Carlingford High School

Year 9 Mathematics 5.3

2018 Term 2 Examination

Name: _____

Circle your teacher's name: Mrs Bennett Mr Gong Mrs Hooper/Ms Gamble

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	Algebraic techniques	Area, surface area and volume	Financial mathematics	Total
Mark	**/24**	**/11**	**/5**	**/40**
***Extension**	**/13**	**/3**	**/4**	**/20**
Total	**/37**	**/14**	**/9**	**/60**

Part 1 – Algebraic techniques (37 marks)

1A. Complete the following definitions **(2 marks)**

(i) $(x+5)$ and $(x-1)$ are called _____ _____

(ii) $(x+5)(x-1)$ is called a _____ _____

1B. Simplify each of the following:

(i) $5x^2 - 9x + 3x^2 + 7x$ **(1 mark)**

(ii) $8vw \div 48v$ **(2 marks)**

(iii) $2b \times 3a \times (-4c)$ **(2 marks)**

(iv) $(-3x^4)^3$ **(2 marks)**

(v) $\frac{2p}{5} - \frac{p}{15}$ **(2 marks)**

(vi) $\frac{n+2}{2} - \frac{n+1}{4}$ **(2 marks)** $*$

(vii) $\frac{6}{r} \times \frac{5r}{9} \div \frac{15}{yh}$ **(2 marks)**

1C. Draw an isosceles triangle and write algebraic expressions for its side lengths so that it has a perimeter of $9x - 15$ metres. **(2 marks)***

1D. Expand and simplify each of the following:

(i) $3x(6 - x)$ **(1 mark)**

(ii) $-(y - 5)$ **(1 mark)**

(iii) $(m - 4)(m + 4)$ **(1 mark)**

(iv) $(3n - 6)(n + 9)$ **(2 marks)**

(v) $4p - (p + 7)^2 + 8$ **(2 marks)**

(vi) $\left(2z - \frac{3}{4}\right)^2$ **(3 marks)***

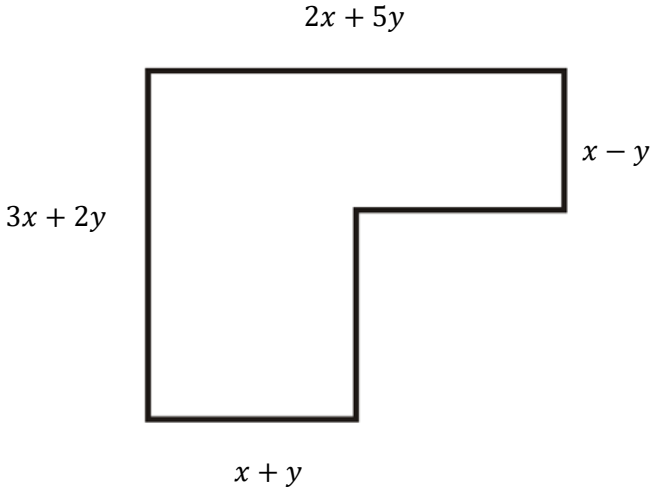
(vii) $(a - 2)^2 + (a - 2)(a + 2) - (a + 2)^2$ **(3 marks)***

1E. Factorise each of the following expressions:

(i) $24x + 16x^2$ **(1 mark)**

(ii) $-6x^2 - 15x$ **(1 mark)**

1F. For this composite shape, write an expression for:



(i) its perimeter **(2 marks)**

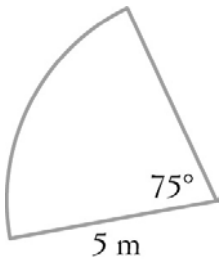
(ii) its area **(3 marks)***

Part 2 – Area Surface Area and Volume (14 marks)

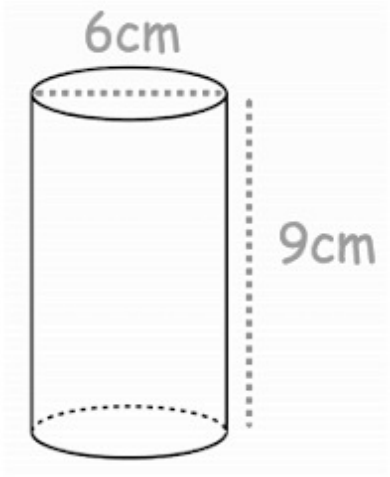
2A. Draw a line from each term to its correct definition. **(2 marks)**

Perimeter	The amount of surface covered by the shape
Area	The amount of fluid (liquid or gas) in a container
Volume	The amount of space a shape occupies
Capacity	The sum of the lengths of the sides of the shape

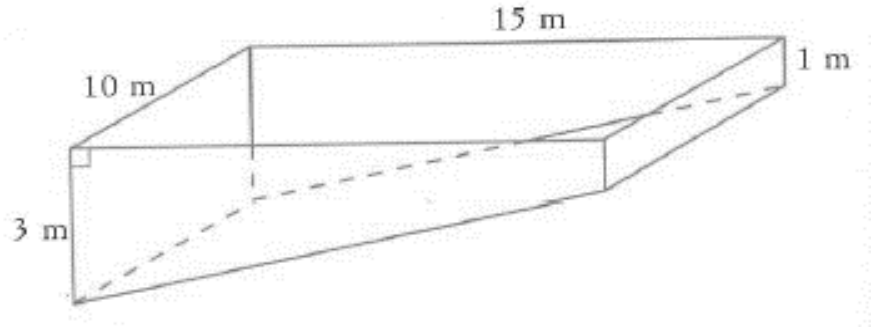
2B. Find the perimeter of this sector correct to two decimal places. **(2 marks)**



2C. Calculate the exterior surface area of this closed cylinder correct to 2 decimal places. **(2 marks)**



2D. This swimming pool is 15 m long and 10 m wide. The depth of the water ranges from 1 m to 3 m.



(i) Calculate the surface area of the pool, correct to the nearest square metre. **(3 marks)***

(ii) If tiles cost $8.90 per square metre, calculate the cost of tiling the pool. **(1 mark)**

2E. A cylindrical rain water tank has a radius of 2.8 m and a height of 2.4 m.

(i) Calculate, the volume of the tank, correct to three decimal places. **(1 mark)**

(ii) Calculate, correct to the nearest litre, the capacity of the tank. **(1 mark)**

(iii) If the flow rate of a hose is 24 litres per minute, how long will it take to fill the tank? Answer correct to the nearest hour. **(2 marks)**

Part 3 – Financial mathematics (9 marks)

3A. Explain the difference between simple and compound interest. **(2 marks)**

3B. Wendy invests $5 000 at 7% p.a. with interest compounding yearly for 3 years.

(i) Calculate the total value of her investment after 3 years **(1 mark)**

(ii) Calculate the total amount of compound interest earned **(1 mark)**

3C. $7500 is invested for 3 years with interest compounded every six months. If at the end of the 3 years the investment is worth $9767, what is the applied interest rate? **(2 marks)***

3D. A photocopying machine originally costing $7 000 depreciates at 20% p.a.

(i) What is the value of the photocopier after 3 years? **(1 mark)**

(ii) By how much will it have depreciated during the third year? **(2 marks)***

END OF EXAM