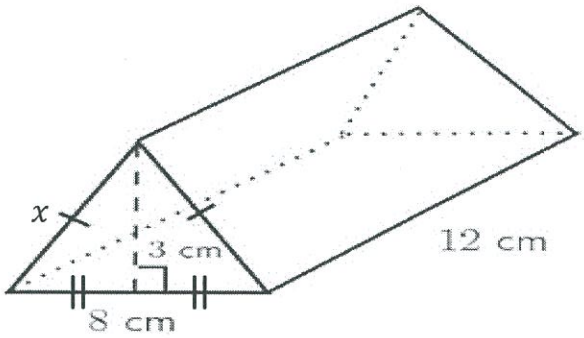
b) Calculate the **surface area** of the solid. **[2]**

✓ either

$SA = (65 \times 2) + (6 \times 7 \times 5)$

$= 340 cm^2$ ✓

8) In the following prism, the triangles have a base length of 8 cm and height of 3 cm.



Calculate:

a) The length of side x **[2]**

$x^2 = 3^2 + 4^2$ ✓

$x^2 = 9 + 16$

$x^2 = 25$

$x = 5 \ cm$ ✓

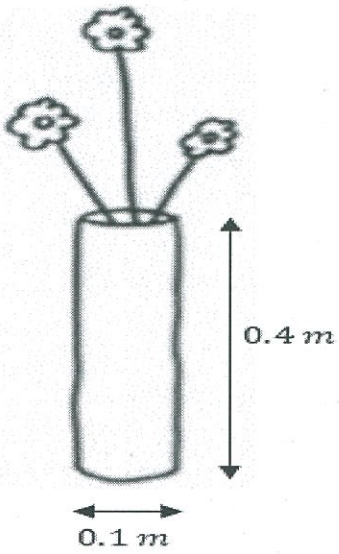
b) The **surface area** of the prism **[3]**

$SA = \left(\frac{8 \times 3}{2} \times 2\right)$ ✓ $+ (2 \times 12 \times 5)$ ✓ $+ (8 \times 12)$

$= 24 + 120 + 96$

$= 240 cm^2$ ✓

9) The plastic cylindrical vase pictured below has $0.1\ m$ diameter and $0.4\ m$ height.



a) What is the **radius** of the base of the vase? **[1]**

$r = 0.1 \div 2$
$= 0.05\ m$ ✓

b) Find the area, to 2 decimal places, of the **curved surface** of the vase. **[1]**

$A = 2 \times \pi \times 0.05 \times 0.4$
$= 0.125663706$
$= 0.13\ m^2$ ✓ correct rounding

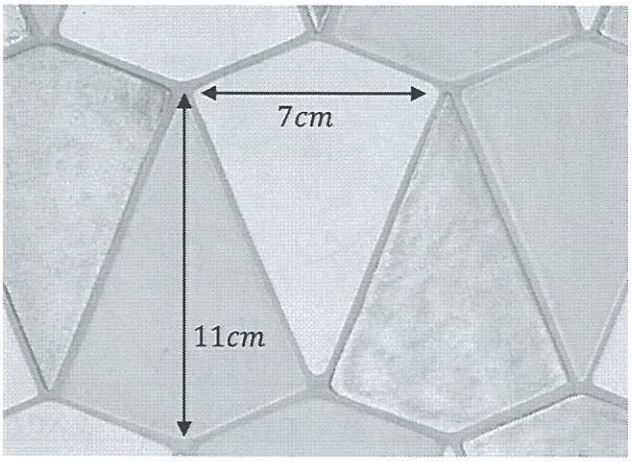
c) How many square metres of plastic, to 2 decimal places, is used to make the vase? **[2]**

$SA = (\pi \times 0.05^2) + 0.13$ ✓
$= 0.137853981$
$= 0.14\ m^2$ ✓

d) How much water can the vase hold? Answer to the nearest litre. **[2]**

$V = \pi \times 0.05^2 \times 0.4$
$= 0.003141592654$ ✓
capacity $= 3.14159...\ L$
$= 3\ L$ ✓

