

# Candidate 1

QUESTION NUMBER	<p>1.</p> $5x + 2y = 7$ $2y = -5x + 7$ $y = -\frac{5}{2}x + \frac{7}{2}$ $m = -\frac{5}{2}$ $\perp m = \frac{2}{5}$ $y - b = m(x - a)$ $y - 6 = \frac{2}{5}(x - (-1))$ $5(y - 6) = 2(x + 1)$ $5y - 30 = 2x + 2$ $5y = 2x + 32$	DO NOT WRITE IN THIS MARGIN
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## Candidate 2

QUESTION NUMBER	<p>1. <math>5x + 2y = 7</math> <math>(-1, 6)</math> <math>m_1 \times m_2</math></p> <p><math>2y = -5x + 7</math> <math>\frac{-5}{2} \times \frac{2}{5} = -1</math></p> <p><math>\div 2 \div 2</math></p> <p><math>y = -\frac{5}{2}x + \frac{7}{2}</math></p> <p><math>m = -\frac{5}{2}</math></p> <p><math>(-1, 6)</math></p> <p><math>y - b = m(x - a)</math></p> <p><math>y - 6 = \frac{2}{5}(x - (-1))</math> <span style="border: 1px solid black; padding: 2px;"><math>5y = 2x + 32</math></span></p> <p><math>\times 5</math> <math>y - 6 = \frac{2}{5}(x + 1)</math></p> <p><math>5y - 30 = 2x + 2</math></p> <p style="margin-left: 40px;"><math>+30</math> <span style="margin-left: 100px;"><math>+30</math></span></p>	DO NOT WRITE IN THIS MARGIN
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## Candidate 3

QUESTION NUMBER	<p>1. <math>5x + 2y = 7</math> <math>(-1, 6)</math></p> <p><math>2y = -5x + 7</math> <math>y - b = m(x - a)</math></p> <p><math>y = -\frac{5}{2}x + \frac{7}{2}</math> <math>y - 6 = \frac{1}{10}(x - (-1))</math></p> <p><math>m = -\frac{5}{2}</math> <math>y - 6 = \frac{1}{10}(x + 1)</math></p> <p><math>\perp m = \frac{1}{10}</math> <math>10y - 60 = x + 1</math></p> <p><math>10y - x = 61</math></p>	DO NOT WRITE IN THIS MARGIN
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## Candidate 4

2.	$2 \log_3 6 - \log_3 4$ $\log_3 6^2 - \log_3 4$ $\log_3 36 - \log_3 4$ $\log_3 \frac{36}{4}$ $\log_3 9$ $3^x = 9$ $x = 2$	
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## Candidate 5

QUESTION NUMBER	<p>3.</p> $h(x) = 4 + \frac{1}{3}x$ $y = 4 + \frac{1}{3}x$ $x = 4 + \frac{1}{3}y$ $-4$ $x - 4 = \frac{1}{3}y$ $\times 3$ $3(x - 4) = y$ $h^{-1}(x) = \underline{\underline{3(x - 4)}}$	DO NOT WRITE IN THIS MARGIN
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## Candidate 6

3.	$h(x) = 4 + \frac{1}{3}x$ $y = 4 + \frac{1}{3}x \rightarrow 3y = 12 + x$ <del><math display="block">3y = 12 + x</math></del> <del><math display="block">y = 4 + \frac{1}{3}x</math></del> $x = 3y - 12$ $\underline{h^{-1}(x) = 3y - 12}$	MARGIN
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## Candidate 7

3.	$h(x) = 4 + \frac{1}{3}x$ <del><math display="block">y = 4 + \frac{1}{3}x</math></del> $y - 4 = \frac{1}{3}x$ $\frac{1}{3}x = y - 4$ $x = \frac{y - 4}{\frac{1}{3}}$ $h^{-1}(x) = \frac{x - 4}{\frac{1}{3}}$	DO NOT WRITE IN THIS MARGIN
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## Candidate 8

3.	$h(x) = 4 + \frac{1}{3}x$ $\text{let } h(x) = y$ $y = 4 + \frac{1}{3}x$ $y - 4 = \frac{1}{3}x$ $3y - 12 = x$ $y = 3x - 12$ $h^{-1}(x) = 3x - 12$	MARGIN
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## Candidate 9

5.	$m = \tan \theta$ $= \tan 60$ $= \sqrt{3}$ $y - b = m(x - a)$ $y - 0 = \sqrt{3}(x + 2)$ $y = \sqrt{3}x + 2\sqrt{3}$	MARGIN
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# Candidate 10

