



2020

ASSESSMENT TASK 3

Mathematics Advanced (V2)

**General
Instructions**

- Reading time – 10 minutes
- Working time – 2 hours
- Write using black pen
- Calculators approved by NESA may be used
- A reference sheet is provided with this question paper
- For questions in Section II, show relevant mathematical reasoning and/or calculations

Total Marks: Section I – 10 Marks

- Attempt questions 1 – 10
- Allow about 15 minutes for this section.

Section II – 60 Marks

- Attempt all questions
- Allow about 1 hour and 45 minutes for this section.

Section I

10 marks

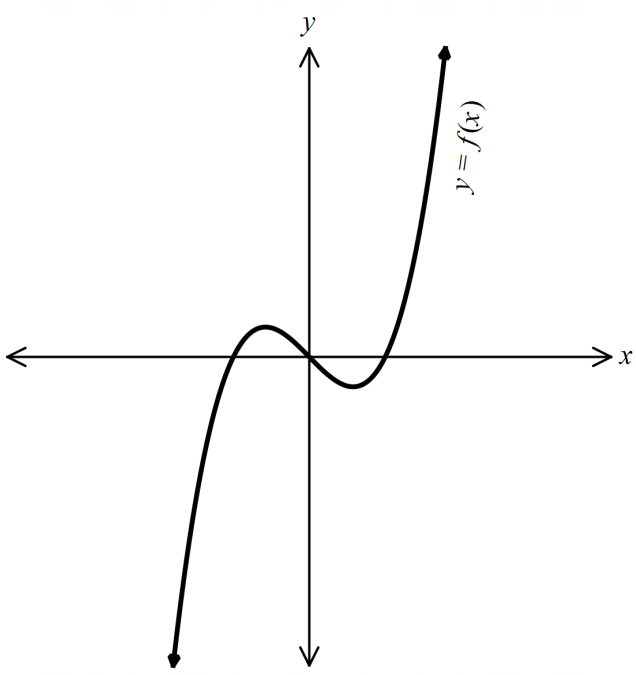
Attempt Questions 1–10

Allow about 15 minutes for this section

Use the multiple-choice answer sheet for Questions 1–10.

1	Simplify $\frac{5m^3 \times 5m^7}{10m^4}$.	
	A.	$\frac{m^4}{2}$
	B.	$\frac{m^5}{2}$
	C.	$2m^4$
	D.	$\frac{5m^6}{2}$
2	Which set of points below is a function?	
	A.	$(-6, 7)$, $(7, -6)$, $(-4, 5)$ and $(5, -4)$
	B.	$(-6, 7)$, $(7, 5)$, $(-4, 5)$ and $(7, -6)$
	C.	$(-6, 7)$, $(7, -4)$, $(-6, 5)$ and $(7, -2)$
	D.	$(-6, 7)$, $(7, 6)$, $(-4, 5)$ and $(-6, -4)$
3	If $f(x) = 2x^2 - 5$, find $f(-5)$	
	A.	-37
	B.	59
	C.	-55
	D.	45

4	Which graph best represents $y = -\sqrt{4 - x^2}$?	
	A C B D	
5	What is the solution to the equation $2x^2 + 5x - 4 = 0$?	
	A.	$x = \frac{-5 \pm \sqrt{57}}{4}$
	B.	$x = \frac{-7 \pm \sqrt{7}}{4}$
	C.	$x = \frac{7 \pm \sqrt{57}}{4}$
	D.	$x = \frac{7 \pm \sqrt{7}}{4}$

6	Consider the graph of $y = f(x)$ shown below.  Which of the following statements is true about $f(x)$?		
	<table border="1"> <tr> <td data-bbox="215 1064 300 1137">A.</td><td data-bbox="300 1064 1409 1137">It is even and both increasing and decreasing.</td></tr> </table>	A.	It is even and both increasing and decreasing.
A.	It is even and both increasing and decreasing.		
	<table border="1"> <tr> <td data-bbox="215 1137 300 1214">B.</td><td data-bbox="300 1137 1409 1214">It is even and increasing.</td></tr> </table>	B.	It is even and increasing.
B.	It is even and increasing.		
	<table border="1"> <tr> <td data-bbox="215 1214 300 1290">C.</td><td data-bbox="300 1214 1409 1290">It is odd and both increasing and decreasing.</td></tr> </table>	C.	It is odd and both increasing and decreasing.
C.	It is odd and both increasing and decreasing.		
	<table border="1"> <tr> <td data-bbox="215 1290 300 1366">D.</td><td data-bbox="300 1290 1409 1366">It is odd and increasing.</td></tr> </table>	D.	It is odd and increasing.
D.	It is odd and increasing.		
7	Write $3x\sqrt{11}$ in the form $\sqrt{a}$		
	<table border="1"> <tr> <td data-bbox="215 1518 300 1594">A.</td><td data-bbox="300 1518 1409 1594">$\sqrt{33x^2}$</td></tr> </table>	A.	$\sqrt{33x^2}$
A.	$\sqrt{33x^2}$		
	<table border="1"> <tr> <td data-bbox="215 1594 300 1671">B.</td><td data-bbox="300 1594 1409 1671">$\sqrt{33x}$</td></tr> </table>	B.	$\sqrt{33x}$
B.	$\sqrt{33x}$		
	<table border="1"> <tr> <td data-bbox="215 1671 300 1747">C.</td><td data-bbox="300 1671 1409 1747">$\sqrt{99x^2}$</td></tr> </table>	C.	$\sqrt{99x^2}$
C.	$\sqrt{99x^2}$		
	<table border="1"> <tr> <td data-bbox="215 1747 300 1823">D.</td><td data-bbox="300 1747 1409 1823">$\sqrt{99x}$</td></tr> </table>	D.	$\sqrt{99x}$
D.	$\sqrt{99x}$		

