

01.0580_s24_ms_42 Q: 10

Question	Answer	Marks	Partial Marks
(a)(i)	$(4.5, -1)$	2	B1 for each

Question	Answer	Marks	Partial Marks
(a)(ii)	6.71 or 6.708...	3	M2 for $(6-3)^2 + (2--4)^2$ oe or better or M1 for $[-](6-3)$ and $[-](2--4)$ oe or for $([-]3)^2$ and $([-]6)^2$ oe
(b)(i)	$-\frac{4}{3}$	2	M1 for $3y = -4x + 12$ or $\frac{4}{3}x + y - \frac{12}{3} [= 0]$ or better seen
(b)(ii)	$(0, 4)$	2	B1 for each or for $y = 4$ not in coordinate form
(b)(iii)	$[y =] \frac{3}{4}x + \frac{1}{2}$ final answer	3	M1 for gradient $\frac{3}{4}$ or $\frac{-1}{\text{their(b)(i)}}$ oe or better M1 for $(6, 5)$ substituted into $y = \frac{3}{4}x + c$ or $y = \text{their } mx + c$ oe

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Question	Answer	Marks	Partial Marks
(a)	$y = 4$ oe	1	
(b)	$[y =] -\frac{1}{2}x + 4$ final answer	2	B1 for $\text{grad} = -\frac{4}{8}$ oe soi or $[y =] kx + 4$
(c)(i)	Gradient = $\frac{-1}{\text{their gradient in (b)}}$	M1	Accept e.g. $2 \times -\frac{1}{2} = -1$ oe or states negative reciprocal of $-\frac{1}{2} = 2$
	Substituting (2, 3) in <i>their</i> equation.	M1	$3 = 2 \times \text{their } m + c$
	leading to $y = 2x - 1$	A1	No errors or omissions
(c)(ii)	3.35 or 3.354...	5	B2 for $\left(\frac{1}{2}, 0\right)$ soi or x-coordinate of $D = \frac{1}{2}$ or M1 for $2x - 1 = 0$ M2 for $(2 - \text{their } \frac{1}{2})^2 + (3 - \text{their } 0)^2$ oe or M1 for $(2 - \text{their } \frac{1}{2})$ and $(3 - \text{their } 0)$ oe

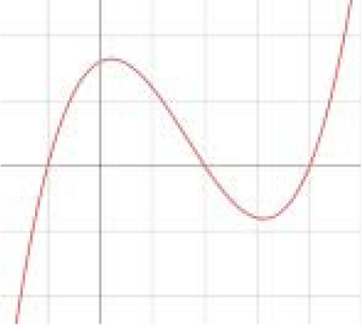


03. 0580_s23_ms_41 Q: 6

Question	Answer	Marks	Partial Marks
(a)	(5, 2) (2, -2)	4	B3 for 3 correct values or answers for <i>C</i> and <i>D</i> reversed or correct coordinates given on diagram wrongly labelled or B2 for one correct coordinate pair correctly labelled or M2 for <i>A, B, C</i> and <i>D</i> correctly plotted or M1 for <i>A</i> and <i>B</i> correctly plotted If 0 or 1 scored instead award SC2 for answers (-3, 8) and (-6, 4) or answers (1.5, 1.5) and (-2.5, 4.5)
(b)(i)	(2.5, 3.5) oe	2	B1 for each
(b)(ii)	7.07 or 7.071...	3	M2 for $(6 - -1)^2 + (4 - 3)^2$ oe or M1 for $(6 - -1)$ or $(4 - 3)$ oe
(b)(iii)	$\frac{1}{7}$	2	M1 for $\frac{4-3}{6--1}$ oe
(b)(iv)	$y = \frac{1}{7}x - \frac{2}{7}$ or $7y = x - 2$ oe final answer	3	M1 for gradient = <i>their</i> (iii) M1dep for substituting (2, 0) in a linear equation with their <i>m</i> allow if (2,0) satisfies $y = (\text{their}(\mathbf{b})(\mathbf{iii}) \text{ gradient})x + c$