10) Each of these kite-shaped floor tiles have the same dimensions.



a) Calculate the **area** covered by **one** tile. **[1]**

$A = \frac{7 \times 11}{2}$
$= 38.5\ cm^2$ ✓

b) *How many of these tiles will be needed to cover a $2\ m$ by $1\ m$ rectangular floor space? Assume that any gaps can be filled by cutting the tiles to size. **[3]**

Floor area $= 200 \times 100 = 20000\ cm^2$ ✓
# of tiles $= 20000 \div 38.5$ ✓
$= 519.4805195$
$\therefore$ 520 tiles needed ✓

c) The tiles are made of clay. If each tile needs to be $0.5\ cm$ deep, calculate the **volume** of clay needed for **one** tile. **[1]**

$V = 38.5 \times 0.5$ ✓
$= 19.25\ cm^3$

Linear Relationships

1) From the words written in **bold**, circle the word that best matches the statement. **[1 mark each]**

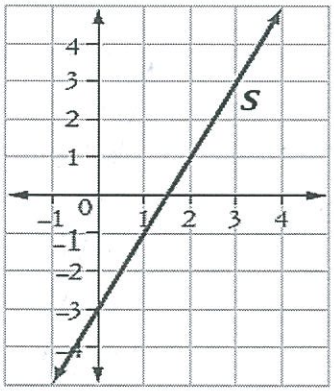
a) **Infinite** / **definite** means "limitless or endless".

b) A **vertical** / **horizontal** line runs from left to right.

2) Write the equation of the line that is always 5 units to the left of the y-axis **[1]**

$x = -5$ ✓

3) For the line S in the graph below, write TRUE or FALSE for each of the following statements.



[1 mark each]

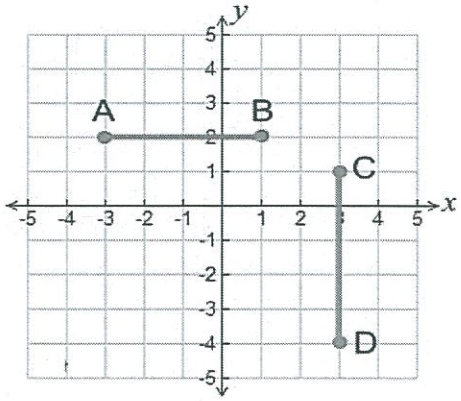
a) The line has a negative gradient. F ✓

b) The point $(-1,1)$ lies on the line. F ✓

c) The coordinates of the x-intercept is $\left(\frac{3}{2}, 0\right)$.

T ✓

4) Consider the following graph.



For the interval AB, find the: **[1 mark each]**

a) Length 4 units ✓

b) Midpoint $(-1, 2)$ ✓ in coordinate form

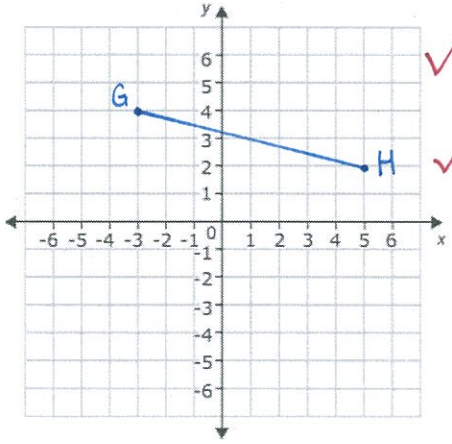
c) Gradient 0 ✓

d) Equation of the line that goes through AB.