8	A theatrical agent has 50 artists on his books. The Venn diagram shows the genres in which they perform. He rings one of his artists at random. What is the probability that the artist does comedy or documentary or both, but not drama?
	A. $\frac{3}{10}$
	B. $\frac{2}{5}$
	C. $\frac{3}{5}$
	D. $\frac{16}{25}$
9	Express $\frac{3}{2-\sqrt{3}}$ as a fraction with a rational denominator.
	A. $\frac{6-3\sqrt{3}}{7}$
	B. $\frac{6+3\sqrt{3}}{7}$
	C. $6+3\sqrt{3}$
	D. $6-3\sqrt{3}$

10	Hannah correctly calculated the size of angle θ using trigonometry. Not to scale What was her first line of working?	
	A.	$\cos \theta = \frac{12}{13}$
	B.	$\cos \theta = \frac{13}{12}$
	C.	$\sin \theta = \frac{12}{13}$
	D.	$\sin \theta = \frac{13}{12}$
		END OF SECTION I

Mathematics Advanced Section II Answer Booklet

60 Marks

Attempt all questions

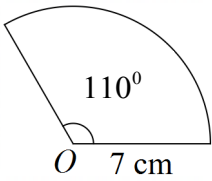
Allow about 1 hour and 45 minutes for this section

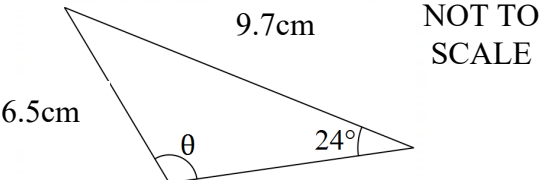
Instructions

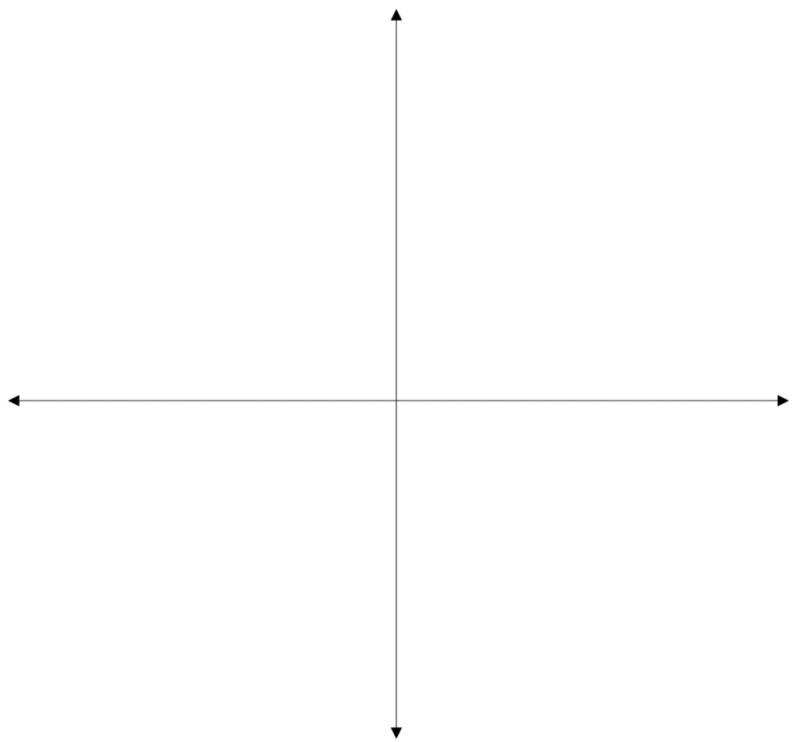
- Answer the questions in the spaces provided. Sufficient spaces are provided for typical responses.
- Your responses should include relevant mathematical reasoning and/or calculations.
- Extra writing space is provided at the back of this booklet. If you use this space, clearly indicate which question you are answering.

Question 11		2
	Simplify the expression $\sqrt{32} - \sqrt{8}$	
		
Question 12		2
	Solve the equation $\frac{4x+10}{3} = x + 5$	
		
Question 13		1
	Convert $\frac{4x+10}{3} =$ to degrees.	
		

Question 14		
Find the exact value of		
	(i) $\tan 120^\circ$	1
		
	(ii) $\sin \frac{3\pi}{4}$	1
		
Question 15		2
	Find the equation of the line that is parallel to $y = \frac{1}{4}x - 3$ and passes through the point $(1, 2)$. Give your answer in gradient-intercept form.	
		

Question 16		2
	Given $\cos \theta = -\frac{\sqrt{11}}{6}$ and $90^\circ \leq \theta \leq 180^\circ$, find the exact value of $\sin \theta$.	
		
Question 17		2
	Find the perimeter of the sector of a circle centred at O with a radius of 7 cm and subtended by an angle of 110°. Give your answer rounded to one decimal place. 	
		

