

HORNSBY GIRLS HIGH SCHOOL



Mathematics Advanced

Year 11 Assessment 2 Term 2 2022

STUDENT NUMBER: _____

General Instructions

- Reading Time – 5 minutes
- Working Time – 60 minutes
- Write using black pen
- Calculators approved by NESA may be used
- In Questions 6 – 11, show relevant mathematical reasoning and/or calculations
- Marks may be deducted for untidy and poorly arranged work
- Do not use correction fluid or tape
- Do not remove this paper from the examination
- Students are permitted to refer to one double-sided A4 page of handwritten topic summaries which they prepared prior this assessment

Total marks – 46

Section I Pages 2 – 3

5 marks

Attempt Questions 1 – 5

Allow about 8 minutes for this section

Answer on the Objective Response Answer Sheet provided

Section II Pages 4 – 15

41 marks

Attempt Questions 6 -11

Allow about 52 minutes for this section

Write your answers in the space provided.

Question	1-5	6	7	8	9	10	11	Total
Total	/5	/7	/7	/7	/6	/7	/7	/46

This assessment task constitutes 30% of the Preliminary Higher School Certificate Course School Assessment

Section I

5 marks

Attempt Questions 1 – 5

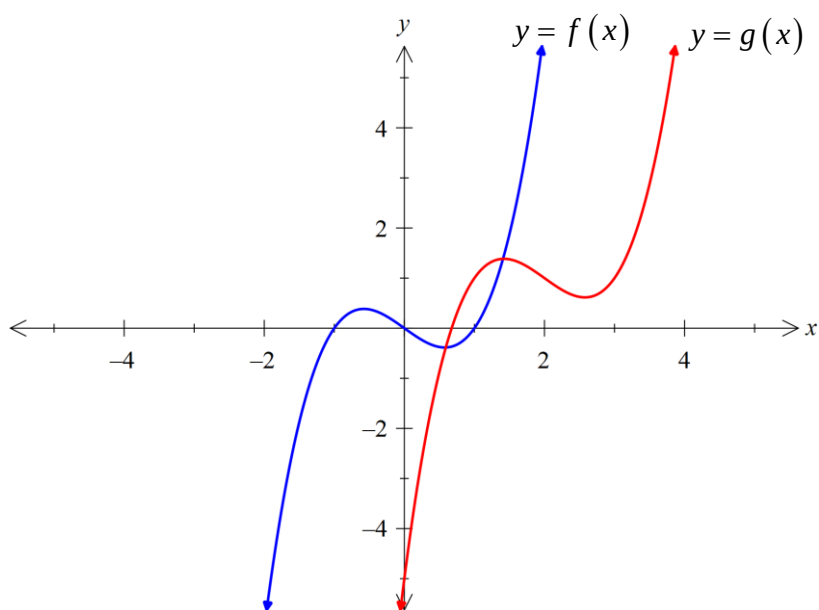
Allow about 8 minutes for this section

Use the Objective Response answer sheet for Questions 1 – 5

1 The domain of $f(x) = \frac{1}{\sqrt{x-4}}$ is:

- A. $x > 0$
- B. $x \geq 0$
- C. $x > 4$
- D. $x \geq 4$

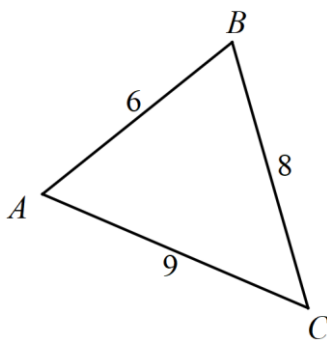
2 The graph of $y = f(x)$ and $y = g(x)$ are shown on the same number plane below.



Which of the following statements are true?

- A. $g(x) = f(x-2) + 1$
- B. $g(x) = f(x+2) - 1$
- C. $f(x) = g(x-2) + 1$
- D. $f(x) = g(x+2) - 1$

- 3 The size of $\angle A$ in the triangle below is closest to:



NOT TO
SCALE

- A. $60^{\circ}36'$
B. $60^{\circ}37'$
C. $1^{\circ}3'$
D. $1^{\circ}4'$
- 4 The equation of the line that is perpendicular to $y = 3x + 4$ that passes through $(0, 2)$ is given by:

- A. $3x - y + 2 = 0$
B. $3x + y + 2 = 0$
C. $x + 3y + 6 = 0$
D. $x + 3y - 6 = 0$

- 5 Two functions are defined such that $f(x) = x^2 - 1$ and $g(x) = |x + 1|$.

Which of the following statements is **false**?

- A. $f(0) = -g(0)$
B. $f(2) = g(2)$
C. $g(f(x)) = x^2$
D. $f(x) \geq 0$ and $g(x) \geq 0$ for all x

End of Section I

Section II

41 marks

Attempt Questions 6-11

Allow about 52 minutes for this section

Question 6 (7 marks)

- (a) (i) Sketch the graph of $y = \sin x$ for $0^\circ \leq x \leq 360^\circ$. 2

- (ii) Hence, or otherwise, solve $\sin x = 0$ for $0^\circ \leq x \leq 360^\circ$. 1

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- (b) Solve $|3x + 1| = 10$. 2

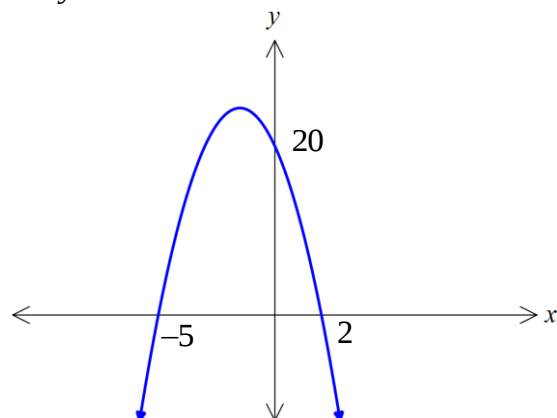
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- (c) Solve $\cos x = \frac{1}{2}$, for $0 \leq x \leq 2\pi$. 2

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Question 7 (7 marks)

- (a) The graph has equation $y = ax^2 + bx + c$.



NOT TO
SCALE

- (i) State the value of c .

1

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- (ii) Using simultaneous equations, or otherwise, find the values of a and b .

2

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- (b) Solve $\tan^2 \theta = 1$ for $0^\circ \leq \theta \leq 360^\circ$.

