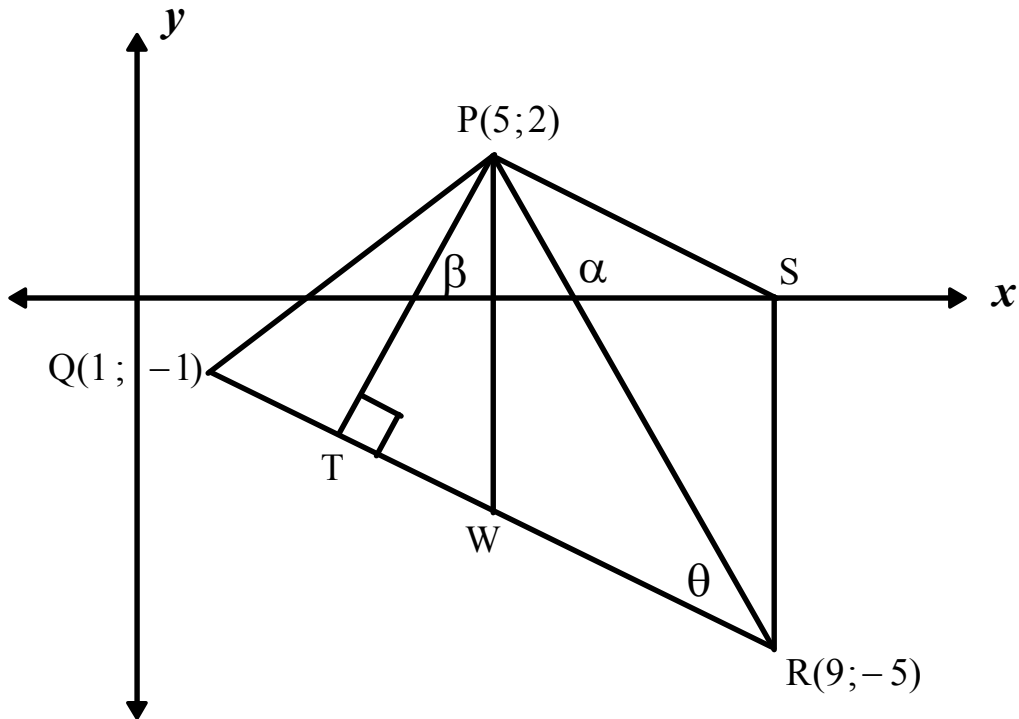


**MATHEMATICS EXEMPLAR EXAMINATION
GRADE 12
PAPER 2**

MEMORANDUM

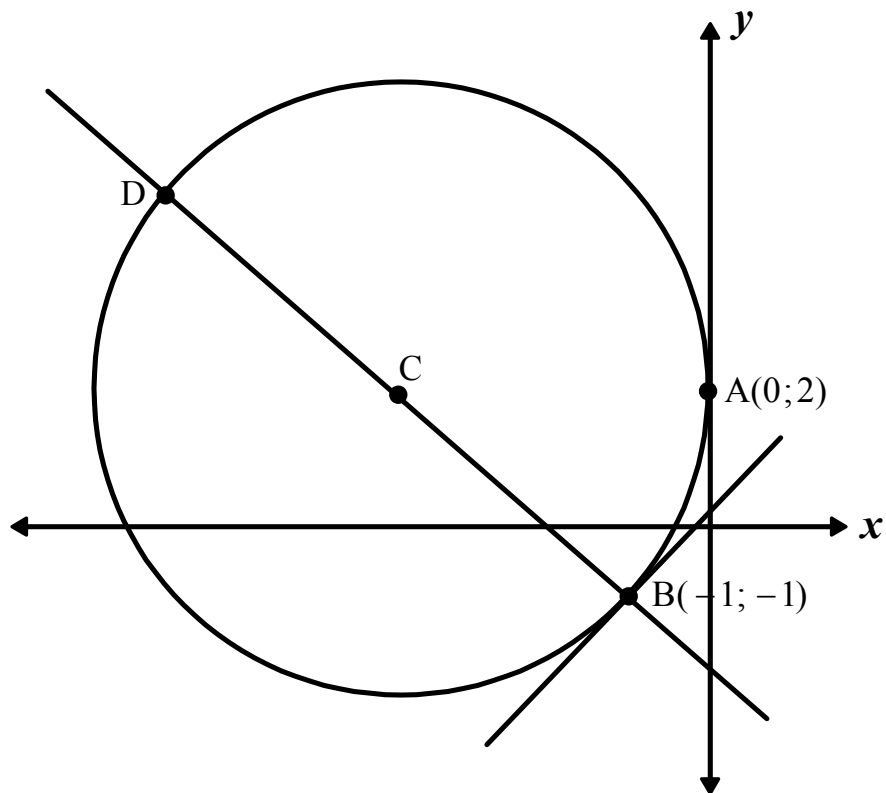
QUESTION 1



1.1	$W\left(\frac{1+(9)}{2}; \frac{-1+(-5)}{2}\right)$ $= W(5; -3)$ <p>The equation of PW is $x = 5$</p>	<ul style="list-style-type: none"> ✓ midpoint ✓ $x = 5$ <p style="text-align: right;">(2)</p>
1.2	$m_{QR} = \frac{-5 - (-1)}{9 - 1} = \frac{-4}{8} = -\frac{1}{2}$ $\therefore m_{PS} = -\frac{1}{2} \quad (PS \parallel QR)$ $y - 2 = -\frac{1}{2}(x - 5)$ $\therefore y - 2 = -\frac{1}{2}x + \frac{5}{2}$ $\therefore y = -\frac{1}{2}x + \frac{9}{2}$	<ul style="list-style-type: none"> ✓ m_{QR} ✓ m_{PS} ✓ correct substitution into formula for equation ✓ $y = -\frac{1}{2}x + \frac{9}{2}$ <p style="text-align: right;">(4)</p>