Question 18		3
	The diagram shows an obtuse triangle with side lengths 6.5 cm and 9.7 cm, and angles 24° and θ, where θ is the largest angle.  Find the value of θ to the nearest degree.	
		
Question 19		2
	Given $f(x) = \begin{cases} x & x \leq 1 \\ x^3 & 1 < x \leq 3 \\ 36 - x^2 & x > 3 \end{cases}$, evaluate $f(-3)$ and $f(2)$.	
		

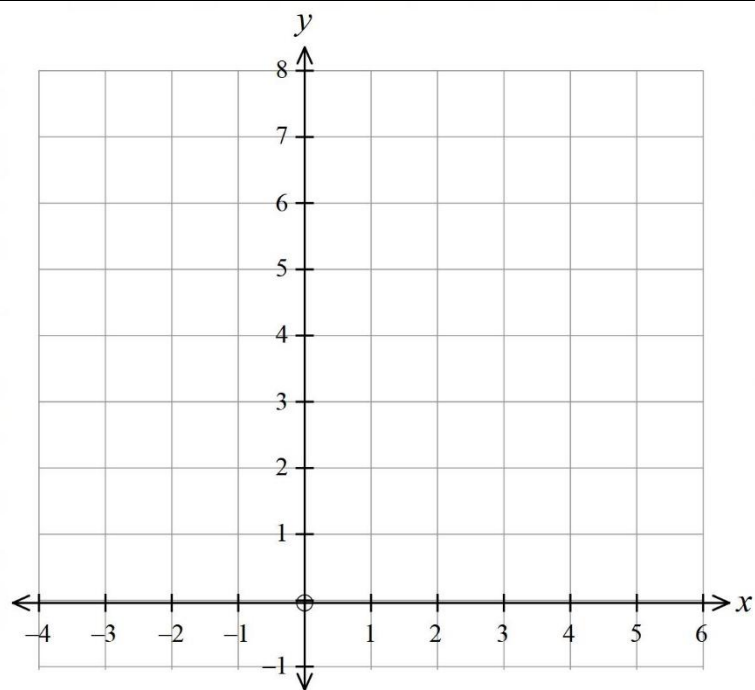
			
Question 20			
The graph of a circle is given by the relation $x^2 + 4x + y^2 - 8y = 5$.			
	(i)	By completing the square on both x and y , put the relation into standard form and identify the coordinates of the centre and length of the radius.	2
			
	(ii)	Sketch the function showing all important features.	2
			

Question 21			
	Differentiate		
	(i)	$y = \sqrt{x}$	1
			
	(ii)	$y = x + \frac{1}{x^2}$	1
			
	(iii)	$y = (3x^2 + 3)^5$	2
			

Question 22		
	Differentiate $y = (2x + 1)(x + 3)$ using the product rule.	2
		
Question 23		
	Differentiate $y = \frac{x + 4}{3x - 1}$	2
		

		
Question 24		
(a)	Andrew swims 6 km from A to B on a bearing $N60^{\circ}E$. He then turns and cycles 9 km to C on a bearing $S40^{\circ}E$. He then runs from C to A. NOT TO SCALE	
(i)	Find the size of $\angle ABC$.	1
		
(ii)	When at C, how far is he from its starting point? Give your answer correct to one decimal place.	2
		

			
	(iii)	Andrew swims at 3 km/h, cycles at 18 km/h and runs at 10km/h. If Andrew had left A at 6:30 am, what time would he arrive at C.	1
			
Question 25			2
		On the axes below, draw the graphs of $y = x - 3$ and $y = 3x + 3$. Showing all the important features.	



Question 26	Prove	
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	(i)	$\frac{\sec \theta}{\cos \theta} - \frac{\tan \theta}{\cot \theta} = 1$	2
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	(ii)	$\sec \theta - \tan \theta \sin \theta = \frac{1}{\sec \theta}$	2
Question 27			
	A particle is moving along the x -axis. Its displacement x centimetres at time t seconds is given by $x = 2t^3 - 5t^2 - 2t + 1$ for $t \geq 0$.		
	(i)	What is the <u>initial</u> displacement of the particle?	1

	(ii)	What is the particle's <u>initial</u> velocity?	2
			
	(iii)	What is the particle's acceleration at $t = 3$?	2
			
Question 28			3
	Use algebra to solve the following simultaneous equations: $3x - y - 11 = 0$ $x + 3y - 17 = 0$		
			

Question 29			
	Use the formula $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ to find $f'(x)$ when $f(x) = x^2 + 3$		2
Question 30			
Solve for $0^\circ \leq x \leq 360^\circ$			
	(i)	$2 \sin x - 2 = 0$	2

			
	(ii)	$\cos^2 x + \cos x = 0$	3
			
Question 31			
	Lizzie places 3 red lollies and 4 blue lollies in a bag. She chooses one without looking and eats it before choosing a second lolly without looking.		
	(i)	Complete the probability tree diagram below by writing probabilities on the branches. <pre> graph LR A[" "] --- B1["R"] A --- B2["B"] B1 --- C1[" "] B1 --- C2[" "] B2 --- C3[" "] B2 --- C4[" "] C1 --- D1["R"] C2 --- D2["B"] C3 --- D3["R"] C4 --- D4["B"] </pre>	2

	(ii)	What is the probability that Lizzie gets two red lollies?	1
			
	(iii)	What is the probability that Lizzie gets lollies of two different colours?	2
			
END OF EXAMINATION			

Section II extra writing space

If you use this space, clearly indicate which question you are answering.