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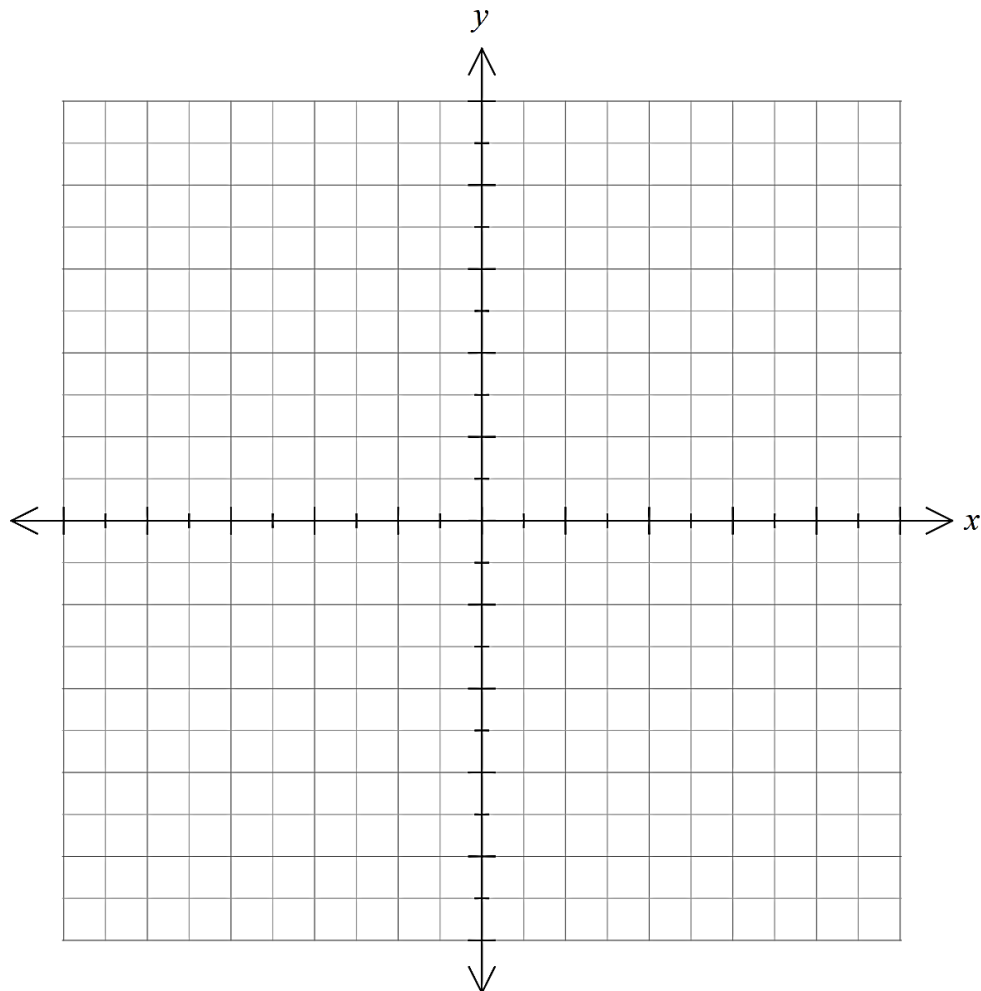
Question 7 continues on page 6

Question 7 (continued)

- (c) A function has a domain of $-3 \leq x \leq 3$ and has a range of $1 \leq f(x) \leq 5$. It is also known that $f(x)$ is an even function.

2

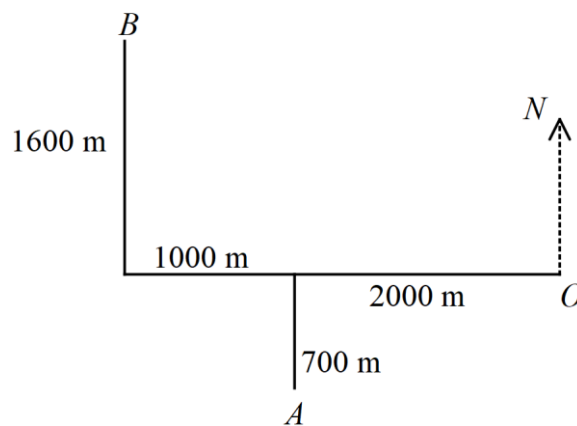
Draw a possible graph of $y = f(x)$ on the number plane below.



End of Question 7

Question 8 (7 marks)

- (a) Anna and Ben are trekking in the forest. They both set off from O , heading due West.



After walking a distance of 2000 m Anna changes direction and heads due south for another 700 m and stops. Ben continues to walk another 1000 metres west before he changes direction. He then walks due north for another 1600 m.

- (i) Show that the distance between Anna and Ben is approximately 2508 metres. 2

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- (ii) Find the true bearing of Anna from Ben, correct to the nearest degree. 2

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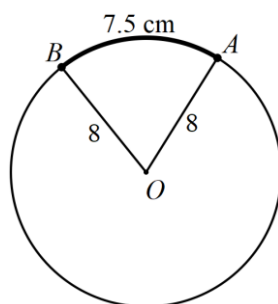
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Question 8 continues on page 8

Question 8 (continued)

- (b) In the diagram below, the radius of the circle is 8 cm and the length of the minor arc AB is 7.5 cm.



NOT TO
SCALE

Calculate the size of the angle $\angle AOB$:

- (i) in radians

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- (ii) in degrees, correct to the nearest degree.

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End of Question 8

Question 9 (6 marks)

- (a) The subscription to a mathematics revision program SMARTYMATH is \$5 per month. There is an additional charge of \$0.60 per visit. The total monthly cost of using the site can be represented as:

$C = C_0 + n \times t$ where C is the total monthly cost, C_0 is the fixed monthly subscription fee, n is the number of visits in a month, and t is the charge per visit.

- (i) Calculate the total cost for Jemima who made 40 visits to the site last month. 2

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A second website MATHSTAR charges \$3.20 monthly subscription and \$0.65 per visit.