1.3	$m_{PT} = 2 \quad (PT \perp QR)$ $y - 2 = 2(x - 5)$ $\therefore y - 2 = 2x - 10$ $\therefore y = 2x - 8$	<ul style="list-style-type: none"> ✓ m_{PT} ✓ correct substitution into formula for equation ✓ $y = 2x - 8$ <p style="text-align: right;">(3)</p>
1.4	$m_{QR} = -\frac{1}{2}$ $y - (-1) = -\frac{1}{2}(x - 1)$ $\therefore y + 1 = -\frac{1}{2}x + \frac{1}{2}$ $\therefore y = -\frac{1}{2}x - \frac{1}{2}$ $\therefore -\frac{1}{2}x - \frac{1}{2} = 2x - 8$ $\therefore -x - 1 = 4x - 16$ $\therefore -5x = -15$ $\therefore x = 3$ $\therefore y = 2(3) - 8 = -2$ $\therefore T(3; -2)$	<ul style="list-style-type: none"> ✓ correct substitution into formula for equation ✓ $y = -\frac{1}{2}x - \frac{1}{2}$ ✓ $-\frac{1}{2}x - \frac{1}{2} = 2x - 8$ ✓ $x = 3$ ✓ $T(3; -2)$ <p style="text-align: right;">(5)</p>
1.5	$QT^2 = (1 - 3)^2 + (-1 - (-2))^2$ $\therefore QT^2 = 4 + 1$ $\therefore QT^2 = 5$ $\therefore QT = \sqrt{5}$ $TR^2 = (3 - 9)^2 + (-2 - (-5))^2$ $\therefore TR^2 = 36 + 9$ $\therefore TR^2 = 45$ $\therefore TR = \sqrt{45} = \sqrt{9 \times 5} = 3\sqrt{5}$ $\therefore \frac{1}{3}TR = \sqrt{5} = QT$ $\therefore QT = \frac{1}{3}TR$	<ul style="list-style-type: none"> ✓ correct substitution to get QT ✓ answer for QT ✓ correct substitution to get TR ✓ answer for TR ✓ establishing that $QT = \frac{1}{3}TR$ <p style="text-align: right;">(5)</p>

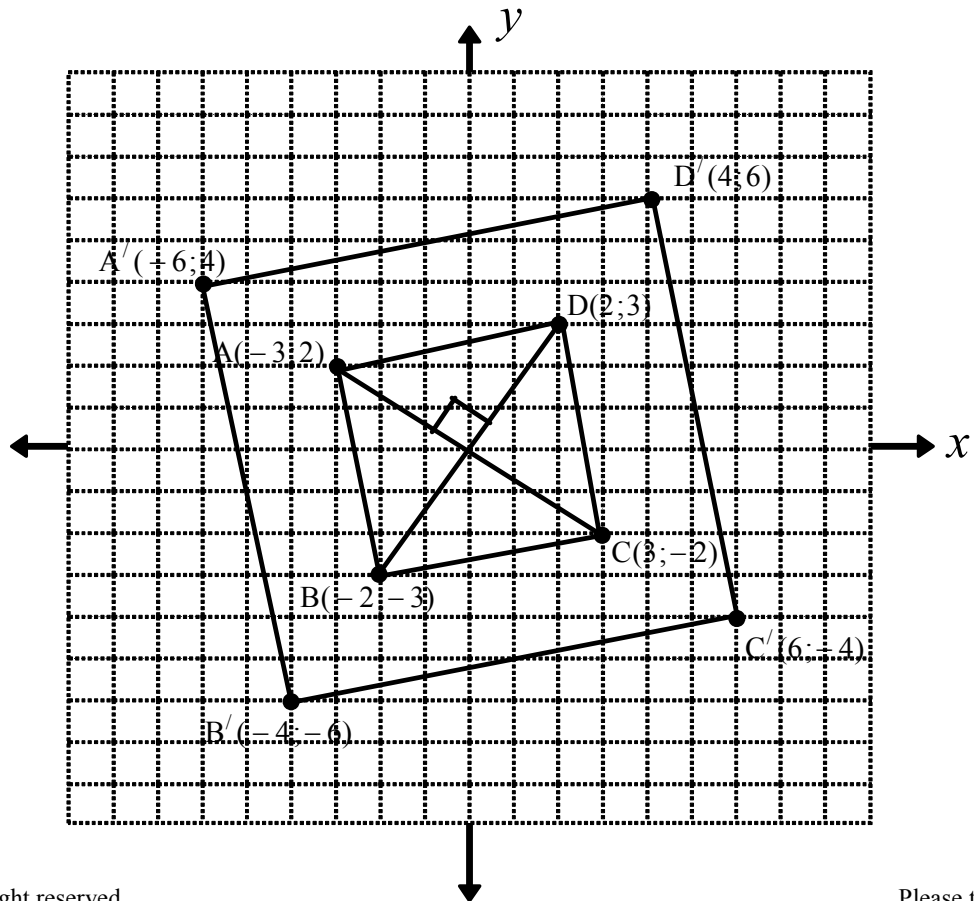
1.6	$\tan \alpha = m_{PR}$ $\therefore \tan \alpha = \frac{2 - (-5)}{5 - 9}$ $\therefore \tan \alpha = -1$ $\therefore \alpha = 180^\circ - 45^\circ$ $\therefore \alpha = 135^\circ$ $\tan \beta = m_{PT}$ $\therefore \tan \beta = 2$ $\therefore \beta = 63,43494882^\circ$ <p>Now $\hat{T\hat{P}R} + \beta = \alpha$</p> $\therefore \hat{T\hat{P}R} = \alpha - \beta$ $\therefore \hat{T\hat{P}R} = 135^\circ - 63,43494882^\circ$ $\therefore \hat{T\hat{P}R} = 71,56505118^\circ$ $\theta + 90^\circ + 71,56505118^\circ = 180^\circ$ $\therefore \theta = 18,43^\circ$	$\checkmark \tan \alpha = -1$ $\checkmark \alpha = 135^\circ$ $\checkmark \beta = 63,43494882^\circ$ $\checkmark \hat{T\hat{P}R} = 71,56505118^\circ$ $\checkmark \theta = 18,43^\circ$ <p style="text-align: right;">(5)</p>
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QUESTION 2