QUESTION NUMBER	$\frac{\pi}{2} - \frac{\pi}{3}$ $= \frac{3\pi}{6} - \frac{2\pi}{6}$ $= \frac{\pi}{6}$ $= 30$	$\tan \frac{\pi}{6} = m$ $m = \frac{\sqrt{3}}{2}$ $y = m(x - a)$ $y = \frac{\sqrt{3}}{2}x + \sqrt{3}$	$\frac{1}{\frac{1}{\sqrt{3}}} = \frac{\sqrt{3}}{2}$ $x_2 = \sqrt{3}$	DO NOT WRITE IN THIS MARGIN
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# Candidate 11

QUESTION	<p>(6) <math>\int_{-5}^2 (10 - 3x)^{\frac{1}{2}} dx</math></p> $= \left( \frac{10 - 3x}{\frac{1}{2}} \right)^{\frac{1}{2}}$ $= 2 (10 - 3x)^{\frac{1}{2}} \cdot -\frac{1}{3}$ $= -\frac{2}{3} (10 - 3x)^{\frac{1}{2}}$ $= \left[ -\frac{2}{3} \sqrt{10 - 3x} \right]_{-5}^2$ $= \left( -\frac{2}{3} \sqrt{10 - 3(2)} \right) - \left( -\frac{2}{3} \sqrt{10 - 3(-5)} \right)$ $= \left( -\frac{2}{3} \times 2 \right) - \left( -\frac{2}{3} \times 5 \right)$ $= -\frac{4}{3} - \left( -\frac{10}{3} \right)$ $= \frac{10}{3} - \frac{4}{3}$ $= \frac{6}{3} = 2 \text{ sq units.}$	MARGIN
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## Candidate 12

$$\int_{-5}^2 (10-3x)^{\frac{1}{2}} \cdot dx$$

$$= \int_{-5}^2 \frac{(10-3x)^{\frac{1}{2}}}{\frac{1}{2}} \cdot dx$$

$$= \left( \frac{10-3x^{\frac{1}{2}}}{\frac{1}{2}} \right) - \left( \frac{10-3x-5}{\frac{1}{2}} \right)$$

$$= 1 - 6.25$$

$$= -5.25$$

$10-3 \times 2 = 4^{\frac{1}{2}}$   
 $= 2$   
 $\frac{2}{\frac{1}{2}}$   
 $= 4$   
 $10-3 \times (-5) = 25^{\frac{1}{2}}$   
 $= 5$   
 $\frac{5}{\frac{1}{2}}$   
 $= 12.5$

## Candidate 13

7.(b)

$$\sin(q-r) = \sin q \cos r - \cos q \sin r$$

$$= \frac{3}{\sqrt{13}} \times \frac{3}{\sqrt{10}} - \frac{2}{\sqrt{13}} \times \frac{1}{\sqrt{10}}$$

$$= \frac{9}{\sqrt{10}\sqrt{13}} - \frac{2}{\sqrt{10}\sqrt{13}}$$

$$= \frac{7}{\sqrt{130}}$$

$$= \frac{7\sqrt{130}}{130}$$

$\cos r = \frac{3}{\sqrt{10}}$   
 $\cos q = \frac{2}{\sqrt{13}}$

~~$= \frac{\frac{3}{\sqrt{10}} \times \frac{3}{\sqrt{13}}}{\sqrt{10} \times \sqrt{13}} - \frac{\frac{2}{\sqrt{10}} \times \frac{1}{\sqrt{13}}}{\sqrt{10} \times \sqrt{13}}$   
 $= \frac{2\sqrt{10} \times 2\sqrt{13}}{1} - \frac{\sqrt{10}}{1}$   
 $= \frac{2\sqrt{13} \times \sqrt{10}}{1}$   
 $= \frac{\sqrt{520}}{1}$~~

## Candidate 14

7.(b)

$$\begin{aligned}\sin(q-r) &= \sin q - \sin r \\ &= \frac{3}{\sqrt{13}} - \frac{1}{\sqrt{10}} \\ &= \frac{9}{13} - \frac{1}{10} \\ &= \frac{90}{130} - \frac{13}{130} \\ &= \frac{77}{130}\end{aligned}$$