- (ii) Find the number of visits per month such that the cost of using SMARTYMATH is the same as the cost of using MATHSTAR. 2

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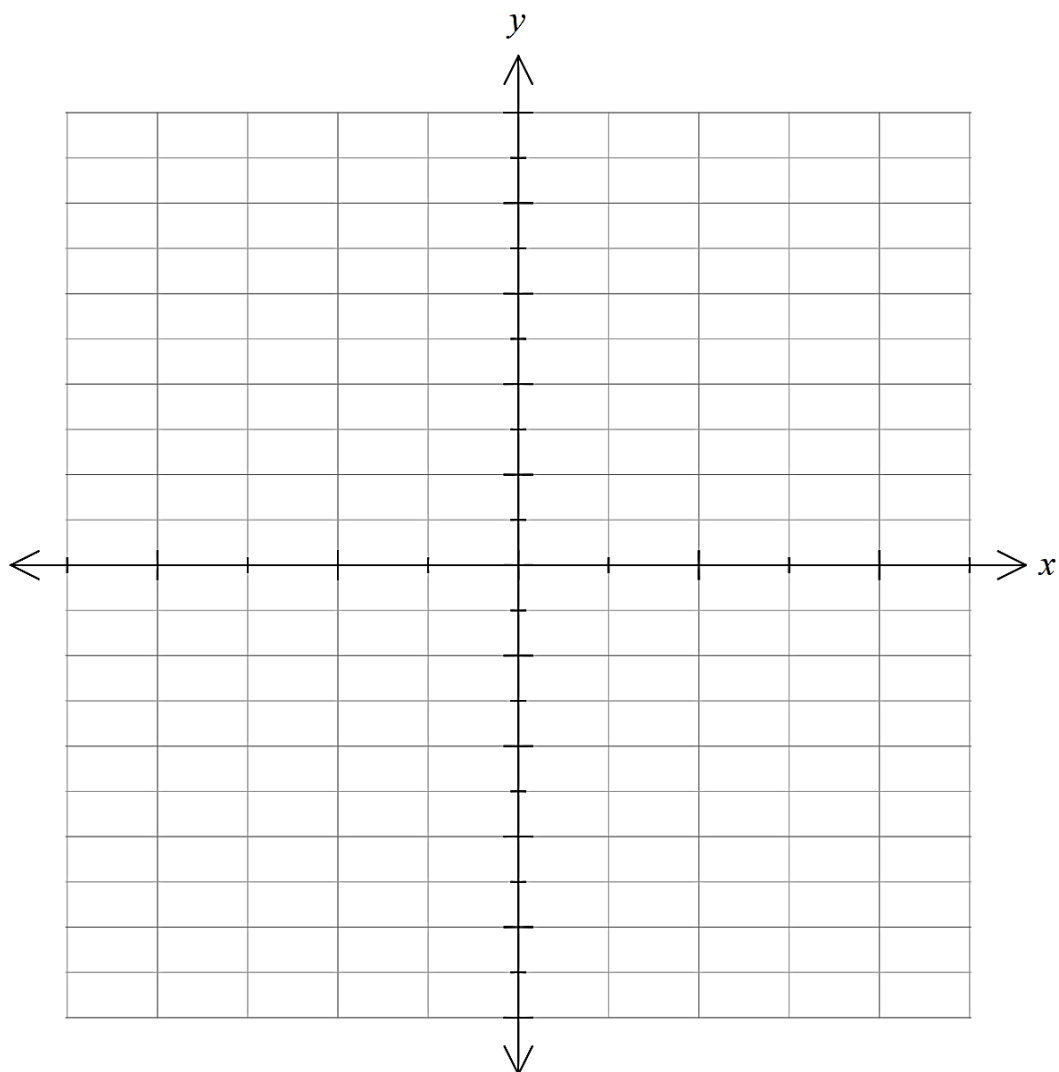
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Question 9 continues on Page 10

- (b) Sketch the graph of $y = (x + 2)(x - 2)(x - 1)^2$, showing the x and y intercepts.

2



End of Question 9

Question 10 (7 marks)

- (a) The shutter speed S of a camera varies inversely as the square of the aperture setting, f .
When $f = 8$, $S = 125$.

- (i) Find a formula for S in terms of f .

2

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- (ii) Hence calculate the value of S when $f = 4$.

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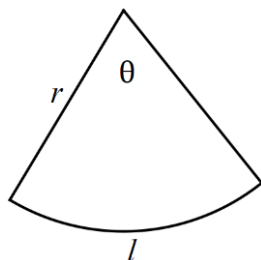
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Question 10 continues on page 12

Question 10 (continued)

- (b) A sector of a circle has perimeter 7 cm and area 3 cm^2 .



NOT TO
SCALE

- (i) By considering the area of the sector, show that $\theta = \frac{6}{r^2}$.

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- (ii) Find the possible values of the radius of the circle.

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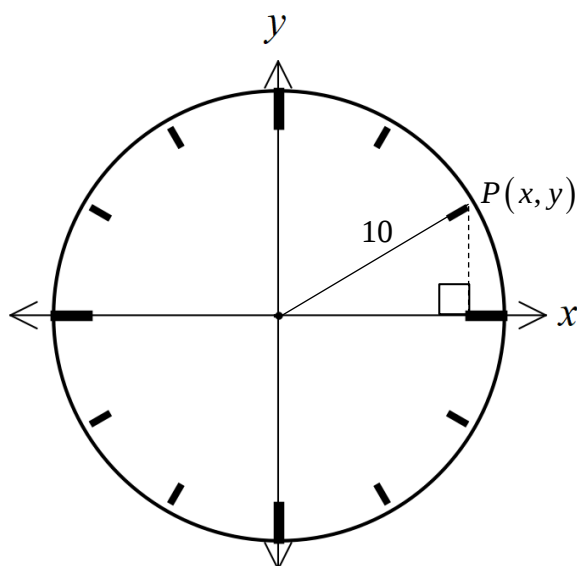
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End of Question 10

Question 11 (7 marks)

- (a) A circular clock-face has radius 10 cm, centred at the origin.

2



NOT TO
SCALE

The coordinates of the 'twelve o'clock' position are $(0, 10)$.

Find the coordinates of P , the position of 'two o'clock' in exact form.

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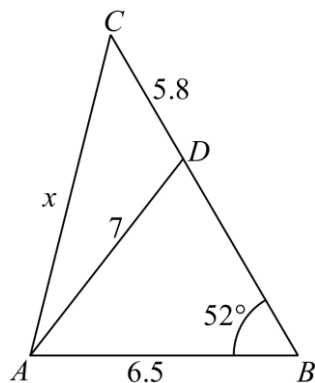
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Question 11 continues on page 14

Question 11 (continued)

- (b) In the triangle shown in the diagram below, $AB = 6.5$ cm, $AD = 7$ cm, $CD = 5.8$ cm, $\angle ABC = 52^\circ$ and $AC = x$ cm.



NOT TO
SCALE

- (i) Without finding the value of $\angle ADB$, explain why $\angle ADB < 52^\circ$.

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- (ii) Show that $\angle ADB = 47^\circ$, correct to the nearest degree.

2

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Question 11 (b) continues on page 15

(iii) Find the value of x , correct to one decimal place.