2.1	$m_{AB} = m_{BC}$ $\therefore \frac{2-5}{3-6} = \frac{k+4-2}{2k-3}$ $\therefore 1 = \frac{k+2}{2k-3}$ $\therefore 2k-3 = k+2$ $\therefore k = 5$	<ul style="list-style-type: none"> ✓ $m_{AB} = m_{BC}$ ✓ working out gradients ✓ $k = 5$ <p style="text-align: right;">(3)</p>
2.2	$x^2 + y^2 - 4x + 6y + 4 = 0$ $\therefore x^2 - 4x + y^2 + 6y = -4$ $\therefore x^2 - 4x + \left[\frac{-4}{2}\right]^2 + y^2 + 6y + \left[\frac{6}{2}\right]^2 = -4 + \left[\frac{-4}{2}\right]^2 + \left[\frac{6}{2}\right]^2$ $\therefore (x-2)^2 + (y+3)^2 = -4 + 4 + 9$ $\therefore (x-2)^2 + (y+3)^2 = 9$ <p>centre = (2; -3)</p> <p>new centre after rotation of 90° clockwise: (-3; -2)</p> <p>new centre after enlargement through origin: (-6; -4)</p> <p>original radius: $r = 3$</p> <p>new radius after enlargement through origin: $r = 3 \times 2 = 6$</p> <p>new circle:</p> $(x+6)^2 + (y+4)^2 = 36$	<ul style="list-style-type: none"> ✓ $(x-2)^2$ ✓ $(y+3)^2$ ✓ $r^2 = 9$ ✓ new centre = (-6; -4) ✓ new radius: $r = 6$ ✓ new circle: $(x+6)^2 + (y+4)^2 = 36$ <p style="text-align: right;">(6)</p>
2.3.1	$3x + 4y = -7$ $\therefore 4y = -3x - 7$ $\therefore y = -\frac{3}{4}x - \frac{7}{4}$ $\therefore m_{CB} = -\frac{3}{4}$ $\therefore m_{\text{tangent}} = \frac{4}{3}$ $y - (-1) = \frac{4}{3}(x - (-1))$ $\therefore y + 1 = \frac{4}{3}(x + 1)$ $\therefore y + 1 = \frac{4}{3}x + \frac{4}{3}$ $\therefore y = \frac{4}{3}x + \frac{1}{3}$	<ul style="list-style-type: none"> ✓ $m_{CB} = -\frac{3}{4}$ ✓ $m_{\text{tangent}} = \frac{4}{3}$ ✓ substitution into equation of line ✓ $y = \frac{4}{3}x + \frac{1}{3}$ <p style="text-align: right;">(4)</p>