04. 0580_s23_ms_42 Q: 8

Question	Answer	Marks	Partial Marks
(a)(i)	Correct expansion of a pair of brackets $x^2 - 4x + [1]x - 4$ or $x^2 - 4x - 2x + 8$ or $x^2 + [1]x - 2x - 2$	M1	accept $x^2 - 3x - 4$ or $x^2 - 6x + 8$ or $x^2 - [1]x - 2$
	$x^3 - 4x^2 + x^2 - 4x - 2x^2 + 8x - 2x + 8$ leading to and stating [<i>y</i> =] $x^3 - 5x^2 + 2x + 8$	A1	Accept $x^3 - 3x^2 - 4x - 2x^2 + 6x + 8$ or $x^3 - 6x^2 + [1]x^2 + 8x - 6x + 8$ or $x^3 - [1]x^2 - 2x - 4x^2 + 4x + 8$ leading to and stating [<i>y</i> =] $x^3 - 5x^2 + 2x + 8$

Question	Answer	Marks	Partial Marks
(a)(ii)	<p>Correct labelled sketch positive cubic Crossing x-axis at -1, 2 and 4 only Crossing y-axis at 8 only</p> 	4	<p>B1 for positive cubic B2 for three intercepts only with x-axis labelled at -1, 2 and 4</p> <p>or B1 for 1 or 2 correctly labelled x-intercepts B1 for a single intercept on y-axis labelled at 8 but not if line $y = 8$</p>
(b)	$3x^2 - 10x - 8 [= 0]$	M3	<p>B2 for derivative $= 3x^2 - 10x + 2$ isw OR B1 for derivative with $3x^2$ or $-10x$ given in expression isw M1dep on B1 for <i>their</i> first derivative $= 10$</p>
	$x = 4$ and $x = -\frac{2}{3}$	B1	
	$(4, 0)$ and $\left(-\frac{2}{3}, \frac{112}{27}\right)$ oe	B1	
	<p>$[y =] 10x - 40$ and $[y =] 10x + \frac{292}{27}$</p>	B2	<p>B1 for each or for two different equations of the form $[y =] 10x + c$ (c must be numeric) or for $c = -40$ and $\frac{292}{27}$</p>

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05. 0580_s23_ms_43 Q: 11

Question	Answer	Marks	Partial Marks
(a)	10	3	M2 for $(1 - -7)^2 + (4 - -2)^2$ oe or M1 for $(1 - -7)$ or $(4 - -2)$ oe
(b)	$\frac{4}{3}$ or $\frac{8}{6}$	2	M1 for $\frac{1 - -7}{4 - -2}$ oe
(c)	$y = -\frac{3}{4}x - \frac{9}{4}$ or $4y + 3x + 9 = 0$ oe final answers	4	B3 for $-\frac{3}{4}x - \frac{9}{4}$ OR B1 for midpoint $(1, -3)$ M1 for gradient $-\frac{3}{4}$ or $-\frac{1}{\text{their (b)}}$ M1 for substituting <i>their</i> $(1, -3)$ into $y = (\text{their } m)x + c$ or for $\text{their } m = \frac{y - -3}{x - 1}$ oe

06. 0580_s23_ms_43 Q: 12

Question	Answer	Marks	Partial Marks
(a)	$4x^3 - 16x$ cao	2	M1 for $4x^3 + kx$ or $kx^3 - 16x$ or $4x^3 - 16x + k$ or $4x^3 - 16$ as final answers