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2020

Year 11 Assessment Task 1

Student Name:

Mathematics Advanced

Section I Multiple-Choice Answer Sheet

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 ☐

6 A ☐ B ☐ C ☐ D ☐

7 A ☐ B ☐ C ☐ D ☐

8 A ☐ B ☐ C ☐ D ☐

9 A ☐ B ☐ C ☐ D ☐

10 A ☐ B ☐ C ☐ D ☐



2020

ASSESSMENT TASK 3

Mathematics Advanced

**General
Instructions**

- Reading time – 10 minutes
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Total Marks: Section I – 10 Marks

- Attempt questions 1 – 10
- Allow about 15 minutes for this section.

Section II – 60 Marks

- Attempt all questions
- Allow about 1 hour and 45 minutes for this section.

Section I

10 marks

Attempt Questions 1–10

Allow about 15 minutes for this section

Use the multiple-choice answer sheet for Questions 1–10.

1 Simplify $\frac{5m^2 \times 4m^6}{10m^3}$.

A. $\frac{m^4}{2}$

B. $\frac{m^5}{2}$

C. $2m^4$

D. $2m^5$

2 Which set of points below is a function?

A. $(-6, 7)$, $(7, 6)$, $(-4, 5)$ and $(-6, -4)$

B. $(-6, 7)$, $(7, -4)$, $(-6, 5)$ and $(7, -2)$

C. $(-6, 7)$, $(7, 5)$, $(-4, 5)$ and $(7, -6)$

D. $(-6, 7)$, $(7, -6)$, $(-4, 5)$ and $(5, -4)$

3 If $f(x) = 2x^2 - 5$, find $f(-4)$

A. -37

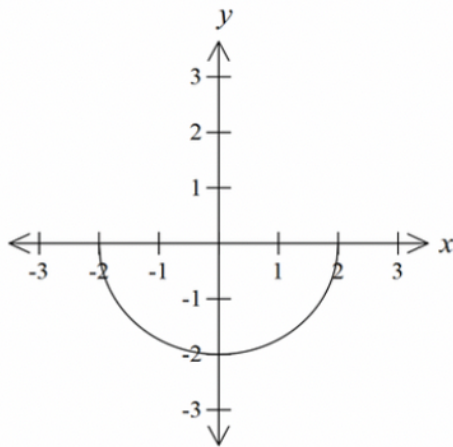
B. 59

C. -69

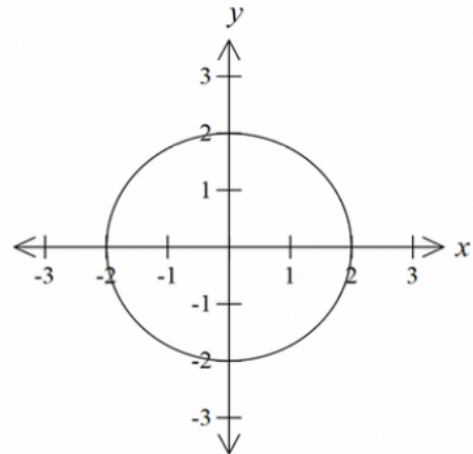
D. 27

4 Which graph best represents $y = \sqrt{4 - x^2}$?

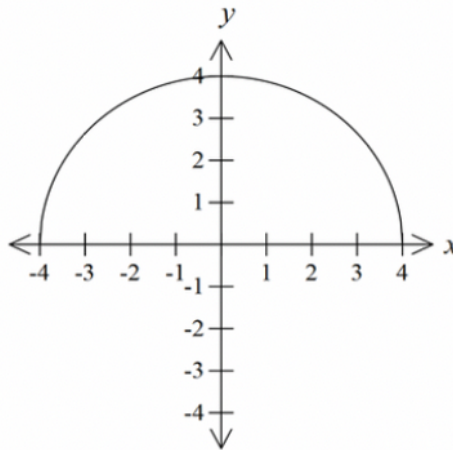
A



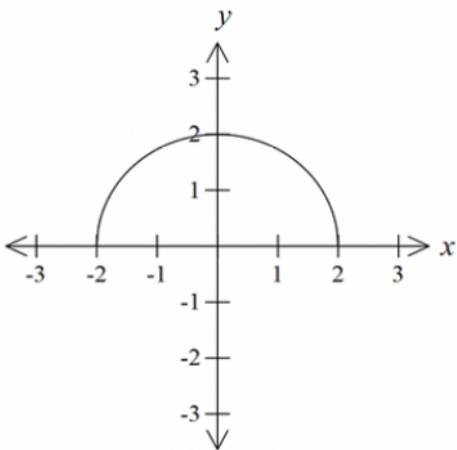
C



B



D



5 What is the solution to the equation $3x^2 + 7x - 1 = 0$?

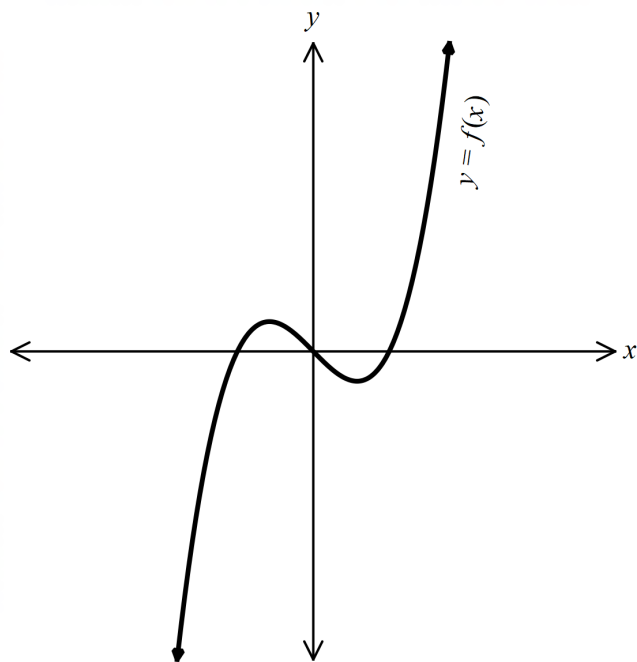
A. $x = \frac{-7 \pm \sqrt{61}}{6}$

B. $x = \frac{-7 \pm \sqrt{37}}{6}$

C. $x = \frac{7 \pm \sqrt{37}}{6}$

D. $x = \frac{7 \pm \sqrt{61}}{6}$

- 6 Consider the graph of $y = f(x)$ shown below.