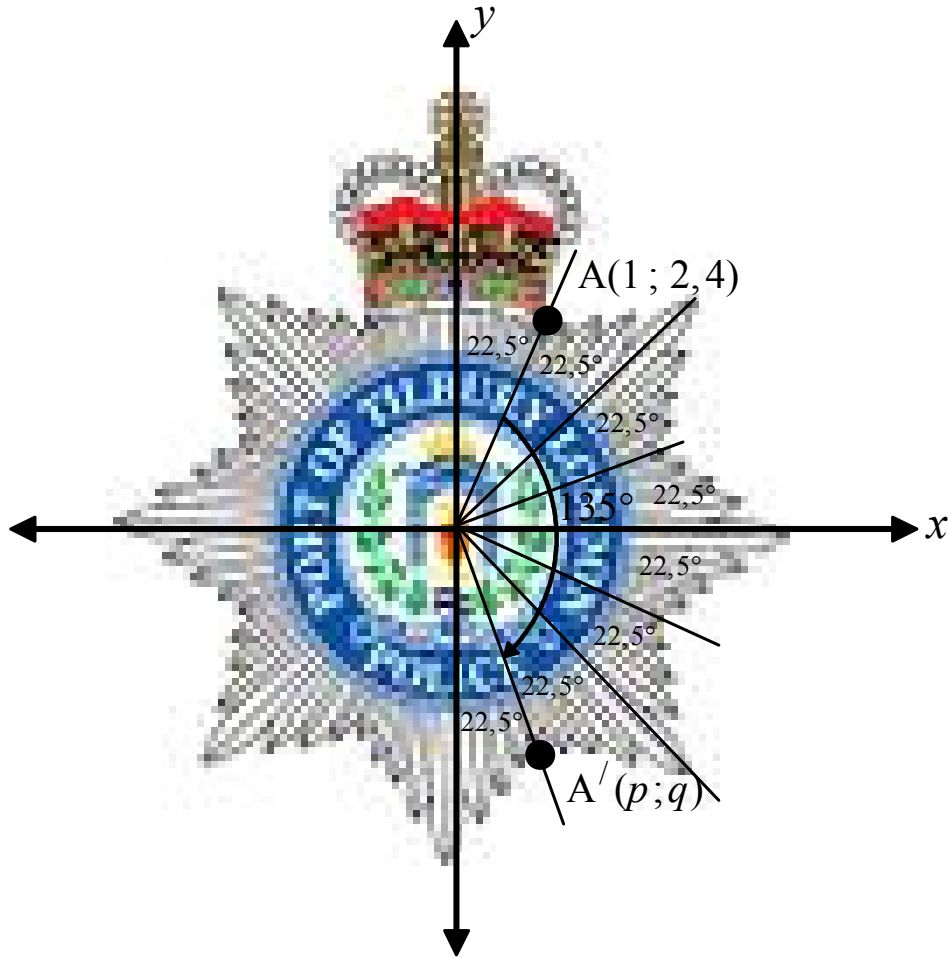
<p>2.3.2</p>	<p>$C(x; 2)$ Substitute $y = 2$ into $3x + 4y = -7$ $3x + 4(2) = -7$ $\therefore 3x = -15$ $\therefore x = -5$ $\therefore C(-5; 2)$ $\therefore (x+5)^2 + (y-2)^2 = r^2$ Now $r = 5$ $\therefore (x+5)^2 + (y-2)^2 = 25$</p>	<p>✓ $y_C = 2$ ✓ $x = -5$ ✓ $C(-5; 2)$ ✓ $r = 5$ ✓ $(x+5)^2 + (y-2)^2 = 25$ (5)</p>
<p>2.3.3</p>	<p>$C(-5; 2) = \left(\frac{x_D + x_B}{2} ; \frac{y_D + y_B}{2} \right)$ $\therefore C(-5; 2) = \left(\frac{x_D - 1}{2} ; \frac{y_D - 1}{2} \right)$ $\therefore -5 = \frac{x_D - 1}{2}$ and $2 = \frac{y_D - 1}{2}$ $\therefore -10 = x_D - 1$ and $4 = y_D - 1$ $\therefore x_D = -9$ and $y_D = 5$ $\therefore D(-9; 5)$</p>	<p>✓ correct substitution into midpoint formula ✓ $x_D = -9$ ✓ $y_D = 5$ ✓ $D(-9; 5)$ (4)</p>

QUESTION 3



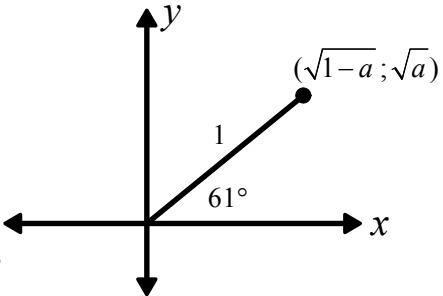
3.1	B(-2;-3) C(3;-2) D(2;3)	✓ B(-2;-3) ✓ C(3;-2) ✓ D(2;3) (3)
3.2	ABCD is a square since: Diagonals are equal in length Diagonals bisect each other at right angles	✓ square ✓ properties (2)
3.3	A'(-6;4) B'(-4;-6) C'(6;-4) D'(4;6)	✓ correct coordinates indicated ✓ joining points to form enlarged square (2)
3.4	$\frac{\text{Area ABCD}}{\text{Area A'B'C'D'}} = \frac{1}{2^2} = \frac{1}{4}$	✓ $\frac{1}{4}$ (1)
3.5.1	E(3;2)	✓ answer (1)
3.5.2	$\frac{\text{Perimeter ABCD}}{\text{Perimeter EFGH}} = \frac{4 \times \text{side AB}}{4 \times \text{side EF}} = 1$ (since AB = EF)	✓ answer (1)
3.6	$(x; y) \rightarrow \left(\frac{1}{2}x; \frac{1}{2}y\right)$ reduction by a factor of $\frac{1}{2}$ $\left(\frac{1}{2}x; \frac{1}{2}y\right) \rightarrow \left(\frac{1}{2}x; -\frac{1}{2}y\right)$ reflection about x-axis $\left(\frac{1}{2}x; -\frac{1}{2}y\right) \rightarrow \left(\frac{1}{2}x; -\frac{1}{2}y - 1\right)$ translation of 1 unit downwards $\therefore (x; y) \rightarrow \left(\frac{1}{2}x; -\frac{1}{2}y - 1\right)$	✓ reduction ✓ reflection ✓ translation (3)

