CARLINGFORD HIGH SCHOOL

NAME: _____

Teacher: _____

2021

Semester 2/Term 4
YEARLY
EXAMINATION

Year 9 (5.3) Mathematics

General Instructions

- Write using black or blue pen.
- Time allowed: 50 minutes
- NESA approved calculators may be used.
- Show relevant mathematical reasoning and/or calculations.
- Marks may be deducted for incorrect working or no working.

TOPICS	MARKS
Linear Relationships	/8
Geometry	/9
Surface Area & Volume	/9
Equations	/9
Trigonometry	/7
Indices	/8
TOTAL	**/50**

Linear Relationships (8 marks)

1. Find the equation of the line, in general form, through the origin and perpendicular to $y = 7x - 5$. 2

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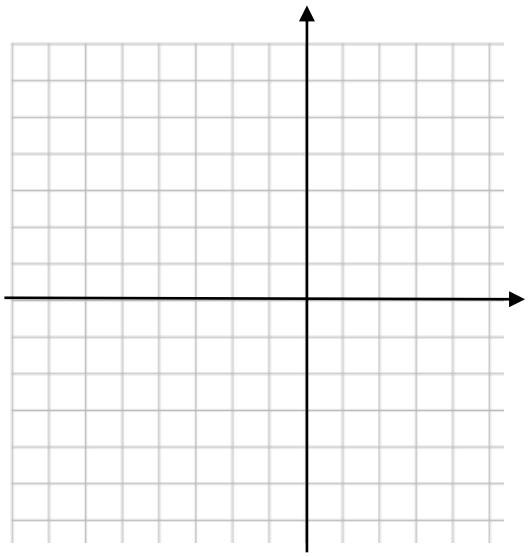
2. A(2, 1), B(-5, -6), C(-6, - 1) and D(1, 6) form a parallelogram.

(i) Plot points A, B, C and D on the number plane below 1



(ii) Find the gradient of AB

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(iii) Show that the equation of AB is: $x - y - 1 = 0$ 1

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(iv) Find the exact length of AB 1

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(v) Find the coordinates where the diagonals of ABCD intersect. Label it as point E on your diagram. 2

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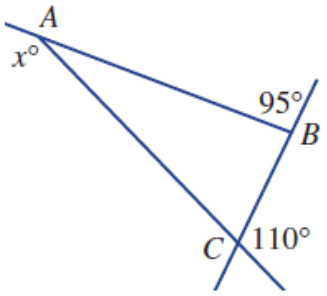
Geometry (9 marks)

1. Find the value of x , giving reasons. 2



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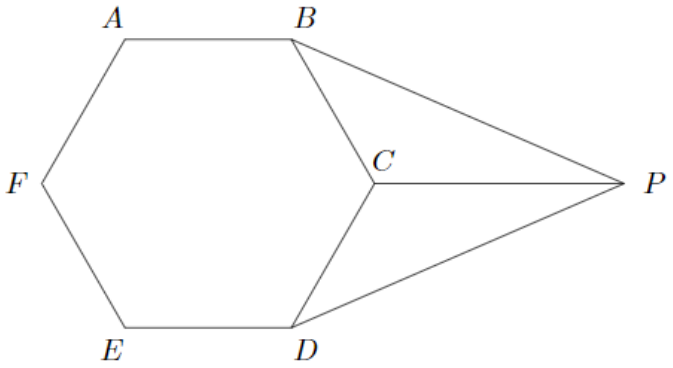
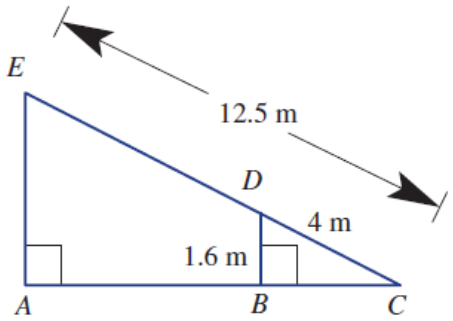
2. $ABCDEF$ Is a regular hexagon, and $CP \parallel AB$.



i. Find the size of $\angle BCP$, giving reasons. 2

ii. Prove that $\triangle BCP \equiv \triangle DCP$. 3

3. A conveyor belt loading luggage onto a plane is 12.5 m long. A vertical support 1.6 m high is placed under the conveyor belt so that it is 4 m along the conveyor belt as shown.