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Question	Answer	Marks	Partial Marks
b	<i>Their</i> $\frac{dy}{dx} = 0$ or stating $\frac{dy}{dx} = 0$	B1	
	Correct method to solve <i>their</i> $4x^3 - 16x = 0$	M1	e.g. $4x(x^2 - 4)$ or $4x(x - 2)(x + 2)$ oe
	$[x =] 0, -2, 2$	A1	Or B1 for $(-2, -11)$ and $(2, -11)$
	$(0, 5) (-2, -11) (2, -11)$	A1	
(c)	$(0, 5)$ with correct reasoning	2	M1 for any of <ul style="list-style-type: none"> correct use of 2nd derivative $12x^2 - 16$ evaluates correctly both values of y on either side evaluates correctly the gradient on either side reasonable correct sketch

07. 0580_w23_ms_42 Q: 9

Question	Answer	Marks	Partial Marks
(a)	$12x^2 - 4x^3$ oe final answer	2	B1 for $12x^2$ or $-4x^3$ in final answer or for correct answer seen

Question	Answer	Marks	Partial Marks
(b)	$(3, 27)$	3	B2 for $x = 3$ OR M1 for <i>their</i> $12x^2 - 4x^3 = 0$ or better or states $\frac{dy}{dx} = 0$ M1dep for substituting <i>their</i> x into $y = 4x^3 - x^4$ shown
(c)	-64	3	M1 for $4x^3 - x^4 = 0$ B1 for $x = 4$

08.0580_w23_ms_43 Q: 9

Question	Answer	Marks	Partial Marks
(a)	$[AB^2 =] (3 - 0)^2 + (3 - 2)^2$ oe or better	M1	or $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$ oe
	$[AC^2 =] (0 - 2)^2 + (4 - 0)^2$ oe or better	M1	or $\begin{pmatrix} 4 \\ -2 \end{pmatrix}$ oe
	$[BC^2 =] (0 - 3)^2 + (4 - 3)^2$ oe or better	M1	or $\begin{pmatrix} 1 \\ -3 \end{pmatrix}$ oe

Question	Answer	Marks	Partial Marks
	Triangle is isosceles [with 10, 20 and 10 or better shown]	A1	or Triangle is isosceles and only vector AB and BC have the same magnitude [because they have the same components]
(b)(i)	$[y =] -\frac{1}{2}x + 2$ oe	3	M1 for $\frac{0-2}{4-0}$ oe M1 for substituting (0, 2) or (4, 0) into $y = \text{their } mx + c$ oe or B1 for answer $y = kx + 2$
(b)(ii)	$[y =] 2x - 3$	4	M1 for $\frac{-1}{\text{their grad (b)(i)}}$ B1 for (2, 1) M1 for substituting <i>their</i> (2, 1) into $y = \text{their } px + d$ oe
(b)(iii)	$(-2, -7)$	3	B2 for $w = -2$ or M1 for $4w + 1 = 2w - 3$ FT <i>their</i> (b)(ii) or for $2 = \frac{4w+1-3}{w-3}$

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09. 0580_w23_ms_43 Q: 11

Question	Answer	Marks	Partial Marks
(a)	$(-2, 0)$ $(0, 18)$ $(4.5, 0)$ oe	4	B1 for $B = (0, 18)$ B3 for $A = (-2, 0)$ and $C = (4.5, 0)$ oe or B2 for $x = -2$ and $x = 4.5$ oe or B1 for $(9 - 2x)(2 + x)$ oe or either A or C correct
(b)	$5 - 4x$ final answer	2	B1 for one correct term when simplified
(c)	$(-3, -15)$	3	B2FT for $x = -3$ OR M1 for <i>their</i> (b) = 17 M1 dep for correct substitution of <i>their</i> x into $18 + 5x - 2x^2$ shown

10. 0580_s22_ms_42 Q: 3

Question	Answer	Marks	Partial Marks
(a)	8.25 or 8.246...	3	M2 for $(3 - -5)^2 + (2 - 4)^2$ oe or better or M1 for $(3 - -5)$ and $(2 - 4)$ oe seen
(b)	$[y =] 4x + 7$	5	B1 for [midpoint] $(-1, 3)$ soi M1 for [gradient of $l =$] $\frac{4-2}{-5-3}$ oe M1 for gradient -1 / <i>their</i> $\left(-\frac{1}{4}\right)$ M1dep on at least M1 for <i>their</i> $(-1, 3)$ substituted into $y = \text{their } m \times x + c$ oe