QUESTION 4



4.1	$22,5^\circ \times 6 = 135^\circ$	✓ $22,5^\circ$ ✓ 135° (2)
4.2	$x' = (1) \cos(-135^\circ) - (2,4) \sin(-135^\circ)$ $\therefore x' = 1$ $y' = (2,4) \cos(-135^\circ) + (1) \sin(-135^\circ)$ $y' = -2,4$ $\therefore A'(1; -2,4)$	✓ correct substitution into formula for x' ✓ $x' = 1$ ✓ correct substitution into formula for y' ✓ $y' = -2,4$ (4)

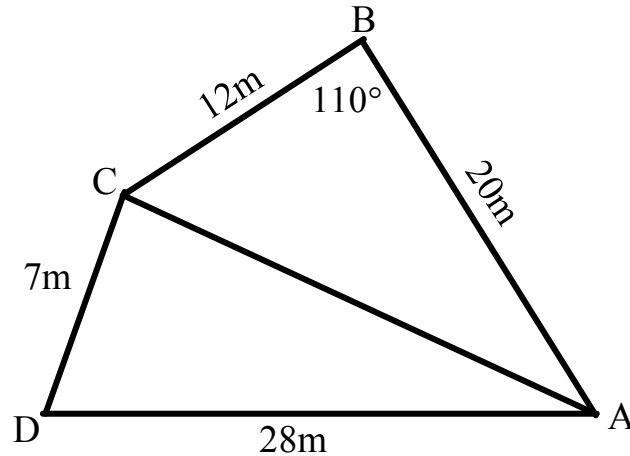
QUESTION 5

<p>5.1</p>	$\frac{\tan(-60^\circ)\cos(-156^\circ)\cos 294^\circ}{\sin 492^\circ}$ $= \frac{(-\tan 60^\circ)(\cos 156^\circ)(-\cos 66^\circ)}{(\sin 132^\circ)}$ $= \frac{(-\sqrt{3})(-\cos 24^\circ)(-\sin 24^\circ)}{(\sin 48^\circ)}$ $= \frac{(-\sqrt{3})(-\cos 24^\circ)(-\sin 24^\circ)}{2 \sin 24^\circ \cos 24^\circ}$ $= \frac{\sqrt{3}}{2}$	<ul style="list-style-type: none"> ✓ $(-\tan 60^\circ)(\cos 156^\circ)$ ✓ $-\cos 66^\circ$ ✓ $\sin 48^\circ$ ✓ $-\sqrt{3}$ ✓ $-\sin 24^\circ$ ✓ $2 \sin 24^\circ \cos 24^\circ$ ✓ $\frac{\sqrt{3}}{2}$ <p style="text-align: right;">(7)</p>
<p>5.2</p>	$\cos^2(180^\circ + x)[\tan(360^\circ - x)\cos(90^\circ + x) + \sin(x - 90^\circ)\cos 180^\circ]$ $= (-\cos x)^2 [(-\tan x)(-\sin x) + (-\cos x)(-1)]$ $= (\cos^2 x) \left[\left(\frac{-\sin x}{\cos x} \right) (-\sin x) + \cos x \right]$ $= (\cos^2 x) \left[\frac{\sin^2 x}{\cos x} + \cos x \right]$ $= (\cos^2 x) \left[\frac{\sin^2 x + \cos^2 x}{\cos x} \right]$ $= (\cos^2 x) \left[\frac{1}{\cos x} \right]$ $= \cos x$	<ul style="list-style-type: none"> ✓ $\cos^2 x$ ✓ $-\tan x$ ✓ $-\sin x$ ✓ $-\cos x$ ✓ -1 ✓ $\frac{-\sin x}{\cos x}$ ✓ $\frac{\sin^2 x + \cos^2 x}{\cos x}$ ✓ $\frac{1}{\cos x}$ ✓ $\cos x$ <p style="text-align: right;">(9)</p>
<p>5.3</p>	$\sin 61^\circ = \frac{\sqrt{a}}{1}$ $x^2 + (\sqrt{a})^2 = (1)^2$ $\therefore x^2 = 1 - a$ $\therefore x = \sqrt{1 - a}$ <div style="text-align: center;">  </div> $\cos 73^\circ \cos 15^\circ + \sin 73^\circ \sin 15^\circ$ $= \cos(73^\circ - 15^\circ)$ $= \cos 58^\circ$ $= 2 \cos^2 29^\circ - 1$ $= 2 \sin^2 61^\circ - 1$ $= 2(\sqrt{a})^2 - 1$ $= 2a - 1$	<ul style="list-style-type: none"> ✓ diagram ✓ $x = \sqrt{1 - a}$ ✓ $\cos 58^\circ$ ✓ $2 \cos^2 29^\circ - 1$ ✓ $2 \sin^2 61^\circ - 1$ ✓ $2a - 1$ <p style="text-align: right;">(6)</p>

