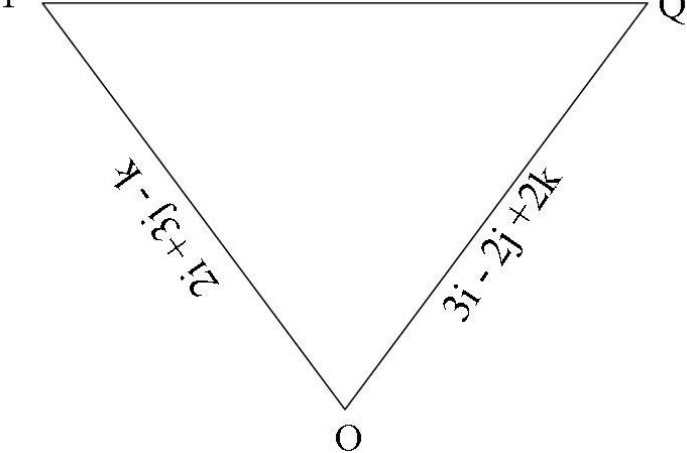


**MARKING SCHEME
MATHEMATICS
FORM 3**

No	Calculations	Marks
1	$81^{x+1} + 3^{4x} = 246$ $3^{4(x+1)} + 3^{4x} = 246$ $3^{4x} \times 3^4 + 3^{4x} = 246$ <p>Let $3^{4x} = y$</p> $81y + y = 246$ $\frac{82y=246}{82 \quad 82}$ $y=3$ $3^{4x}=3^1$ $\frac{4x}{4} = \frac{1}{4}$ $x = \frac{1}{4}$	<p>M₁</p> <p>M₁</p> <p>A₁</p>
2	$3^{5x-2y} = 3^5$ $3^{2x-y} = 3^1$ $5x - 2y = 5 \times 2$ $2x - y = 1 \times 5$ $\left. \begin{array}{l} 10x - 4y = 10 \\ 10x - 5y = 5 \end{array} \right\} -$ $y = 5$ $2x - 5 = 1$ $\frac{2x}{2} = \frac{6}{2} \quad x=3$	<p>M₁</p> <p>M₁</p> <p>A₁</p>
3	$\sqrt{6.458 \times 10^{-2}} = 6.5613 \times 10^{-1} = 0.65413$	<p>M₁</p> <p>M₁</p>

	$2 \left(\frac{1}{4.327 \times 10^{-1}} \right) = 2 (0.2319 \times 10^1) = 4.638$ $(4.638)^2 = 21.511$ $0.65413 + 21.511 = 22.16513$	M ₁ A ₁
4	$3y + 2x = 5$ $\frac{3y}{3} = \frac{5}{3} - \frac{2x}{3}$ $y = -\frac{2}{3}x + \frac{5}{3}$ $m_1 = -\frac{2}{3}$ $m_2 = \frac{3}{2}$ $\frac{-k - 1}{2 + 2} = \frac{3}{2}$ $-2k - 2 = 12$ $-2k = 12 + 2$ $K = -7$	M ₁ M ₁ A ₁
5	If 4 = 64 3 = ? $= \frac{3 \times 64}{4} = 48\text{cm}$ V.sf = $\left(\frac{4}{3}\right)^3 = \frac{64}{27}$ If 27 = 810 64 = ? $\frac{64 \times 810}{27} = 1920\text{g}$	M ₁ M ₁ A ₁
6	$3y - 30 + 7y + 50 = 90$ $\frac{10y}{10} = \frac{70}{10}$ $Y = 7$	M ₁ A ₁
7	Numerator $(2y + x)(2y - x)$	