Question	Answer	Marks	Partial Marks
(c)	$(0, -8)$ and $(0, 16)$	4	<p>B3 for $(0, -8)$ or $(0, 16)$ or for -8 and 16 OR B2 for distance = $[\pm]12$ soi or M1 for $13^2 - (5[-0])^2$ oe B1 for both answers $(0, k)$, $k \neq 0$ or 4</p> <p>ALT METHOD B3 for $(0, -8)$ or $(0, 16)$ or for -8 and 16 OR M2 for $y^2 - 8y - 128 [= 0]$ or for $(y - 4)^2 = 144$ or better or M1 for $13^2 = (-5 - 0)^2 + (4 - y)^2$ oe</p> <p>B1 for both answers $(0, k)$, $k \neq 0$ or 4</p>

11. 0580_s22_ms_43 Q: 8

Question	Answer	Marks	Partial Marks
(a)(i)	$(-0.5, 1)$	2	B1 for each
(a)(ii)	$\begin{pmatrix} 7 \\ -3 \end{pmatrix}$	2	B1 for each
(a)(iii)	7.62 or 7.615 to 7.616	2	<p>FT <i>their</i> (a)(ii) M1 for $(\text{their } 7)^2 + (\text{their } -3)^2$ oe</p>
(a)(iv)	$[y =] -4x - 1$ final answer	3	<p>B2 for answer $-4x + c$ [oe] or for correct equation in different form or for $-4x + -1$ or for $-4m - 1$ OR M1 for $\frac{-5-7}{1--2}$ oe M1 for correct substitution shown of $(-2, 7)$ or $(1, -5)$ or <i>their</i> $(-0.5, 1)$ into $y = (\text{their } m)x + c$ oe OR M1 for $7 = -2m + c$ and $-5 = m + c$ A1 for $m = -4$ and $c = -1$</p>
(a)(v)	$[y =] \frac{1}{4}x + \frac{11}{4}$ final answer	3	<p>M1 for $\text{grad} = \frac{1}{4}$ oe nfwv soi, FT negative reciprocal of <i>their</i> gradient from (iv) M1 for correct substitution shown of $(5, 4)$ into $y = (\text{their } m)x + c$ oe or, if no substitution shown, $(5, 4)$ satisfies <i>their</i> final linear equation.</p>

Question	Answer	Marks	Partial Marks
(b)	$2x^2 + 11x - 21 [= 0]$	M2	or M1 for $8 - 5x = 2x^2 + 6x - 13$ oe or better
	$(2x - 3)(x + 7) [= 0]$ oe or $\frac{-11 \pm \sqrt{11^2 - 4 \times 2 \times (-21)}}{2 \times 2}$ or $-\frac{11}{4} \pm \sqrt{\frac{21}{2} + \left(\frac{11}{4}\right)^2}$ oe	M2	Allow correct method to solve <i>their</i> quadratic equation e.g. formula, complete the square but not for $2x^2 + 6x - 13$ M1 FT <i>their</i> equation for $2x(x+7) - 3(x+7) [= 0]$ or $x(2x-3) + 7(2x-3) [= 0]$ or $(2x+a)(x+b) [= 0]$ where $ab = -21$ or $2b + a = 11$ OR M1 for $\sqrt{11^2 - 4 \times 2 \times -21}$ or for $\frac{-11 + \sqrt{k}}{2 \times 2}$ or $\frac{-11 - \sqrt{k}}{2 \times 2}$ OR M1 for $\left(x + \frac{11}{4}\right)^2$
	$\left(\frac{3}{2}, \frac{1}{2}\right)$ and $(-7, 43)$	B2	B1 for one correct pair or for 2 correct x-values or 2 correct y-values