$y = 2$ ✓

5) Consider the interval joining $G(-3,4)$ and $H(5,2)$.

a) Plot and label interval GH **[2]**



✓ correct points

✓ labels & actually an interval (not a line)

Hence, or otherwise, find

b) The **midpoint** of interval GH **[2]**

$(1, 3)$

If by visual inspection
✓ correct values
✓ coordinate form

If by calculation
✓ evidence of correct method
✓ correct values of x and y

c) The exact **length** of interval GH **[2]**

length $= \sqrt{2^2 + 8^2}$ ✓

$= \sqrt{4+64}$

$= \sqrt{68}$ units ✓ exact value

6) Given the line with equation $y = 3x - 2$, find the:

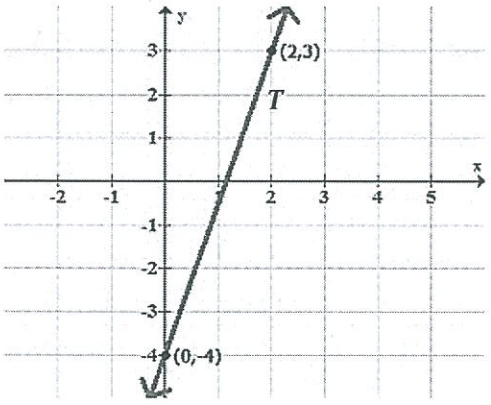
a) Gradient [1]

3 ✓

b) y-intercept [1]

-2 ✓

7) For the line T in the graph given below, find:



a) The **gradient** of the line T [1]

$m = \frac{7}{2}$ ✓

b) The equation of the line T, in gradient-intercept form ($y = mx + b$). [2]

$y = \frac{7}{2}x - 4$ ✓ ✓

8) Does the point $(-4,13)$ lie on the line $y = 2x - 6$? Show all calculations. [2]

$13 = 2(-4) - 6$

$13 = -8 - 6$ ✓

$13 = -14$, false

∴ Point does not lie on line ✓

9) Given the line with equation $y = 2 - 3x$

a) Complete the following table of values [3]

x	0	1	2
y	2 ✓	-1 ✓	-4 ✓

(Working out space)

b) Find the x-**intercept** of the line. [2]

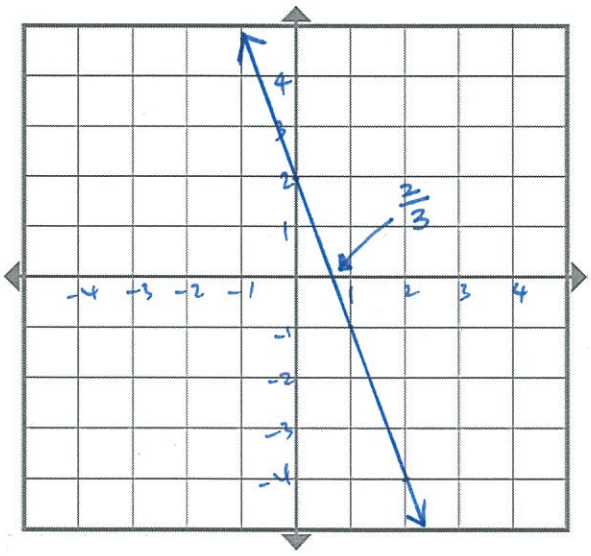
when $y = 0$

$0 = 2 - 3x$ ✓

$3x = 2$

$x = \frac{2}{3}$ ✓

c) Graph the equation, clearly marking the intercepts. [2]



✓ correct line

✓ intercepts labelled, arrowheads

10) *The midpoint of interval TU is $(-14, 3.5)$.

The coordinates of T are $(7, y)$. The coordinates of U are $(x, 5)$.

Find the value of x and y. **[2]**

$\frac{7+x}{2} = -14$ $\qquad$ $\frac{y+5}{2} = 3.5$

$7+x = -28$ $\qquad$ $y+5 = 7$

$x = -35$ $\qquad$ $y = 2$

✓ some evidence of appropriate method

✓ correct values for x and y

End of Exam