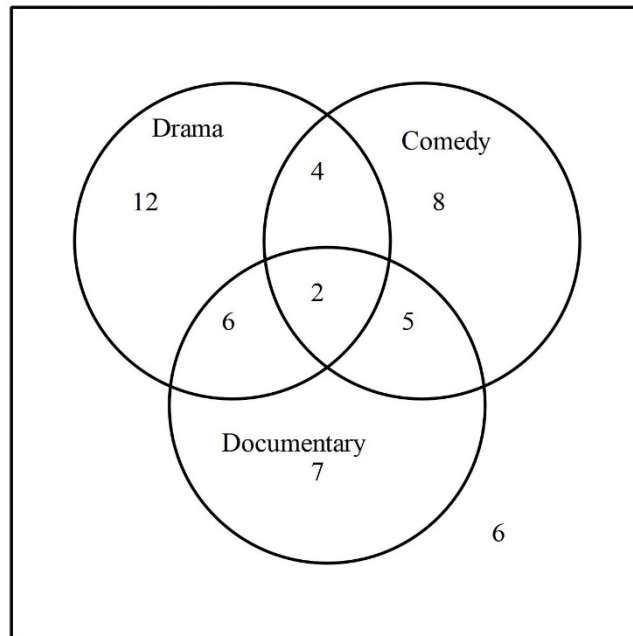
Which of the following statements is true about $f(x)$?

- A. It is even and both increasing and decreasing.
- B. It is even and increasing.
- C.** It is odd and both increasing and decreasing.
- D. It is odd and increasing.

- 7 Write $5x\sqrt{11}$ in the form $\sqrt{a}$.

- A. $\sqrt{55x^2}$
- B. $\sqrt{55x}$
- C.** $\sqrt{275x^2}$
- D. $\sqrt{275x}$

- 8 A theatrical agent has 50 artists on his books.
The Venn diagram shows the genres in which they perform.

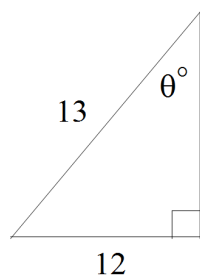


He rings one of his artists at random.
What is the probability that the artist does comedy or documentary or both, but not drama?

- A. $\frac{3}{10}$
B. $\frac{2}{5}$
 C. $\frac{3}{5}$
 D. $\frac{16}{25}$
- 9 Express $\frac{2}{2+\sqrt{3}}$ as a fraction with a rational denominator.

- A. $\frac{4-2\sqrt{3}}{7}$
 B. $\frac{4+2\sqrt{3}}{7}$
C. $4-2\sqrt{3}$
 D. $4+2\sqrt{3}$

- 10 Hannah correctly calculated the size of angle θ using trigonometry.



Not to scale

What was her first line of working?

- A. $\cos \theta = \frac{12}{13}$
- B. $\cos \theta = \frac{13}{12}$
- C.** $\sin \theta = \frac{12}{13}$
- D. $\sin \theta = \frac{13}{12}$

END OF SECTION I

Mathematics Advanced Section II Answer Booklet

60 Marks

Attempt all questions

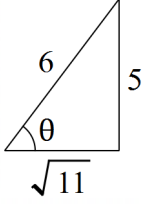
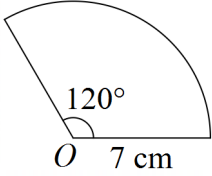
Allow about 1 hour and 45 minutes for this section

Instructions

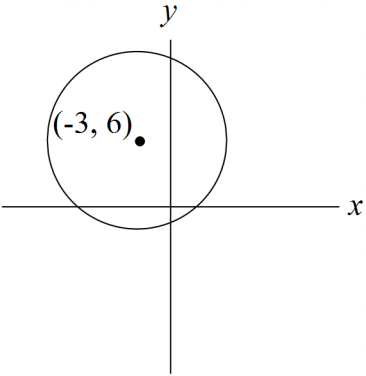
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 - Your responses should include relevant mathematical reasoning and/or calculations.
 - Extra writing space is provided at the back of this booklet. If you use this space, clearly indicate which question you are answering.
-