## Candidate 15

7.(b)

$$\begin{aligned}\sin(q-r) &= \sin q \cos r - \cos q \sin r \\ &= \frac{3}{\sqrt{13}} \times \frac{3}{\sqrt{10}} - \frac{2}{\sqrt{13}} \times \frac{1}{\sqrt{10}} \\ &= \frac{9}{\sqrt{13} \times \sqrt{10}} - \frac{2}{\sqrt{13} \times \sqrt{10}} \\ &= \frac{9}{\sqrt{13} \times 10} - \frac{2}{\sqrt{13} \times 10} \\ &= \frac{9}{\sqrt{130}} - \frac{2}{\sqrt{130}} \\ &= \frac{6}{\sqrt{130}} \\ &= \frac{6}{\sqrt{13} \sqrt{10}}\end{aligned}$$

$\sin q = \frac{3}{\sqrt{13}}$   
 $\cos r = \frac{3}{\sqrt{10}}$   
 $\cos q = \frac{2}{\sqrt{13}}$   
 $\sin r = \frac{1}{\sqrt{10}}$

~~130~~  
~~13~~  
~~10~~  
~~3~~  
~~14~~  
~~9~~  
~~16~~  
~~25~~  
~~36~~  
~~48~~  
~~63~~

1 130  
 2 65  
 3  
 4  
 5 26

## Candidate 16

9.

$$\cos 2x = 5 \cos x - 3 \quad 0 \leq x \leq 360$$

$$2 \cos^2 x - 1 = 5 \cos x - 3$$

$$2 \cos^2 x - 5 \cos x + 2 = 0$$

$$(2 \cos^2 x - 1)(\cos x - 2) = 0$$

$$b^2 - 4ac \quad \rightarrow \text{Invalid use of discriminant.}$$

$$-5^2 - 4 \times 2 \times -4$$

$$25 - 8 \times -4$$

$$25 + 32$$

$$57.$$

*(Note: A handwritten note on the right side of the work shows a diagram of a quadratic equation  $a \cos^2 x + b \cos x + c = 0$  with  $a=2$ ,  $b=-5$ , and  $c=2$ .)*

## Candidate 17

9.