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Mathematics Advanced

Year 11 Assessment 2
Term 2 2022

STUDENT NUMBER: _____

Section I – Multiple Choice Answer Sheet

Allow about 15 minutes for this section

Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

Sample: $2 + 4 =$ (A) 2 (B) 6 (C) 8 (D) 9
A ☐ B ☒ C ☐ D ☐

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A ☒ B ☒ C ☐ D ☐

If you change your mind and have crossed out what you consider to be the correct answer, then indicate the correct answer by writing the word **correct** and drawing an arrow as follows.

A ☒ B ☒ ^{correct} C ☐ D ☐

1. A ☐ B ☐ C ☐ D ☐

2. A ☐ B ☐ C ☐ D ☐

3. A ☐ B ☐ C ☐ D ☐

4. A ☐ B ☐ C ☐ D ☐

5. A ☐ B ☐ C ☐ D ☐

Outcome HORNSBY GIRLS HIGH SCHOOL



Mathematics Advanced

Year 11 Assessment 2 Term 2 2022

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Total marks – 46

Section I Pages 2 – 3

5 marks

Attempt Questions 1 – 5

Allow about 8 minutes for this section

Answer on the Objective Response Answer Sheet provided

Section II Pages 4 – 15

41 marks

Attempt Questions 6 – 15

Allow about 50 minutes for this section

Marking:

Question	1-5	6	7	8	9	10	11	Total
Total	/5	/7	/7	/7	/6	/7	/7	/46

This assessment task constitutes 30% of the Preliminary Higher School Certificate Course School Assessment

Section I

5 marks

Attempt Questions 1 – 5

Allow about 8 minutes for this section

Use the Objective Response answer sheet for Questions 1 – 5

1 The domain of $f(x) = \frac{1}{\sqrt{x-4}}$ is:

A. $x > 0$

B. $x \geq 0$

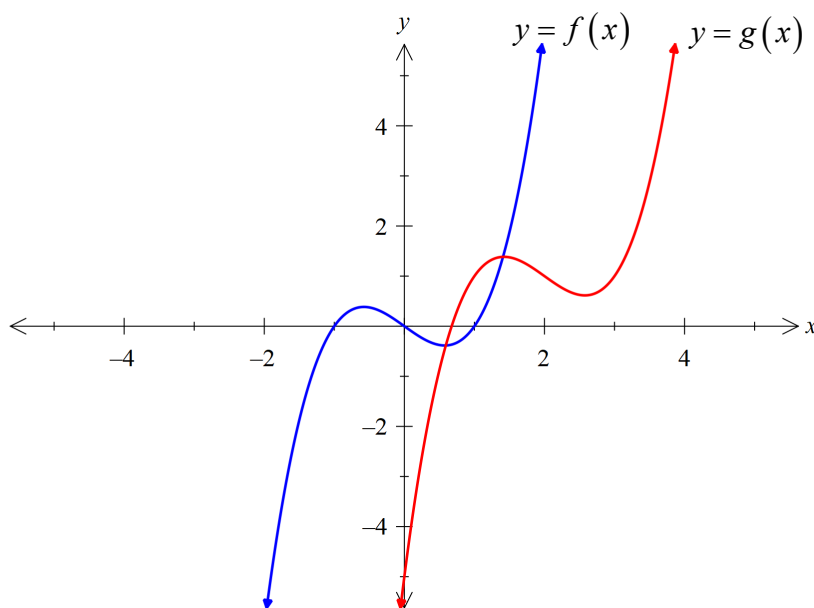
C. $x > 4$

D. $x \geq 4$

$$x - 4 > 0$$

$$x > 4$$

2 The graph of $y = f(x)$ and $y = g(x)$ are shown on the same number plane below.



Which of the following statements are true?

A. $g(x) = f(x-2) + 1$

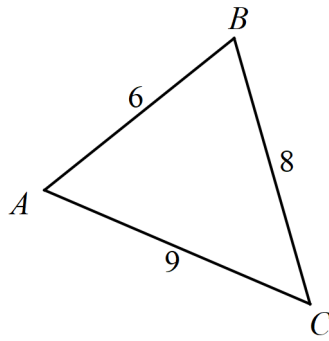
B. $g(x) = f(x+2) - 1$

C. $f(x) = g(x-2) + 1$

D. $f(x) = g(x+2) - 1$

Graph of $y = g(x)$ is graph of $f(x)$ shifted horizontally right – therefore answer is A or D

- 3 The size of $\angle A$ in the triangle below is closest to:



NOT TO
SCALE

- A. $60^\circ 36'$
☒ B. $60^\circ 37'$
 C. $1^\circ 3'$
 D. $1^\circ 4'$

$$\theta = \cos^{-1} \left(\frac{6^2 + 9^2 - 8^2}{2 \times 6 \times 9} \right)$$

$$= 60^\circ 36' 38.59''$$

- 4 The equation of the line that is perpendicular to $y = 3x + 4$ that passes through $(0, 2)$ is given by:

- A. $3x - y + 2 = 0$
 B. $3x + y + 2 = 0$
 C. $x + 3y + 6 = 0$
☒ D. $x + 3y - 6 = 0$

Required gradient $-\frac{1}{3}$

$$y = mx + b$$

$$y = -\frac{1}{3}x + 2$$

$$3y = -x + 6$$

$$x + 3y - 6 = 0$$

- 5 Two functions are defined such that $f(x) = x^2 - 1$ and $g(x) = |x + 1|$.

Which of the following statements is **false**?

- A. $f(0) = -g(0)$
 B. $f(2) = g(2)$
 C. $g(f(x)) = x^2$
☒ D. $f(x) \geq 0$ and $g(x) \geq 0$ for all x

$$f(0) = -1$$

$$g(0) = 1$$

$$f(2) = 3$$

$$g(2) = 3$$

$$g(x^2 - 1) = |x^2 - 1 + 1|$$

$$= |x^2|$$

$$= x^2$$

$$f(x) < 0 \text{ for } -1 < x < 1$$

End of Section I

Section II

41 marks

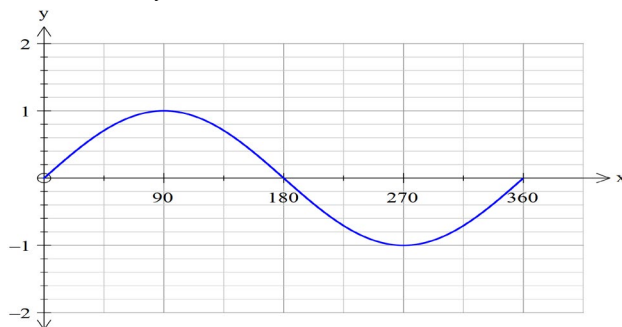
Attempt Questions 6-11

Allow about 52 minutes for this section

Question 6 (7 marks)

- (a) (i) Sketch the graph of $y = \sin x$ for $0^\circ \leq x \leq 360^\circ$.