Question 11		2
	Simplify the expression $\sqrt{32} - \sqrt{8}$	
	$\sqrt{32} - \sqrt{8} = \sqrt{16 \times 2} - \sqrt{4 \times 2} = 4\sqrt{2} - 2\sqrt{2} = 2\sqrt{2}$	
Question 12		2
	Solve the equation $\frac{6x+10}{3} = x + 2$.	
	$6x + 10 = 3x + 6$ $6x - 3x = 6 - 10$ $3x = -4$ $x = -\frac{4}{3}$	
Question 13		1
	Convert $\frac{11\pi}{12}$ to degrees.	
	$\frac{11\pi}{12} \times \frac{180^\circ}{\pi} = 165^\circ$	

Question 14			
Find the exact value of			
	(i)	$\cos 120^\circ$	1
	$\begin{aligned}\cos 120 &= \cos(180 - 60) \\ &= -\cos 60 \\ &= -\frac{1}{2}\end{aligned}$		
	(ii)	$\tan \frac{5\pi}{4}$	1
	$\begin{aligned}\tan \frac{5\pi}{4} &= \tan\left(\pi + \frac{\pi}{4}\right) \\ &= \tan \frac{\pi}{4} \\ &= 1\end{aligned}$		
Question 15			2
Find the equation of the line that is parallel to $y = \frac{1}{4}x - 3$ and passes through the point $(2, 3)$. Give your answer in gradient-intercept form.			
	$\begin{aligned}m &= \frac{1}{4} \text{ (parallel lines have same gradient), } (x_1, y_1) = (2, 3) \\ y - y_1 &= m(x - x_1) \\ y - 3 &= \frac{1}{4}(x - 2) \\ y - 3 &= \frac{1}{4}x - \frac{1}{2} \\ y &= \frac{1}{4}x + \frac{5}{2}\end{aligned}$		

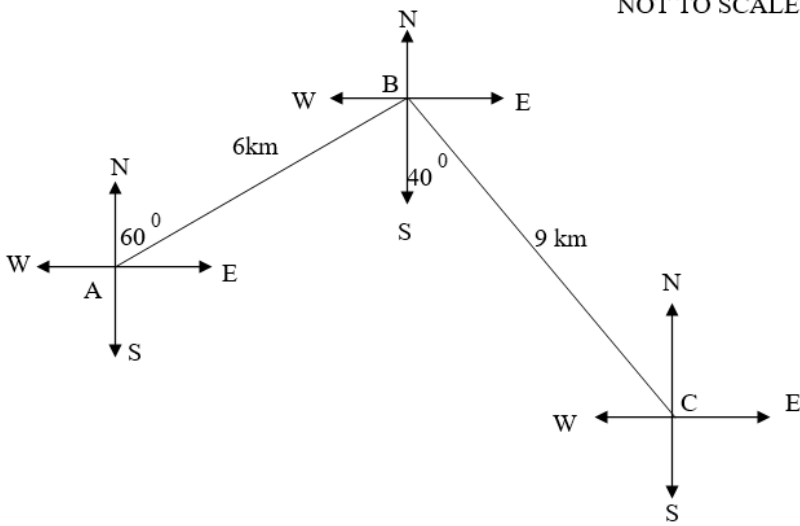
Question 16	2
Given $\sin \theta = \frac{5}{6}$ and $90^\circ \leq \theta \leq 180^\circ$, find the exact value of $\cos \theta$.	
 A right triangle can be drawn using $\sin \theta = \frac{\text{opp}}{\text{hyp}}$ We can then find the adjacent side using Pythagoras' Theorem: $b^2 = c^2 - a^2 = 36 - 25 = 11$ $b = \sqrt{11}$ We can now find cosine using $\cos \theta = \frac{\text{adj}}{\text{hyp}}$ $\cos \theta = -\frac{\sqrt{11}}{6} \text{ (cosine is negative)}$	
Question 17	2
Find the perimeter of the sector of a circle centred at O with a radius of 7 cm and subtended by an angle of 120°. Give your answer rounded to one decimal place. 	
	Arc length: $l = \frac{\theta}{360^\circ} \times 2\pi r \text{ (see Reference Sheet)}$ $l = \frac{120^\circ}{360^\circ} \times 2\pi(7) \approx 14.7 \text{ cm}$ $P = 14.7 + 7 + 7 = 28.7 \text{ cm}$