QUESTION 6

6.1.1	$\sin(45^\circ + \theta) \cdot \sin(45^\circ - \theta)$ $= [\sin 45^\circ \cos \theta + \cos 45^\circ \sin \theta][\sin 45^\circ \cos \theta - \cos 45^\circ \sin \theta]$ $= \left[\frac{\sqrt{2}}{2} \cos \theta + \frac{\sqrt{2}}{2} \sin \theta \right] \left[\frac{\sqrt{2}}{2} \cos \theta - \frac{\sqrt{2}}{2} \sin \theta \right]$ $= \left[\frac{\sqrt{2}}{2} (\cos \theta + \sin \theta) \right] \left[\frac{\sqrt{2}}{2} (\cos \theta - \sin \theta) \right]$ $= \frac{2}{4} (\cos \theta + \sin \theta)(\cos \theta - \sin \theta)$ $= \frac{1}{2} (\cos^2 \theta - \sin^2 \theta)$ $= \frac{1}{2} \cos 2\theta$	<ul style="list-style-type: none"> ✓ expansion of $\sin(45^\circ + \theta)$ ✓ expansion of $\sin(45^\circ - \theta)$ ✓ $\sin 45^\circ = \cos 45^\circ = \frac{\sqrt{2}}{2}$ ✓ $(\cos^2 \theta - \sin^2 \theta)$ ✓ $\frac{1}{2} \cos 2\theta$ <p style="text-align: right;">(5)</p>
6.1.2	$\sin 75^\circ \cdot \sin 15^\circ$ $= \sin(45^\circ + 30^\circ) \cdot \sin(45^\circ - 30^\circ)$ $= \frac{1}{2} \cos 2(30^\circ)$ $= \frac{1}{2} \cos 60^\circ = \frac{1}{2} \left(\frac{1}{2} \right) = \frac{1}{4}$	<ul style="list-style-type: none"> ✓ $45^\circ + 30^\circ$; $45^\circ - 30^\circ$ ✓ $\frac{1}{2} \cos 60^\circ$ ✓ $\frac{1}{4}$ <p style="text-align: right;">(3)</p>
6.2	$\sin 2x + 2 \sin x + \cos^2 x + \cos x = 0$ $\therefore 2 \sin x \cos x + 2 \sin x + \cos^2 x + \cos x = 0$ $\therefore 2 \sin x (\cos x + 1) + \cos x (\cos x + 1) = 0$ $\therefore (\cos x + 1)(2 \sin x + \cos x) = 0$ $\therefore \cos x = -1 \quad \text{or} \quad 2 \sin x = -\cos x$ $\therefore \frac{\sin x}{\cos x} = -\frac{1}{2}$ $\therefore \tan x = -0,5$ $x = 0^\circ + k360^\circ \qquad x = 153,4^\circ + k360^\circ$ $x = 180^\circ + k360^\circ \qquad x = 333,4^\circ + k360^\circ$ <p>OR</p> $x = 0^\circ + k180^\circ \qquad x = 153,4^\circ + k180^\circ$ <p>OR</p> $x = 180^\circ + k180^\circ \qquad x = 333,4^\circ + k180^\circ$ <p>OR</p> $x = \pm 180^\circ + k360^\circ \qquad x = -45^\circ + k180^\circ$	<ul style="list-style-type: none"> ✓ $2 \sin x \cos x$ ✓ factorising by grouping ✓ $(\quad)(\quad) = 0$ ✓ $\cos x = -1$ ✓ $\tan x = -0,5$ ✓✓ general solutions <p>Deduct 1 mark if $k \in \square$ is not stated.</p> <p style="text-align: right;">(7)</p>