2



2 marks given for correct domain and shape.

Many lost a mark for incorrect scale and incorrect domain, some used radians, some extended the graph for values less than zero etc.

- (ii) Hence, or otherwise, solve $\sin x = 0$ for $0^\circ \leq x \leq 360^\circ$.

1

From graph,
 $x = 0^\circ, 180^\circ, 360^\circ$

1 mark for **all three** correct solutions
from graph

- (b) Solve $|3x+1| = 10$.

2

$$\begin{array}{ll} 3x+1=10 & 3x+1=-10 \\ 3x=9 & 3x=-11 \\ x=3 & x=-\frac{11}{3} \\ \therefore x=3 \text{ or } x=-\frac{11}{3} \end{array}$$

1 mark for splitting equations and attempting to solve.

2 marks for solving both equations and two correct solutions

- (c) Solve $\cos x = \frac{1}{2}$, for $0 \leq x \leq 2\pi$.

2

related acute $\angle$:

$$\cos \frac{\pi}{3} = \frac{1}{2}$$

x is in the 1st and 4th quadrant.

$$\begin{aligned} x &= \frac{\pi}{3}, 2\pi - \frac{\pi}{3} \\ &= \frac{\pi}{3}, \frac{5\pi}{3} \end{aligned}$$

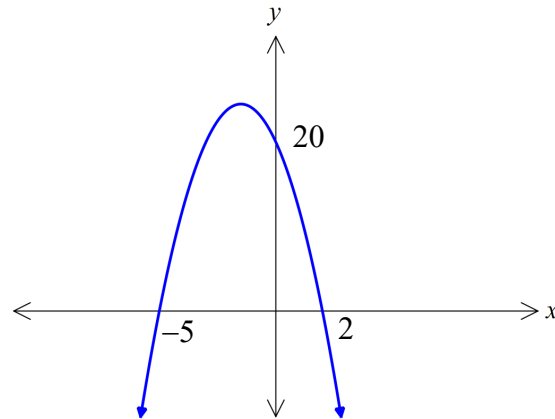
1 mark for related acute angle.

2 marks for solving equation with two correct solutions

1 mark only if worked in degrees.

Question 7 (7 marks)

- (a) The graph has equation $y = ax^2 + bx + c$.



NOT TO
SCALE

- (i) State the value of c .

1

$c = 20$

1 mark for correct value of c

- (ii) Using simultaneous equations, or otherwise, find the values of a and b .

2

$x = -5, y = 0$
 $0 = 25a - 5b + 20$
 $0 = 5a - b + 4$
 $b = 5a + 4 \dots (1)$
 Sub (1) into (2):
 $0 = 2a + (5a + 4) + 10$
 $0 = 7a + 14$
 $7a = -14$
 $a = -2$
 Sub $a = -2$ into (1)
 $b = 5 \times -2 + 4$
 $= -10 + 4$
 $= -6$
 $\therefore a = -2, b = -6$

1 mark for correctly two simultaneous equations.

2 marks for correctly solving simultaneous equations to find solution for a and b .

Some algebraic mistakes solving the simultaneous equations.

- (b) Solve $\tan^2 \theta = 1$ for $0^\circ \leq \theta \leq 360^\circ$.

2

$\tan^2 \theta = 1$
 $\tan \theta = \pm 1$
 Related acute angle:
 $\tan 45^\circ = 1$

 θ is in all four quadrants

 $\theta = 45^\circ, 180^\circ - 45^\circ, 180^\circ + 45^\circ, 360^\circ - 45^\circ$
 $\theta = 45^\circ, 135^\circ, 225^\circ, 315^\circ$

1 mark for related acute angle

2 marks for correct solution, finding all four solutions.

Some students forgot the solution $\tan \theta = -1$.

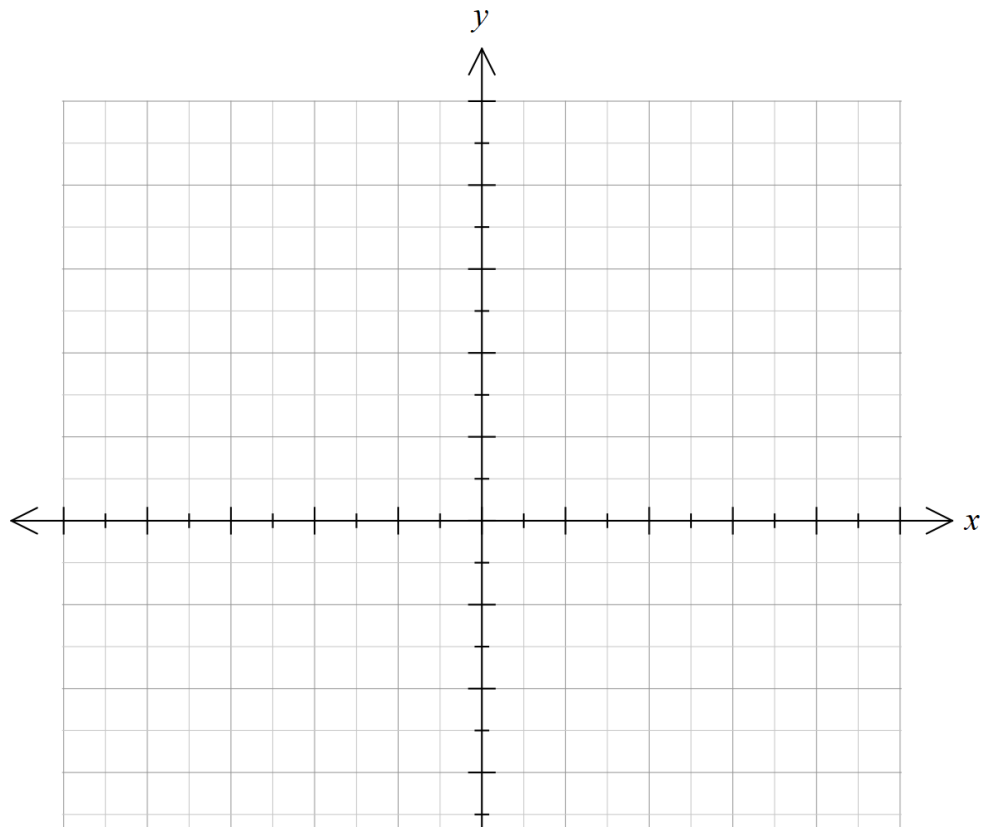
Some found the correct answers but in radian.

Question 7 (continued)

- (c) A function has a domain of $-3 \leq x \leq 3$ and has a range of $1 \leq f(x) \leq 5$. It is also known that $f(x)$ is an even function.