$$\cos 2x = 5 \cos x - 3 \quad 0 \leq x < 360$$

$$2 \cos^2 x - 1 = 5 \cos x - 3$$

$$2 \cos^2 x - 5 \cos x + 2 = 0$$

$$(2 \cos x - 1)(\cos x - 2) = 0$$

$$2 \cos x - 1 = 0 \quad \cos x - 2 = 0$$

$$2 \cos x = 1 \quad \cos x = 2$$

$$\cos x = \frac{1}{2} \quad \text{No solution}$$

$$x = \frac{90}{2}, \frac{270}{2}, \frac{450}{2}, \frac{315}{2}$$

$$= 45^\circ, 135^\circ, 225^\circ, 315^\circ$$

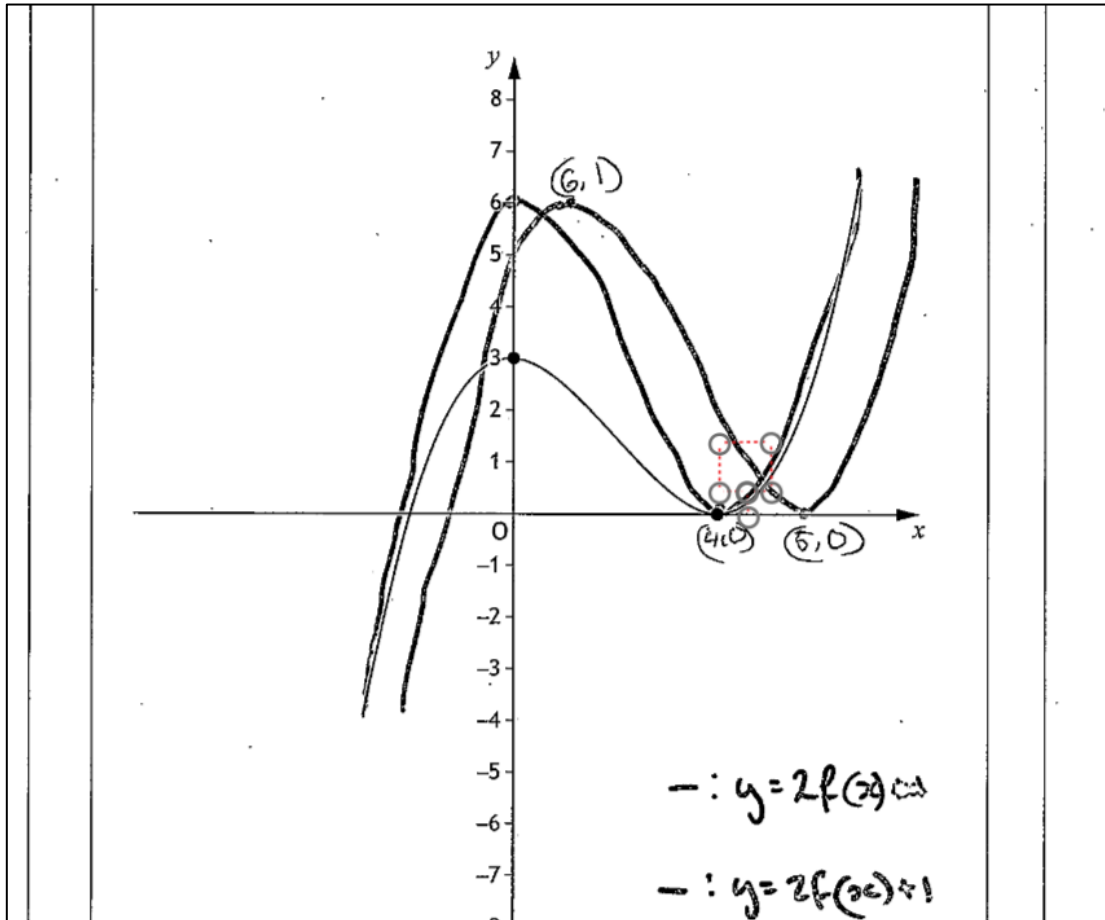
$$= 45^\circ, 225^\circ$$

$$360 + 90$$

$$540 + 90$$

# Candidate 18

## Question 10



## Candidate 19


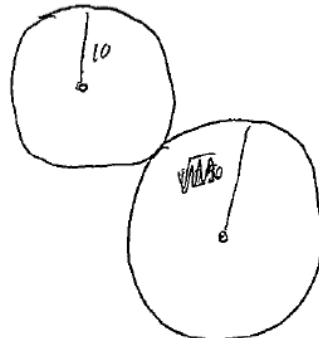
11.	$2x^2 + 12x + 23$ $2(x^2 + 6x) + 23$ $2[(x+3)^2 - 9] + 23$ $2(x+3)^2 - 18 + 23$ $\underline{\underline{2(x+3)^2 + 5}}$	MARGIN
	$2x^2 + 12x + 23$ $2(x^2 + 6x) + 23$ $2(x+3)^2 - 9 + 23$ $2(x+3)^2 - 18 + 23$ $\underline{\underline{2(x+3)^2 + 5}}$	

## Candidate 20

12.	$f(x) = 4 \sin(3x - 60)$ $f'(x) = 4[3 \cos(3x - 60)]$ $= 12 \cos(3x - 60)$ $= 12 \cos(3(30) - 60)$ $= 12 \cos(90 - 60)$ $= 12 \cos(30)$ $12 \cos(30) = 0$ $\cos(30) = \frac{\sqrt{3}}{2}$	



# Candidate 23

NUMBER		THIS MARGIN
14.(a) (i)	<p>centre = <math>(2, -5)</math></p> <p>radius = 10</p>	
14.(a) (ii)	<p>distance between centre of <math>C_2</math> and P</p> <p><math>(2, -5)</math> <math>(-2, 7)</math> = 9 along, 13 up</p> $= \sqrt{9^2 + 13^2}$ $= \sqrt{81 + 169}$ $= \sqrt{250}$ <p><del><math>\sqrt{250}</math></del> <del><math>\sqrt{250}</math></del></p> <p>as the distance between the points (<math>\sqrt{250}</math>) is greater than the radius (<math>\sqrt{100}</math>), point P lies outside <math>C_1</math>.</p>	<p><math>39 + 170 = 50 \times 50</math> <del><math>= 169</math></del> <del><math>= 50 \times 5</math></del> <del><math>= 2500</math></del></p> 
14.(b)	 <p><math>r = \sqrt{250} - \sqrt{100}</math> <del><math>= 5\sqrt{10} - 10</math></del> <del><math>= \sqrt{25} \times \sqrt{10} - \sqrt{25} \times \sqrt{4}</math></del> <del><math>= 5\sqrt{10} - 5\sqrt{4}</math></del> <del><math>= 5\sqrt{10} - 10</math></del></p> <p>or <math>r^2 = 250 - 100</math> <math>r^2 = 150</math> <math>r = \sqrt{150}</math> <u><u><math>= 5\sqrt{2}\sqrt{3}</math></u></u></p>	