Find the height (AE) of the luggage door above the ground. 2

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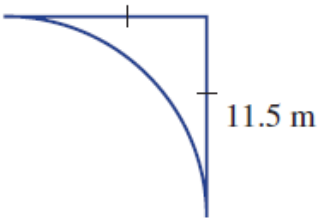
Surface Area and Volume (9 marks)

1. Find the perimeter of this shape. Express your answer to 1 decimal place. 2



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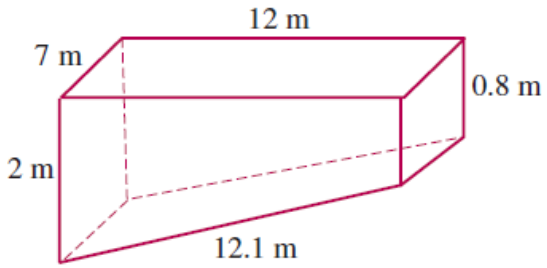
2. The sides and floor of this swimming pool are to be tiled. The tiles cost $22 per square metre and there is a further charge of $1500 for labour.



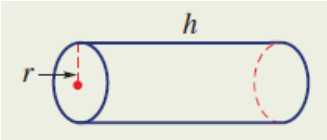
(i) Calculate the area to be tiled. 2

(ii) Find the cost of tiling the pool. 1

(iii) Find the volume of the pool. 1

(iv) How many litres of water is needed to completely fill the pool? 1

3. A closed cylinder has a **curved surface area** of 72π cm^2 and a height of 6 cm.



Calculate the radius of the cylinder. Must show working. 2

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Equations (9 marks)

1. Solve: 2

$8(3x-2)-2(5-4x)+58=0$

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2. Solve: 1

$\frac{5e}{6}-3=12$

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3. Solve: 2

$$\frac{6-x}{3}=\frac{2x-1}{5}$$

4. 2

The area of an equilateral triangle of side x cm is given by the formula $A=\frac{\sqrt{3}}{4}x^2$.

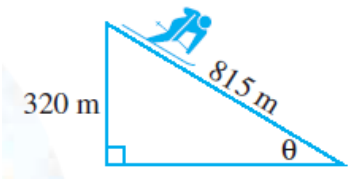
Find, correct to 2 decimal places, the side length of an equilateral triangle with an area 30 cm^2.

5. Make x the subject 2

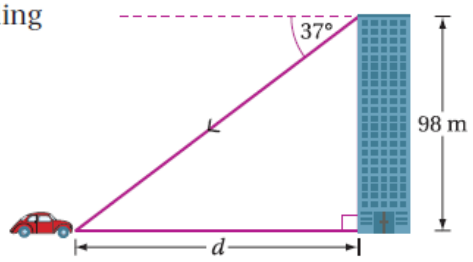
$$t=\frac{x}{x-3}$$

Trigonometry (7 marks)

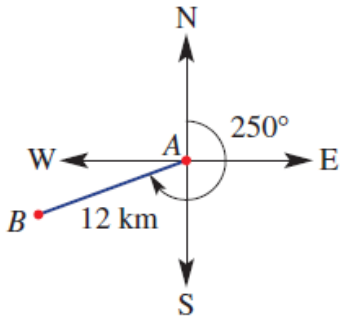
1. A ski slope of length 815 m has a vertical drop of 320 m. Calculate the angle between the ski slope and the horizontal. Round your answer to the nearest minute. 2



2. From a point on top of a building that is 98 m tall, the angle of depression of a car is 37°. How far is the car from the foot of the building? Give your answer correct to the nearest metre. 2



3. Two towns, A and B, are 12 km apart. The bearing of B from A is 250°.



(i) How far west of A is B, correct to 3 significant figures? 2

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(ii) Find the bearing of A from B. 1

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Indices (8 marks)

1. Simplify: 1

$3p^4 \times 4p^5 \times 3p$

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2. Simplify: 1

$(8g)^0 + 8g^0$

3. Simplify: 2

$$\frac{5d^2 \times 2\, d^2e^2}{(2d)^4}$$

4. Simplify, writing your answer with positive indices. 2

$$a^5b^{-4} \times a^{-3}b^{-5}$$

5. Write in index form: 1

$$\frac{1}{x \times \sqrt[3]{x}}$$

6. The distance from Earth to the moon is approximately 3.844×10^5 km. 1
If you could drive there without breaking the speed limit of 110 km/h, how many days would it take?

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END OF EXAM