	<p>Denominator $(2x^2 - 4xy) + (3xy - 6y^2)$ $2x(x - 2y) + 3y(x - 2y)$ $(2x + 3y)(x - 2y)$</p> $\frac{(2y+x)(\cancel{2y-x})}{(2y+3y)-1(\cancel{2y-x})} = \frac{2y+x}{-2x-3y}$	<p>M₁</p> <p>M₁</p> <p>A₁</p>
8	<p>$L_1 = \frac{x}{5} + \frac{y}{3} = 1$</p> <p>$3x + 5y = 15$ $3x + 5y < 15$</p> <p>$L_2 = \frac{x}{-3} + \frac{y}{3} = 1$ $x - y = -3$ $x - y \geq -3$</p> <p>$L_3 \ y = -3$ $y \geq -3$</p>	<p>M₁</p> <p>M₁</p> <p>A₁</p>
9	 <p>$PQ = -2i - 3j + k + 3i - 2j + 2k$ $= i - 5j + 3k$</p> <p>$\sqrt{(1)^2 + (-5)^2 + (3)^2}$</p> <p>$\sqrt{34} = 5.831$</p>	<p>M₁</p> <p>M₁</p> <p>A₁</p>

10	<p>a) $R = \frac{1}{0.003144 - 0.003130}$ $= 62500$</p> <p>b) $\frac{1}{0.00315 - 0.00313}$ $= 50000$</p> <p>c) $62500 - 50000$ $= 12500$</p>	<p>M₁</p> <p>M₁</p> <p>A₁</p>
11	<p>$2x + \frac{1}{2}x + x + 110 + 130 + 160 = (2x6 - 4)90$</p> <p>$3.5x + 440 = 720$</p> <p>$\frac{3.5x}{3.5} = \frac{280}{3.5}$</p> <p>$X = 80$</p> <p>$\frac{1}{2} \times 80 = 40$</p>	<p>M₁</p> <p>0</p> <p>A₁</p>
SECTION II		
12	<p>a) $\angle APB = \sin \theta = \frac{4.5}{8}$</p> <p>$\theta = \sin^{-1} 0.5625$ $= 34.2 \times 2 = 68.4^\circ$</p> <p>$\angle AQB = \sin \theta = \frac{4.5}{6}$</p> <p>$\theta = \sin^{-1} 0.75$ $= 48.2 \times 2 = 96.4^\circ$</p> <p>b) $\frac{68.4}{360} \times \frac{22}{7} \times 8 \times 8 - \frac{1}{2} \times 8 \times 8 \sin 68.4$ $= 8.47$</p> <p>$\frac{96.4}{360} \times \frac{22}{7} \times 6 \times 6 - \frac{1}{2} \times 6 \times 6 \sin 96.4$ $= 12.41$</p>	<p>M₁</p> <p>A₁</p> <p>M₁</p> <p>A₁</p> <p>M₁</p> <p>A₁</p> <p>M₁</p> <p>A₁</p>

	$= 8.47 + 12.41 = 20.88$ <p>c) $\frac{1}{2} \times 8 \times 8 \sin 68.4 + \frac{1}{2} \times 6 \times 6 \sin 96.4$ $= 42.16$ $= 42.16 - 2088$ $= 21.26$</p>	M ₁ A ₁
14	<p>a) $75 \times \frac{12}{60} = 15 \text{ km}$</p> <p>b) $\frac{15}{20} = 45 \text{ minutes}$</p> <p>c) $95 \times \frac{3}{4} = 71.25 \text{ km}$</p>	M ₁ A ₁ M ₁ A ₁ M ₁ A ₁ M ₁ A ₁ M ₁ A ₁
15	<p>a) $\frac{20}{3} = 6\frac{2}{3} \text{ m/s}$</p> <p>b) $\frac{20}{3} = 6\frac{2}{3} \text{ m/s}$</p> <p>c) $\frac{1}{2} (4 + 10)20 = 140 \text{ m}$</p> <p>d) $\frac{1}{2} (4 + 1)20 = 50 \text{ m}$</p> <p>e) $\text{Speed} = \frac{140}{10} = 14 \frac{\text{m}}{\text{s}}$</p> <p>f) $\text{Distance} = 20 \times 4 = 80 \text{ m}$</p>	B ₁ B ₁ M ₁ A ₁ M ₁ A ₁ M ₁ A ₁ M ₁ A ₁