2

Draw a possible graph of $y = f(x)$ on the number plane below.

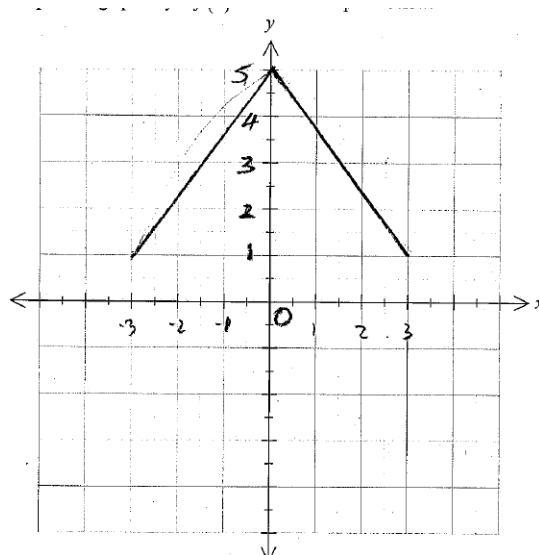


1 mark for an even function OR correct domain/range

2 marks for even function AND correct domain/range

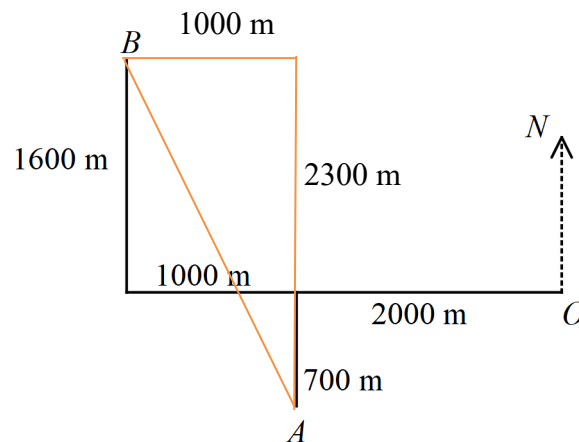
Some students did not label the graph clearly.

End of Question 7



Question 8 (7 marks)

- (a) Anna and Ben are trekking in the forest. They both set off from O , heading due West.



NOT TO
SCALE

After walking a distance of 2000 m Anna changes direction and heads due south for another 700 m and stops. Ben continues to walk another 1000 metres west before he changes direction. He then walks due north for another 1600 m.

- (i) Calculate the distance between Anna and Ben.

2

$$\begin{aligned}
 AB^2 &= 1000^2 + (1600 + 700)^2 \\
 &= 6290000 \\
 AB &= \sqrt{6290000} \\
 &= 2507.98... \\
 &= 2508 \text{ (nearest metre)} \\
 \therefore \text{ the distance between Anna} \\
 &\text{and Ben is 2508 metres}
 \end{aligned}$$

Alternate solution using similar triangles:

$$\begin{aligned}
 \frac{x}{700} &= \frac{1000 - x}{1600} \\
 1600x &= 700000 - 700x \\
 2300x &= 700000 \\
 x &= \frac{7000}{23} \\
 d &= \sqrt{700^2 + \left(\frac{7000}{23}\right)^2} + \sqrt{1600^2 + \left(1000 - \frac{7000}{23}\right)^2} \\
 &= 2507.98... \\
 &= 2508 \text{ m}
 \end{aligned}$$

1 mark for making progress with either method
2 for correctly showing solution.

$$\begin{aligned}
 \theta &= \tan^{-1}\left(\frac{1600 + 700}{1000}\right) \\
 &= 66^\circ 33' 5.16'' \\
 &= 67^\circ \text{ (nearest degree)} \\
 \text{Bearing is } 90^\circ + 67^\circ &= 157^\circ T
 \end{aligned}$$

Bearing of Anna from Ben.

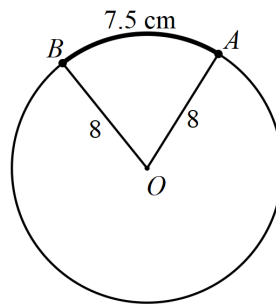
1 mark for finding acute angle in triangle.
2 for using acute angle to find bearing of A from B.

2

Question 8 continues on page 8

Question 8 (continued)

- (b) In the diagram below, the radius of the circle is 8 cm and the length of the minor arc AB is 7.5 cm.



NOT TO
SCALE

Calculate the size of the angle $\angle AOB$:

- (i) in radians

2

$l = r\theta$ $7.5 = 8\theta$ $\theta = \frac{7.5}{8}$ $= \frac{15}{16} \text{ radians}$	1 mark for using formula for arc length and substituting in. 2 mark for re-arranging to find value of angle in radians
--	--

- (ii) in degrees, correct to the nearest degree.

1

$1 = \frac{180^\circ}{\pi}$ $\frac{15}{16} = \frac{180^\circ}{\pi} \times \frac{15}{16}$ $= 53.71^\circ$ $= 54^\circ \text{ (nearest degree)}$	1 mark for correctly converting from answer in (i) to degrees.
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End of Question 8

Question 9 (6 marks)

- (a) The subscription to a mathematics revision program SMARTYMATH is \$5 per month. There is an additional charge of \$0.60 per visit. The total monthly cost of using the site can be represented as:

$C = C_0 + n \times t$ where C is the total monthly cost, C_0 is the fixed monthly subscription fee, n is the number of visits in a month, and t is the charge per visit.

- (i) Calculate the total cost for Jemima who made 40 visits to the site last month. 2

$C = 5 + 0.6n$ Let $n = 40$ $C = 5 + 0.6 \times 40$ $= 29$ Cost is \$29	1 mark for correct equation 1 for solving correctly. Some errors were made with 0.6×40 Done well by most students
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A second website MATHSTAR charges \$3.20 monthly subscription and \$0.65 per visit.