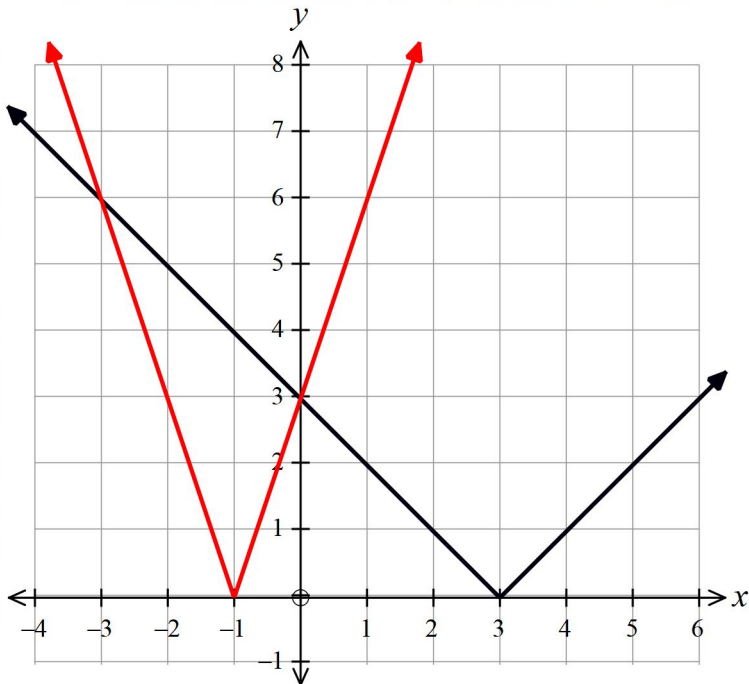
Question 18	3
The diagram shows an obtuse triangle with side lengths 6.2 cm and 9.8 cm, and angles 24° and θ, where θ is the largest angle. Find the value of θ to the nearest degree.	
Using sine rule: $\frac{\sin \theta}{9.8} = \frac{\sin 24^\circ}{6.2}$ $\sin \theta = 9.8 \times \frac{\sin 24^\circ}{6.2} \approx 0.6429$ $\theta = 180^\circ - \sin^{-1} 0.6429 = 140^\circ \text{ (}\theta \text{ is the largest angle in an obtuse triangle, thus } \theta \text{ is obtuse and we subtract the calculator answer from } 180^\circ\text{)}$	
Question 19	2
Given $f(x) = \begin{cases} x & x \leq 1 \\ x^3 & 1 < x \leq 3 \\ 36 - x^2 & x > 3 \end{cases}$, evaluate $f(-2)$ and $f(3)$.	
$f(-2) = -2$ $= 2$ $f(3) = 3^3$ $= 27$	

Question 20			
The graph of a circle is given by the relation $x^2 + 6x + y^2 - 12y = 19$.			
	(i)	By completing the square on both x and y , put the relation into standard form and identify the coordinates of the centre and length of the radius.	2
	$x^2 + y^2 + 6x - 12y = 19$ $x^2 + 6x + 9 + y^2 - 12y + 36 = 19 + 9 + 36 \text{ (completing the square on } x \text{ and } y)$ $(x + 3)^2 + (y - 6)^2 = 64$ Centre: $(-3, 6)$, radius: 8		
	(ii)	Sketch the function showing all important features.	2
			

Question 21			
	Differentiate		
	(i)	$y = \sqrt{x}$	1
	$y' = \frac{1}{2} x^{-\frac{1}{2}}$ $= \frac{1}{2x^{\frac{1}{2}}} = \frac{1}{2\sqrt{x}}$		
	(ii)	$y = x + \frac{1}{x}$	1
	$y = x + x^{-1}$ $y' = 1 - x^{-2}$ $= 1 - \frac{1}{x^2}$		
	(iii)	$y = (2x^2 + 3)^4$	2
	$y' = 4(2x^2 + 3)^3 \times 4x$ $= 16x(2x^2 + 3)^3$		

Question 22		
	Differentiate $y = (x + 4)(3x - 1)$ using the product rule.	2
	$u = x + 4$ $u' = 1$ $v = 3x - 1$ $v' = 3$ $y' = u'v + v'u$ $= (3x - 1) + 3(x + 4)$ $= 3x - 1 + 3x + 12$ $= 6x + 11$	
Question 23		
	Differentiate $y = \frac{2x + 1}{x + 3}$	2
	$u = 2x + 1$ $u' = 2$ $v = x + 3$ $v' = 1$ $y' = \frac{u'v - v'u}{v^2}$ $= \frac{2(x + 3) - (2x + 1)}{(x + 3)^2}$ $= \frac{2x + 6 - 2x - 1}{(x + 3)^2}$ $= \frac{5}{(x + 3)^2}$	

Question 24			
(a)	Andrew swims 6 km from A to B on a bearing $N60^{\circ}E$. He then turns and cycles 9 km to C on a bearing $S40^{\circ}E$. He then runs from C to A. 		
	(i)	Find the size of $\angle ABC$.	1
	$\angle ABC = 100^{\circ}$		
	(ii)	When at C, how far is he from its starting point? Give your answer correct to one decimal place.	2
	$x^2 = 6^2 + 9^2 - 2 \times 6 \times 9 \times \cos 100^{\circ}$ $x^2 = 135.7540032$ $x = 11.7 \text{ km}$		

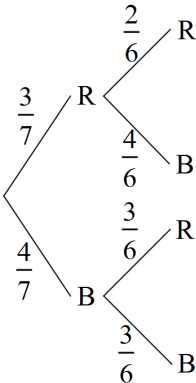
	(iii)	Andrew swims at 3 km/h, cycles at 18 km/h and runs at 10km/h. If Andrew had left A at 6:30 am, what time would he arrive at C.	1
	Time taken : AB= 2 hours BC = ½ hours Arrive at C : 9am		
Question 25			2
	On the axes below, draw the graphs of $y = x - 3 $ and $y = 3x + 3 $. Showing all the important features.		
			

