

Carlingford High School



Year 11 Mathematics

Term 2 Assessment Task 2020

Time allowed: 50 minutes

Student Number: Class: 11MAA.....

Teacher: (Please Circle) Mr Cheng Ms Strilakos Ms Tang
Mr Fardouly/ Mrs Wilson Ms Bennett Mr Gong Mr Wilson

Instructions

- Answer each question in the space provided
- Marks may be deducted for careless or badly arranged work
- All answers are to be completed in blue or black pen except graphs and diagrams
- No lending or borrowing
- Board approved calculators may be used

Functions	Trigonometry	Total	
/16	/25	/41	%

Mathematics Advanced

REFERENCE SHEET

Functions

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Trigonometric Functions

$$\sin A = \frac{\text{opp}}{\text{hyp}}, \quad \cos A = \frac{\text{adj}}{\text{hyp}}, \quad \tan A = \frac{\text{opp}}{\text{adj}}$$

$$A = \frac{1}{2}ab \sin C$$

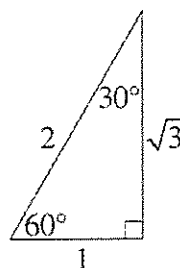
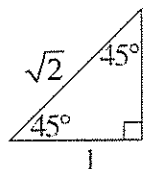
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

$$l = r\theta$$

$$A = \frac{1}{2}r^2\theta$$



Trigonometric Identities

$$\sec A = \frac{1}{\cos A}, \quad \cos A \neq 0$$

$$\operatorname{cosec} A = \frac{1}{\sin A}, \quad \sin A \neq 0$$

$$\cot A = \frac{\cos A}{\sin A}, \quad \sin A \neq 0$$

$$\cos^2 x + \sin^2 x = 1$$

Functions (16 marks)

1. Which equation represents the line perpendicular to $2x - 3y = 1$, passing through the point $(0, 2)$?

A $3x + 2y = 4$

B $3x + 2y = 6$

1

C $3x - 2y = -4$

D $3x - 2y = 6$

2. Find the equation of the straight line with angle of inclination 30° passing through the point $(\sqrt{3}, 2)$. 2

3. The lines $x + 2y + 5 = 0$ and $3x - y + 1 = 0$ intersect at a point P .

a) Find the coordinates of P

2

b) Find the equation of the line passing through P which is parallel to the line $4x - y + 1 = 0$. Give your answer in general form.

2

4. The SRC is selling cards as a fundraiser. They spend \$30 on equipment, and estimate that it costs \$2 in supplies to make each pack of cards. They plan to sell the cards for \$3.50 per pack.

a) Set up the cost, C , and revenue, R , functions for the sale of x items. 2

b) Determine the point at which cost is equal to revenue. 1

c) How many packs of cards would need to be sold to raise \$450? 1

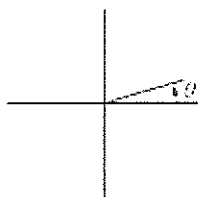
5. Solve the simultaneous equations : $y = x^2 - 1$ 2
 $y = x + 1$

6. For what values of m do the line $y = mx - 4$ and the parabola $y = x^2 - 2x - 2$ intersect twice? 3

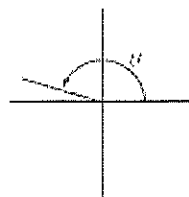
Trigonometry (25 marks)

1. For the angle θ , $\sin \theta = -\frac{7}{25}$ and $\cos \theta = \frac{24}{25}$. Which diagram best shows the angle θ ?

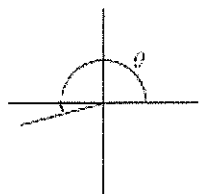
A



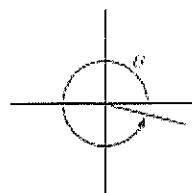
B



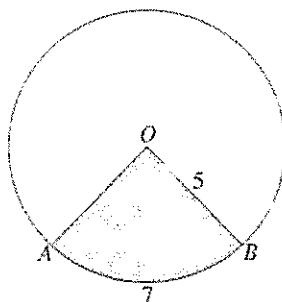
C



D



2. The circle centred at O has radius 5 and arc length AB is 7 as shown in the diagram.



What is the area of the shaded sector OAB ?

A

$$\frac{35\pi}{2}$$

B

$$\frac{35}{2}$$

C

$$\frac{125\pi}{14}$$

D

$$\frac{125}{14}$$

3. Find the exact value of

a) $\sin 300^\circ$

1

b) $\cos 765^\circ$

1

c) $\operatorname{cosec} \frac{4\pi}{3}$

1

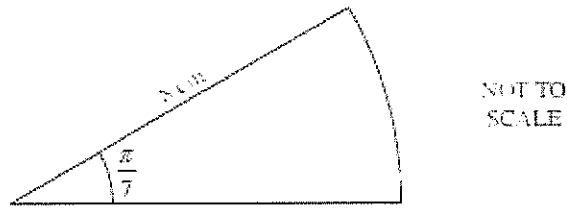
4. Find all values of θ , $0 \leq \theta \leq 2\pi$ for which $\cos \theta + \sqrt{3} \sin \theta = 0$ 2

5. If $\sin A = x$, express $\cos(90^\circ - A) \sin(180^\circ - A)$ in terms of x . 2

6. If $\operatorname{cosec} a = -\frac{13}{5}$ and $\cot a > 0$, find the exact value of $\cos a$. 2

7. Prove the identity $(1 + \tan x)^2 + (1 - \tan x)^2 = 2 \sec^2 x$ 2

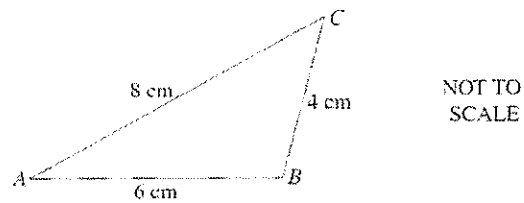
8. The angle of a sector in a circle of radius 8 cm is $\frac{\pi}{7}$ radians, as shown in the diagram.



Find the exact value of the perimeter of the sector.

2

9. The diagram shows $\triangle ABC$ with $AB = 6$ cm, $AC = 8$ cm and $CB = 4$ cm.



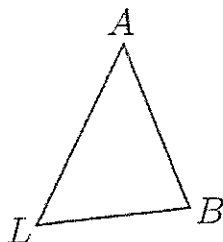
- a) Show that $\cos A = \frac{7}{8}$

1

- b) By finding the exact value of $\sin A$, find the exact area of $\triangle ABC$.

2

10. Boat A is 30 km from lighthouse L on a bearing of 015° and boat B is 20 km from L on a bearing of 085°
- a) How far apart are the boats? Give your answer correct to 1 decimal place. 2



- b) What is the bearing of the lighthouse as seen from boat B ? 1
11. From the ends of a straight horizontal section of road 800 m long, a bird hovering directly above the road is observed to have angles of elevation of 42° and 28° respectively.
- a) Using a ruler, draw a diagram representing this information. 1
- b) Find the height of the bird above the road, correct to the nearest metre. 3

End of Exam. Please check your work.