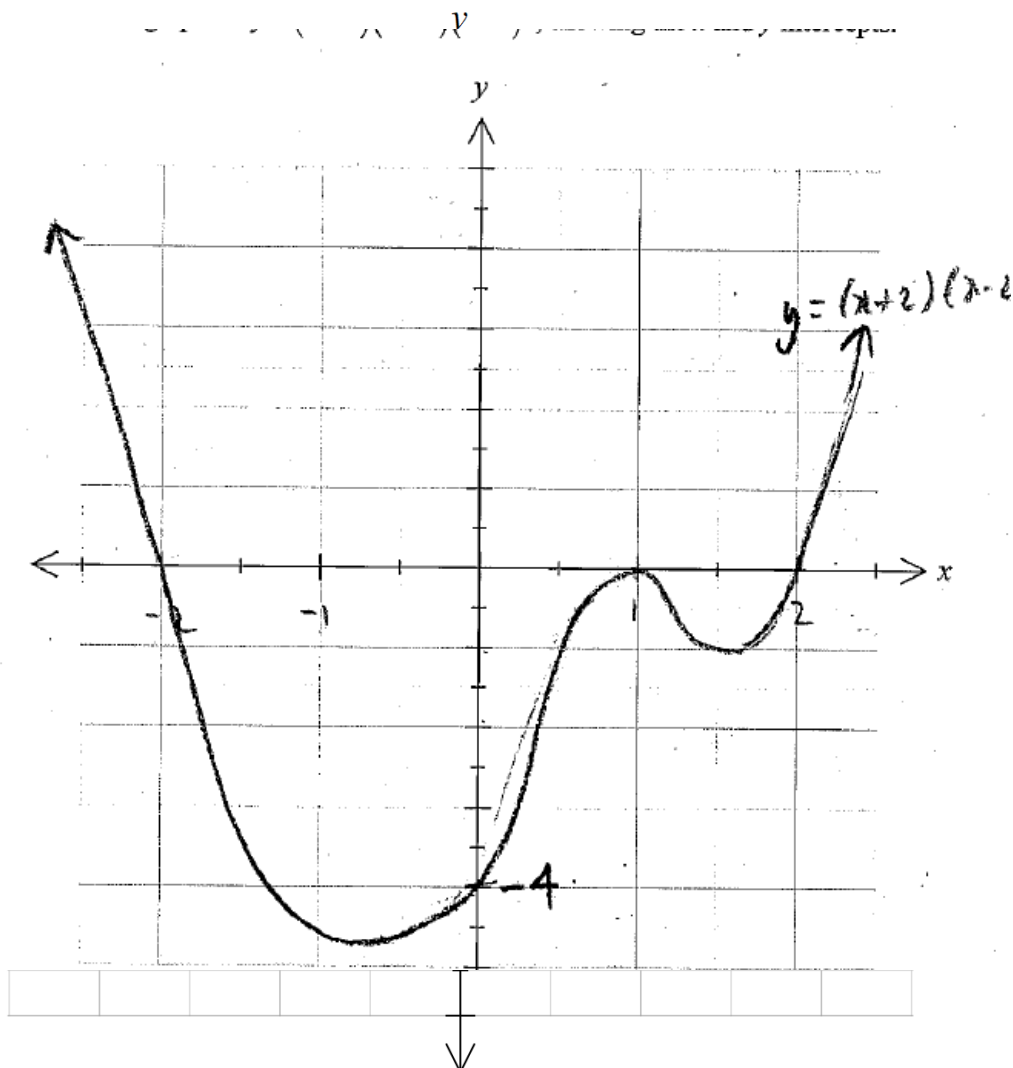
- (ii) Find the number of visits per month such that the cost of using SMARTYMATH is the same as the cost of using MATHSTAR. 2

For MATHSTAR $C = 3.2 + 0.65n$ $5 + 0.6n = 3.2 + 0.65n$ $1.8 = 0.05n$ $n = 36$ The cost will be the same when 26 visits in a month	1 mark for $5 + 0.6n = 3.2 + 0.65n$, must equate equation from (ii) with something from (i), $C = 3.2 + 0.65n$ was not sufficient for the first mark. Many students incorrectly wrote $29 = 3.2 + 0.65n$ and solved it for $n=40$. 2 for correct answer
--	--

Question 9 continues on Page 10

- (b) Sketch the graph of $y = (x+2)(x-2)(x-1)^2$, showing the x and y intercepts.

2



End of Question 9

Features include

- the shape of a positive quartic
- cutting the x axis at -2, 2 and bouncing off at 1
- y intercept at -4
- scale

Question 10 (7 marks)

- (a) The shutter speed S of a camera **varies inversely** as the **square** of the aperture setting, f .
When $f = 8$, $S = 125$.

- (i) Find a formula for S in terms of f .

2

$$S = \frac{k}{f^2}$$

$$125 = \frac{k}{8^2}$$

$$k = 8000$$

$$S = \frac{8000}{f^2}$$

1 mark for setting up equations correctly with k .
2nd mark for finding k .

Poorly done question. A lot of Students failed to **comprehend** this question and therefore were lost.

- (ii) Hence calculate the value of S when $f = 4$.

1

When $f = 4$

$$S = \frac{8000}{4^2}$$

$$= 500$$

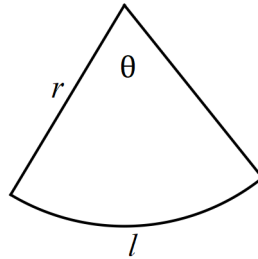
$$\therefore S = 500 \text{ when } f = 4$$

1 mark for finding S (using correct/incorrect formula from (i))

Easy question to gain a mark as long as students had some resemblance of a formula in part (i)

Question 10 (continued)

- (b) A sector of a circle has **perimeter 7 cm** and **area 3 cm²**.



NOT TO
SCALE

- (i) By considering the area of the sector, show that $\theta = \frac{6}{r^2}$.

1

$A = \frac{1}{2} r^2 \theta$ $3 = \frac{1}{2} r^2 \theta$ $6 = r^2 \theta$ $\theta = \frac{6}{r^2}$		1 mark for showing with necessary steps. Most did this question well by substituting A=3 into the formula for Area of a sector
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- (ii) Find the possible values of the radius of the circle.

3

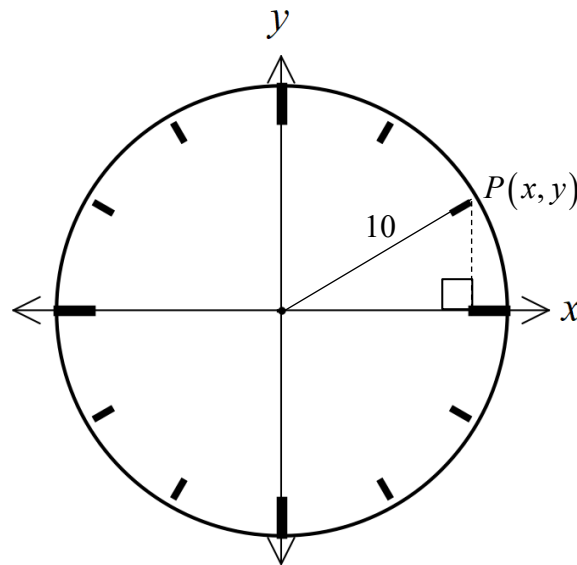
$P = r + r + l$ $= r + r + r\theta$ $= 2r + r\theta$ Sub $\theta = \frac{6}{r^2}$, $P = 7$ $7 = 2r + r \times \frac{6}{r^2}$ $7 = 2r + \frac{6}{r}$ $7r = 2r^2 + 6$ $2r^2 - 7r + 6 = 0$ $2r^2 - 3r - 4r + 6 = 0$ $r(2r - 3) - 2(2r - 3) = 0$ $(r - 2)(2r - 3) = 0$ $\therefore r = 2, r = \frac{3}{2}$ The possible values of the radius is 2 cm or 1.5		1 mark for perimeter formula and substituting result from (i) 2nd mark, rearranging to quadratic equation 3rd mark solving quadratic equation for two solutions for r Unfortunately, not a well-done question by most. Again, failing to comprehend that the Perimeter length was given in the question and a need substituting theta from part (i) for the arc length of the sector was needed to create the quadratic equation in r to find possible values of r.
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End of Question 10