Question 26			
	Prove		
	(i)	$\tan \alpha \operatorname{cosec} \alpha = \sec \alpha$	2
	$\begin{aligned} \tan \alpha \operatorname{cosec} \alpha &= \sec \alpha \\ LHS &= \tan \alpha \operatorname{cosec} \alpha = \frac{\sin \alpha}{\cos \alpha} \operatorname{cosec} \alpha \\ &= \frac{\sin \alpha}{\cos \alpha} \times \frac{1}{\sin \alpha} \\ &= \frac{1}{\cos \alpha} \\ &= \sec \alpha \\ &= RHS \end{aligned}$		
	(ii)	$\frac{1}{\sin^2 \theta} + \frac{1}{\cos^2 \theta} = \sec^2 \theta \operatorname{cosec}^2 \theta$	2
	$\begin{aligned} LHS &= \frac{\cos^2 \theta + \sin^2 \theta}{\sin^2 \theta \cos^2 \theta} \\ &= \frac{1}{\sin^2 \theta \cos^2 \theta} \\ &= \frac{1}{\sin^2 \theta} \times \frac{1}{\cos^2 \theta} \\ &= \operatorname{cosec}^2 \theta \sec^2 \theta \\ &= \sec^2 \theta \operatorname{cosec}^2 \theta \\ &= RHS \end{aligned}$		

Question 27			
	A particle is moving along the x -axis. Its displacement x centimetres at time t seconds is given by $x = 2t^3 - 5t^2 - 2t + 1$ for $t \geq 0$.		
	(i)	What is the <u>initial</u> displacement of the particle?	1
	Substituting $t = 0$: $x = 2(0)^3 - 5(0)^2 - 2(0) + 1 = 1$ Initial displacement is 1 cm.		
	(ii)	What is the particle's <u>initial</u> velocity?	2
	$v = x' = 6t^2 - 10t - 2$ Substituting $t = 0$: $v = 6(0)^2 - 10(0) - 2 = -2$ Initial velocity is -2 cm/s		
	(iii)	What is the particle's acceleration at $t = 3$?	2
	$a = v' = 12t - 10$ Substituting $t = 3$: $a = 12(3) - 10 = 26$ Acceleration is 26 m/s ²		

Question 28		3
	Use algebra to solve the following simultaneous equations: $3x - y - 11 = 0$ $x + 3y - 17 = 0$	
	$3x - y - 11 = 0 \text{ (1)}$ $x + 3y - 17 = 0 \text{ (2)}$ Multiply equation (1) by 3 $9x - 3y - 33 = 0 \text{ (3)}$ Adding equations (2) and (3) $10x = 50$ $x = 5$ Substitute 5 for x into equation (1) $3 \times 5 - y - 11 = 0$ $y = 4$ $\therefore$ Simultaneous solution is (5, 4)	
Question 29		
	Use the formula $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ to find $f'(x)$ when $f(x) = x^2 + 3$	2
	$\lim_{x \rightarrow \infty} \frac{(x+h)^2 + 3 - (x^2 + 3)}{h}$ $\lim_{x \rightarrow \infty} \frac{x^2 + 2xh + 3 + h^2 - x^2 - 3}{h}$ $\lim_{x \rightarrow \infty} \frac{2xh + h^2}{h}$ $\lim_{x \rightarrow \infty} \frac{h(2x + h)}{h}$ $\lim_{x \rightarrow \infty} 2x + h$ $= 2x$	

Question 30			
Solve for $0^\circ \leq x \leq 360^\circ$			
	(i)	$2\cos x - 1 = 0$	2
	$2\cos x - 1 = 0$ $2\cos x = 1$ $\cos x = \frac{1}{2}$ $x = 60^\circ, 300^\circ$		
	(ii)	$\sin^2 x + \sin x = 0$	3
	$\sin^2 x + \sin x = 0$ $\sin x(\sin x + 1) = 0$ $\sin x = 0 \qquad \sin x + 1 = 0$ $x = 0^\circ, 180^\circ, 360^\circ \qquad \sin x = -1$ $x = 270^\circ$ $\therefore x = 0^\circ, 180^\circ, 270^\circ, 360^\circ$		

Question 31			
	Lizzie places 3 red lollies and 4 blue lollies in a bag. She chooses one without looking and eats it before choosing a second lolly without looking.		
(i)	Complete the probability tree diagram below by writing probabilities on the branches. 	2	
(ii)	What is the probability that Lizzie gets two red lollies?	1	
	$\frac{3}{7} \times \frac{2}{6} = \frac{1}{7}$		
(iii)	What is the probability that Lizzie gets lollies of two different colours?	2	
	$\frac{3}{7} \times \frac{4}{6} + \frac{4}{7} \times \frac{3}{6} = \frac{4}{7}$		
END OF EXAMINATION			

Section II extra writing space
If you use this space, clearly indicate which question you are answering.

[illegible]

2020

Year 11 Assessment Task 1

Student Name:

Mathematics Advanced

Section I Multiple-Choice Answer Sheet

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 ☐

6 A ☐ B ☐ C ☐ D ☐

7 A ☐ B ☐ C ☐ D ☐

8 A ☐ B ☐ C ☐ D ☐

9 A ☐ B ☐ C ☐ D ☐

10 A ☐ B ☐ C ☐ D ☐