12. 0580_w22_ms_42 Q: 8

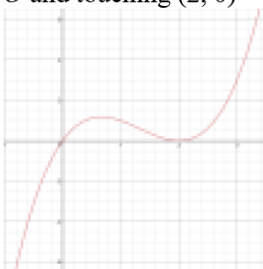
Question	Answer	Marks	Partial Marks
(a)	(22, 11)	2	B1 for each value
(b)	$\frac{their11-3}{their22-2}$ oe or better	M1	
	$\frac{1}{their\ m}$	M1	
	Substitution of (12, 7) into $y = (their\ m)x + c$	M1	Accept $y - 7 = their\ m(x - 12)$ oe
	leading to $2y + 5x = 74$ final answer	A1	Without error or omission
(c)	32	1	
(d)	145	2	M1 for $\frac{1}{2} \times (their\ 32 - 3) \times 10$ oe or $\frac{1}{2} \times \sqrt{(7-3)^2 + (12-2)^2} \times \sqrt{(their32-7)^2 + (2-12)^2}$ oe

13. 0580_m21_ms_42 Q: 12

	Answer	Mark	Partial Marks
(a)	17	3	M2 for $3 \times 2x^2 - 7$ or better isw or M1 for $3 \times 2x^2$ oe or $kx^2 - 7$ seen

	Answer	Mark	Partial Marks
(b)(i)	13.4 or 13.41 to 13.42	3	M2 for $\sqrt{(-5-7)^2 + (8-2)^2}$ oe or M1 for $(-5-7)^2 + (8-2)^2$ oe
(b)(ii)	$[y =] 2x + 5$ final answer	4	M1 for $[\text{gradient of } AB =] \frac{8-2}{-5-7}$ oe M1dep for gradient $p = -1 \div \text{their} - \frac{1}{2}$ oe M1dep on previous M1 for substituting $(-1, 3)$ into $y = \text{their } px + c$ oe where $\text{their } p \neq 0$
(b)(iii)	(5, 0)	4	B3 for $\overrightarrow{AD} = \begin{pmatrix} -2 \\ -2 \end{pmatrix}$ or $\overrightarrow{DA} = \begin{pmatrix} 2 \\ 2 \end{pmatrix}$ or coordinates of C $(-7, 6)$ and $[\overrightarrow{CD} =] \begin{pmatrix} 12 \\ -6 \end{pmatrix}$ oe seen or B2 for $a = b = 2$ soi or coordinates of C $(-7, 6)$ or M1 for $a = b$ oe soi or for $a^2 + b^2 = (\sqrt{8})^2$ oe or $\cos 45 = \frac{a}{\sqrt{8}}$ oe or for $[\overrightarrow{DC} =] \begin{pmatrix} -12 \\ 6 \end{pmatrix}$ or $[\overrightarrow{CD} =] \begin{pmatrix} 12 \\ -6 \end{pmatrix}$ seen or $\frac{y-8}{x-5} = 1$ oe or $\frac{y-2}{x-7} = 1$

14. 0580_s21_ms_42 Q: 9

	Answer	Mark	Partial Marks
(a)(i)	2	2	M1 for $x(x^2 - 4x + 4)$ or $x(x - 2)^2$ or $(x^2 - 2x)(x - 2)$ or $x^3 - 2ax^2 + a^2x$
(a)(ii)	Correct sketch with curve passing through O and touching $(2, 0)$ 	4	B1 for any positive cubic B1 for sketch through or touching O B1 for sketch with min or max touching x -axis once only but not at $(0, 0)$ B1FT <i>their</i> (a)(i) for sketch with min or max touching x -axis at (<i>their</i> 2, 0) and <i>their</i> 2 is labelled or clearly indicated
(b)	$y = 20x - 64$ final answer nfw	7	B6 for equivalent correct equation OR B2 for $3x^2 - 8x + 4$ isw or B1 for $3x^2$ or $-8x$ seen M2dep for [grad =] 20 soi nfw or M1dep for substituting 4 into <i>their</i> derivative isw B1 for (4, 16) soi M1dep for $16 = \text{their } 20 \times 4 + c$ oe