Question 11 (7 marks)

- (a) A circular clock-face has radius 10 cm, centred at the origin.

2



NOT TO
SCALE

The coordinates of the 'twelve o'clock' position are $(0, 10)$.

Find the coordinates of P , the position of 'two o'clock' in exact form.

$$\theta = \frac{1}{3} \times 90^\circ$$

$$= 30^\circ$$

$$\sin \theta = \frac{y}{10}$$

$$y = 10 \sin \theta$$

$$y = 10 \times \sin 30^\circ$$

$$= 10 \times \frac{1}{2}$$

$$= 5$$

$$\therefore P(5\sqrt{3}, 5)$$

$$\cos \theta = \frac{x}{10}$$

$$x = 10 \cos \theta$$

$$x = 10 \times \cos 30^\circ$$

$$x = 10 \times \frac{\sqrt{3}}{2}$$

$$= 5\sqrt{3}$$

.....

If students could recognise it was a right-angled triangle problem, and the angle made by the ray with the positive direction of the x -axis, they were generally successful.

Some students made errors switching sine and cosine.

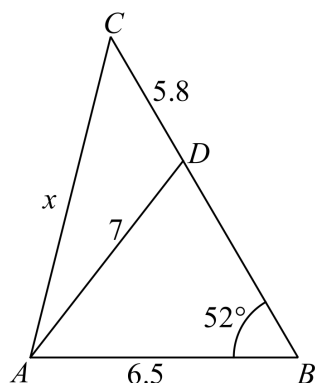
Some students made errors with simplifying fractions with surds

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Question 11 continues on page 14

Question 11 (continued)

- (b) In the triangle shown in the diagram below, $AB = 6.5$ cm, $AD = 7$ cm, $CD = 5.8$ cm, $\angle ABC = 52^\circ$ and $AC = x$ cm.



NOT TO
SCALE

- (i) Without finding the value of $\angle ADB$, explain why $\angle ADB < 52^\circ$.

1

In a triangle, the larger angle is opposite the larger side.

In $\triangle ADB$,

$$AD > AB \text{ since } 7 > 6.5$$

$$\therefore \angle B > \angle D \text{ but } = 52^\circ$$

$$\therefore \angle D < 52^\circ$$

Students should be aware of using correct terminology. Reference should be made to angles and their opposite sides, and the relative sizes.

Students used words like “corresponding side or angle”, which makes more sense in the context of similar triangles or parallel lines than here.

- (ii) Show that $\angle ADB = 47^\circ$, correct to the nearest degree.

In $\triangle ADB$:

$$\frac{\sin \angle ADB}{6.5} = \frac{\sin 52^\circ}{7}$$

$$\sin \angle ADB = \frac{6.5 \sin 52^\circ}{7}$$

$$\angle ADB = \sin^{-1} \left(\frac{6.5 \sin 52^\circ}{7} \right)$$

$$= 47.03...$$

$$= 47^\circ \text{ (nearest degree)}$$

This was generally well set up and students could complete the sine rule.

With show questions, steps should be shown, including the calculator output (before the final line) to show the marker you have actually evaluated the expression in the calculator!

For example, the following solutions does not meet the threshold for showing:

$$\frac{\sin \angle ADB}{6.5} = \frac{\sin 52^\circ}{7}$$

$$\sin \angle ADB = \frac{6.5 \sin 52^\circ}{7}$$

$$\angle ADB = 47^\circ \text{ (nearest degree)}$$

Marking was lenient here but may not be in future.

Question 11 (b) contin

This is known
from the question

(iii) Find the value of x , correct to one decimal place.

2

In $\triangle ACD$

$$x^2 = 5.8^2 + 7^2 - 2 \times 5.8 \times 7 \cos(180^\circ - 47^\circ)$$

$$x = \sqrt{5.8^2 + 7^2 - 2 \times 5.8 \times 7 \cos 133^\circ}$$

$$= 11.748\dots$$

$$= 11.7 \text{ (1dp)}$$

Generally well done.

Common errors included using calculator incorrectly, or not using correct notation when moving from x^2 to x eg

$$x^2 = 5.8^2 + 7^2 - 2 \times 5.8 \times 7 \cos(180^\circ - 47^\circ)$$

$$= \sqrt{5.8^2 + 7^2 - 2 \times 5.8 \times 7 \cos 133^\circ}$$

$$= 11.748\dots$$

$$= 11.7 \text{ (1dp)}$$

Some students did not recognise the cosine rule immediately in triangle ACD and did a sine rule in ADB to find the length of DB, and hence CB then applied the cosine rule.

This approach achieved the same result, but with a lot more work

Some students did not realise that $CB \neq 5.8$ and used the result in (ii) and didn't find the correct angle, simplifying the use of the cosine rule.

END OF PAPER

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Mathematics Advanced

Year 11 Assessment 2
Term 2 2022

STUDENT NUMBER: _____

Section I – Multiple Choice Answer Sheet

Allow about 15 minutes for this section

Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

Sample: $2 + 4 =$ (A) 2 (B) 6 (C) 8 (D) 9
A ☐ B ☒ C ☐ D ☐

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A ☒ B ☒ C ☐ D ☐

If you change your mind and have crossed out what you consider to be the correct answer, then indicate the correct answer by writing the word **correct** and drawing an arrow as follows.

A ☒ B ☒ ^{correct} C ☐ D ☐

1. A ☐ B ☐ C ☐ D ☐

2. A ☐ B ☐ C ☐ D ☐

3. A ☐ B ☐ C ☐ D ☐

4. A ☐ B ☐ C ☐ D ☐

5. A ☐ B ☐ C ☐ D ☐