QUESTION 7

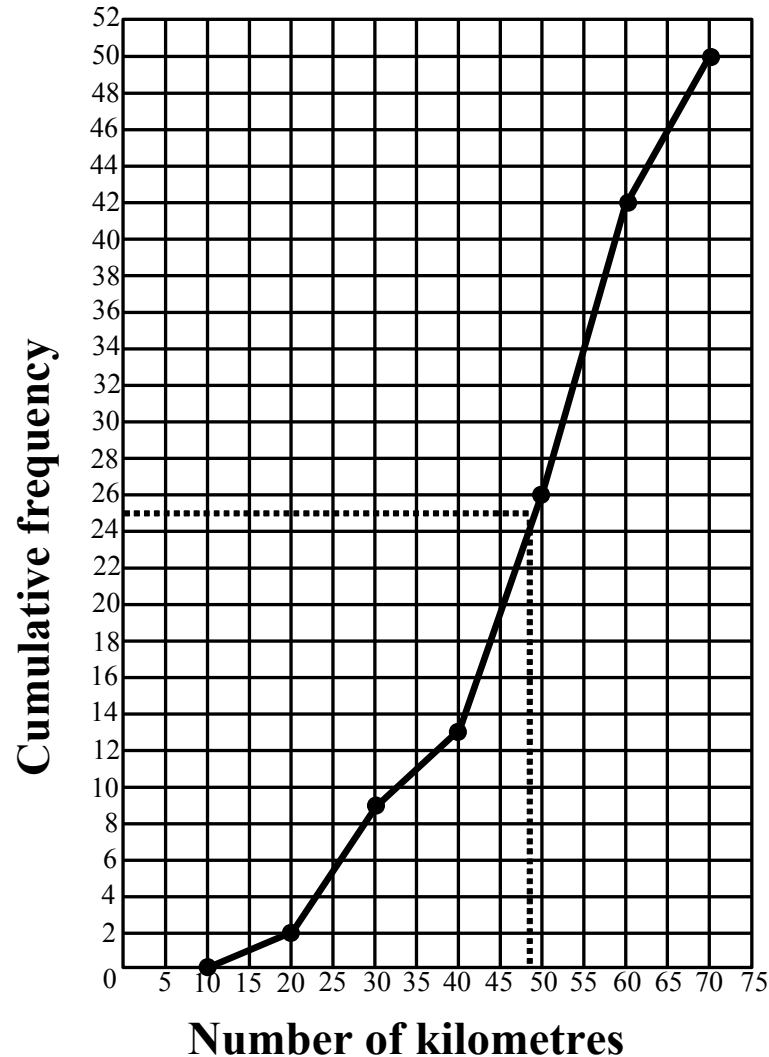


7.1	$AC^2 = (12m)^2 + (20m)^2 - 2(12m)(20m)\cos 110^\circ$ $\therefore AC^2 = 708,1696688$ $\therefore AC = 26,6m$	✓ substitution into cosine rule ✓ answer (2)
7.2	$\frac{\sin \hat{BAC}}{12m} = \frac{\sin 110^\circ}{26,6m}$ $\therefore \sin \hat{BAC} = \frac{12 \times \sin 110^\circ}{26,6m}$ $\therefore \sin \hat{BAC} = 0,4239214831$ $\therefore \hat{BAC} = 25^\circ$ OR $(12m)^2 = (20m)^2 + (26,6m)^2 - 2(20m)(26,6m)\cos \hat{BAC}$ $\therefore 1064 \cos \hat{BAC} = 963,56m^2$ $\therefore \cos \hat{BAC} = 0,9056015038$ $\therefore \hat{BAC} = 25^\circ$	✓ substitution into sine or cosine rule ✓ answer (2)
7.3	$(26,6m)^2 = (7m)^2 + (28m)^2 - 2(7m)(28m)\cos \hat{D}$ $\therefore 392 \cos \hat{D} = 125,44$ $\therefore \cos \hat{D} = 0,32$ $\therefore \hat{D} = 71^\circ$	✓ substitution into cosine rule ✓ $\cos \hat{D} = 0,32$ ✓ answer (3)
7.4	Area ABCD $= \frac{1}{2}(12m)(20m)\sin 110^\circ + \frac{1}{2}(7m)(28m)\sin 71^\circ$ $= 205,4m^2$	$\checkmark \frac{1}{2}(12m)(20m)\sin 110^\circ$ $\checkmark \frac{1}{2}(7m)(28m)\sin 71^\circ$ ✓ answer (3)

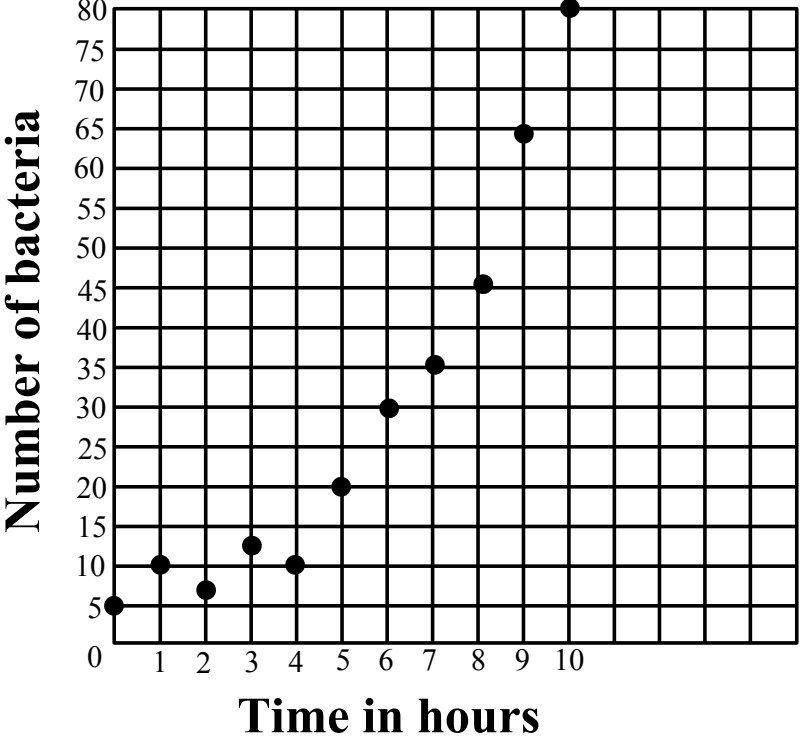
QUESTION 8

<p>8.1</p>	$\cos(x - 30^\circ) = \sin 3x$ $\therefore \cos(x - 30^\circ) = \cos(90^\circ - 3x)$ $\therefore x - 30^\circ = 90^\circ - 3x + k360^\circ \quad x - 30^\circ = 360^\circ - (90^\circ - 3x)$ $\therefore 4x = 120^\circ + k360^\circ \quad \therefore x - 30^\circ = 270^\circ + 3x + k360^\circ$ $\therefore x = 30^\circ + k90^\circ \quad \therefore -2x = 300^\circ + k360^\circ$ $\quad \quad \quad \therefore x = -150^\circ + k180^\circ$ $x = 30^\circ \quad \text{or}$ $x = 120^\circ \quad \text{or}$ $x = -60^\circ$	<ul style="list-style-type: none"> ✓ $\cos(90^\circ - 3x)$ ✓ $4x = 120^\circ + k360^\circ$ ✓ $-2x = 300^\circ + k360^\circ$ ✓ $x = 30^\circ + k90^\circ$ ✓ $x = -150^\circ + k180^\circ$ ✓ $x = 30^\circ$ ✓ $x = 120^\circ$ ✓ $x = -60^\circ$ <p style="text-align: right;">(8)</p>
<p>8.2</p>	<p>see diagram below</p>	<p>$f(x) = \cos(x - 30^\circ)$:</p> <ul style="list-style-type: none"> ✓ shift of 30° right ✓ amplitude ✓ range <p>$g(x) = \sin 3x$:</p> <ul style="list-style-type: none"> ✓ period of 120° ✓ amplitude ✓ intercepts with axes <p style="text-align: right;">(6)</p>
<p>8.3</p>	<p>Points of intersection of the two graphs</p>	<ul style="list-style-type: none"> ✓ correct explanation <p style="text-align: right;">(1)</p>
<p>8.4</p>	$\cos(x - 30^\circ) > \sin 3x$ $\therefore -60^\circ < x < 120^\circ \quad \text{where } x \neq 30^\circ$ <p>OR $x \in (-60^\circ; 30^\circ) - \{30^\circ\}$</p>	<ul style="list-style-type: none"> ✓ $-60^\circ < x < 120^\circ$ ✓ $x \neq 30^\circ$ <p style="text-align: right;">(2)</p>

