

1	Use of $b^2 - 4ac$
	Obtain $k^2 - 20k + 64$
	Attempt solution of quadratic equation or inequality
	Obtain $k < 4$, $k > 16$ or clear equivalent
4(a)	$\{10\} - (x \{+\} \{3\})^2$
4(b)	State reflection in x -axis
	Obtain $m = -3$
	Obtain $n = 10$

3(a)	Solve $2x - 3 = 5x + 2$ to obtain $-\frac{5}{3}$
	Attempt solution of linear equation where $2x$ and $5x$ have different signs
	Obtain $\frac{1}{7}$
	Alternative Method for Question 3(a)
	State or imply non-modulus equation $(2x - 3)^2 = (5x + 2)^2$
	Attempt complete solution of three-term quadratic equation
	Obtain $-\frac{5}{3}$ and $\frac{1}{7}$ or equivalents
3(b)	
	State or imply $\cos \theta = -\frac{3}{5}$
	Attempt correct process for finding third quadrant angle
	Obtain 4.07

7(a)	Substitute $x = -2$, equate to zero and attempt solution
	Obtain $32 - 8k + 4k - 34 + 18 = 0$ or equivalent and hence $k = 4$
7(b)	State $\alpha = -2$
	Divide by $x + 2$ at least as far as $2x^3 + mx$
	Obtain $2x^3 + 4x + 9$
	Rearrange $2x^3 + 4x + 9 = 0$ to confirm $x = \sqrt[3]{-2x - 4.5}$
7(c)	Consider sign of $x - \sqrt[3]{-2x - 4.5}$ or equivalent for -1.4 and -1.0
	Obtain $-0.2\dots$ and $0.3\dots$ or equivalents and justify conclusion
7(d)	Use iterative process correctly at least once
	Obtain final answer -1.26
	Show sufficient iterations to 5 sf to justify answer or show sign change in interval $[-1.265, -1.255]$

2(a)	State or imply $2 = \log_4 4^2$
	Use log power, product or quotient law e.g. $2\log_4 (3x - 1) = \log_4 (3x - 1)^2$
2(b)	Obtain a correct equation in any form, free of logs
2(b)	Solve 3-term quadratic
	Obtain answer 4.59 only
10(a)	State or imply the form $A + \frac{B}{3+x} + \frac{Cx+D}{2+x^2}$
	Use a correct method for finding a constant
	Obtain one of $A = 1$, $B = -4$, $C = 1$ and $D = -3$
	Obtain a second value
10(a)	Obtain a third value
	Obtain all four correct values

10(b)	Use a correct method to find the first two terms in the expansion of $(3 + x)^{-1}$, $\left(1 + \frac{x}{3}\right)^{-1}$, $(2 + x^2)^{-1}$ or $\left(1 + \frac{x^2}{2}\right)^{-1}$
	Obtain correct unsimplified expansions up to the term in x^2 of each partial fraction
	Multiply $(Cx + D)$ by the expansion of $\left(1 + \frac{x^2}{2}\right)^{-1}$ up to the term in x^2 where $CD \neq 0$
	Obtain final answer $-\frac{11}{6} + \frac{17}{18}x + \frac{65}{108}x^2$

3	For attempt to resolve in any direction to form an equation or expression
	Vertically: $(Y =) \pm(45 + 28\sin 35 - 72\sin 50 - 35\sin 60)$
	Horizontally: $(X =) \pm(28\cos 35 + 72\cos 50 - 35\cos 60)$
	$R = \sqrt{(their\ 24.4059\dots)^2 + (their\ 51.7169\dots)^2}$
	$\theta = \tan^{-1}\left(\frac{their\ 24.4059\dots}{their\ 51.7169\dots}\right) [= \tan^{-1} 0.4719\dots]$ OR $\alpha = \tan^{-1}\left(\frac{their\ 51.7169\dots}{their\ 24.4059\dots}\right) [= \tan^{-1} 2.1190\dots]$

3	$R = 57.2\text{ N}$ Direction is 25.3° below the positive x -direction or bearing 115°

7(a)	$v = \frac{1}{3}(2t^2 - 11t + 12) \Rightarrow \frac{dv}{dt} = \frac{1}{3}(4t - 11)$
	$\frac{1}{3}(4 \times 2 - 11) = -1 \text{ m s}^{-2}$
7(b)	Attempt to integrate
	$s = \frac{1}{3} \left(\frac{2t^3}{3} - \frac{11t^2}{2} + 12t \right) (+c)$
	[P changes direction when] $t = 1.5$
	Attempt to evaluate their $\frac{1}{3} \left(\frac{2t^3}{3} - \frac{11t^2}{2} + 12t \right)$ for $t = 0$ to $t = 1.5$ and $t = 1.5$ to $t = 3$
	Total distance is $[2.625 + -1.125 =] 3.75 \text{ m}$

7(c)	Attempt to evaluate their s for $t = 0$ to $t = 4$
	$\int_0^4 v dt = \frac{8}{9} > 0$ so, no P does not return to O

3(a)	Median = [\\$]32400
	[IQR = \\$]33500 – [\\$]31300
	= [\\$]2200

3(b)	[Mean =] $\frac{878.3 + 896.5}{54} [= 32.867]$
	so [\$]32900
	[Variance =] $\left[\frac{28616.09 + 29815.63}{54} - \left(\frac{1774.8}{54} \right)^2 = \right]$
	$\frac{58431.72}{54} - \left(\frac{1774.8}{54} \right)^2$
	= 1.8511
	$\sigma = 1.36$, so $\sigma = [\text{\$}]1360$

1(a)	$e^{-3} \left(\frac{3^3}{3!} + \frac{3^4}{4!} \right) = e^{-3} (4.5 + 3.375) = 0.22404 + 0.16803$
	= 0.392 (3 sf)
1(b)	$\lambda = 5$
	$1 - e^{-5} \left(1 + 5 + \frac{5^2}{2!} \right) = 1 - e^{-5} (1 + 5 + 12.5)$ = $1 - (0.0067379 + 0.0336897 + 0.0842243)$
	= 0.875 (3 sf)
1(c)	$T \sim N(600, 600)$
	$\frac{559.5 - 600}{\sqrt{600}} [= -1.653]$
	$\Phi(-1.653) = 1 - \Phi(1.653)$
	= 0.0492 (3 sf) or 0.0491