QUESTION 9

<p>9.1</p> <table border="1" data-bbox="178 315 1071 588"> <thead> <tr> <th>Number of kilometres</th> <th>Number of motorists</th> <th>Cumulative frequency</th> </tr> </thead> <tbody> <tr> <td>$10 < x \leq 20$</td> <td>2</td> <td>2</td> </tr> <tr> <td>$20 < x \leq 30$</td> <td>7</td> <td>9</td> </tr> <tr> <td>$30 < x \leq 40$</td> <td>4</td> <td>13</td> </tr> <tr> <td>$40 < x \leq 50$</td> <td>13</td> <td>26</td> </tr> <tr> <td>$50 < x \leq 60$</td> <td>16</td> <td>42</td> </tr> <tr> <td>$60 < x \leq 70$</td> <td>8</td> <td>50</td> </tr> </tbody> </table>	Number of kilometres	Number of motorists	Cumulative frequency	$10 < x \leq 20$	2	2	$20 < x \leq 30$	7	9	$30 < x \leq 40$	4	13	$40 < x \leq 50$	13	26	$50 < x \leq 60$	16	42	$60 < x \leq 70$	8	50	<p>✓ correct second column (1)</p>
Number of kilometres	Number of motorists	Cumulative frequency																				
$10 < x \leq 20$	2	2																				
$20 < x \leq 30$	7	9																				
$30 < x \leq 40$	4	13																				
$40 < x \leq 50$	13	26																				
$50 < x \leq 60$	16	42																				
$60 < x \leq 70$	8	50																				
<p>9.2</p> 	<p>✓ endpoints of class intervals ✓ cumulative frequencies ✓ joining points (3)</p>																					
<p>9.3 median lies in the interval $48 \leq x \leq 49$</p>	<p>✓ median in the allowable interval (1)</p>																					

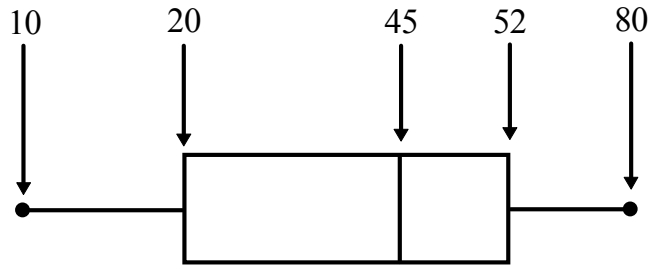
QUESTION 10

<p>10.1</p>  <p style="text-align: center;">Time in hours</p>	<p>✓✓ plotting of points (2)</p>
<p>10.2 quadratic or exponential</p>	<p>✓ answer (1)</p>

QUESTION 11

23	25	22	28	27
20	18	17	24	25

<p>11.1</p>	<p>$\bar{x} = 22,9$</p>	<p>✓✓ answer (2)</p>
<p>11.2</p>	<p>standard deviation = 3,5</p>	<p>✓✓ answer (2)</p>
<p>11.3</p>	<p>$(\bar{x} - s; \bar{x} + s)$ $= (22,9 - 3,5; 22,9 + 3,5)$ $= (19,4 ; 26,4)$ 4 temperatures lie outside the first standard deviation interval</p>	<p>✓ (19,4 ; 26,4) ✓ 4 temperatures (2)</p>

QUESTION 12

10	20	20	x	45	y	51	53	80
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minimum:	10	<ul style="list-style-type: none"> ✓ min, median and max ✓ $T_2 = T_3 = 20$ ✓ $T_7 = 51$ $T_8 = 53$ ✓ working with the mean ✓ value for x and y ✓ nine set of numbers <p>Accept variations for T_7, T_8, x and y BUT make sure that the mean of all nine numbers is 40.</p> <p style="text-align: right;">(6)</p>
maximum:	80	
median:	45	
Lower quartile:	$20 = \frac{20+20}{2}$	
Upper quartile:	$52 = \frac{51+53}{2}$	
Mean:	$\frac{10+20+20+x+45+y+51+53+80}{9} = 40$	
	$\therefore \frac{x+y+279}{9} = 40$	
	$\therefore x+y+279 = 360$	
	$\therefore x+y = 81$	
	Now $20 < x < 45$ and $45 < y < 51$	
	Therefore let $x = 34$ and $y = 47$	
Therefore the set of nine numbers are:		
10; 20; 20; 34; 45; 47; 51; 53; 80		