15. 0580_m20_ms_42 Q: 2

	Answer	Mark	Partial Marks
(a)(i)	3 2.25 1	3	B1 for each
(a)(ii)	Fully correct smooth curve	4	B3FT for 7 or 6 correct plots B2FT for 5 or 4 correct plots B1FT for 3 correct plots
(a)(iii)	-0.6 to -0.51, 0.75 to 0.85, 1.7 to 1.85	3	B1 for each If 0 scored, SC1 for $y = 1.5$ drawn
(a)(iv)	-3 or -2 or -1 or 0	1	
(b)(i)	Tangent ruled at $x = 1$	1	
(b)(ii)	4.4 to 5.6	2	Dep on tangent at $x = 1$ or close attempt M1 for rise/run for <i>their</i> line

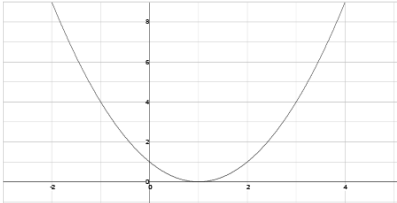
	Answer	Mark	Partial Marks
(b)(iii)	$y = (4.4 \text{ to } 5.6)x - (1.8 \text{ to } 2.2)$ or [y =] <i>their</i> (b)(ii) $x + \text{their}(y\text{-intercept})$	2	FT for any line but not horizontal or vertical line for 2 marks or B1 B1FT for [m =] <i>their</i> 5 or for <i>their</i> y-intercept

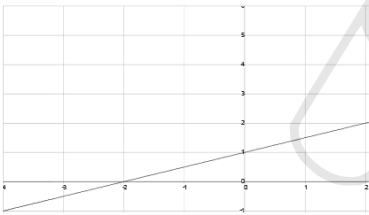
16. 0580_p20_ms_40 Q: 3

	Answer	Mark	Partial Marks
(a)	9 10.5	2	B1 for each
(b)	Fully correct curve	5	SC4 for correct curve, but branches joined B3 FT for 9 or 10 points plotted or B2 FT for 7 or 8 points plotted or B1 FT for 5 or 6 points plotted and B1 for two separate branches not touching or cutting y-axis
(c)	2.1 to 2.6 8.5 to 9	2	B1 for each
(d)	2, 3, 5, 7	2	SC1 for correct 4 values and no more than one extra positive integer or $\pm 2, \pm 3, \pm 5, \pm 7$ or 3 correct values and no extras
(e)	$(-2, -12)$	1	
(f)(i)	$20 + x^2 = x^3$	M1	for multiplication by x
	$x^3 - x^2 - 20 = 0$	A1	for no errors or omissions
(f)(ii)	Fully correct curve $y = x^2$	2	SC1 for U-shaped parabola, vertex at origin
(f)(iii)	3.1 to 3.6	1	
(f)(iv)	3.[0] to 3.1 or FT <i>their</i> answer to (f)(iii)	1	FT dep on (f)(iii) > 0

	Answer	Mark	Partial Marks
(a)(i)	15.7 or 15.65...	3	M2 for $\sqrt{(4-10)^2 + (4-3)^2}$ oe or M1 for $(-4-10)^2 + (4-3)^2$ oe
(a)(ii)	$\frac{-10-4}{4-3} [= -2]$ oe	M1	
	$10 = -2(-3) + c$ Or $-4 = -2(4) + c$ and correct completion to $y = -2x + 4$	A1	
(a)(iii)	$y = \frac{1}{2}x + \frac{11}{4}$ oe	4	M1 for grad = $\frac{1}{2}$ soi M1 for [midpoint =] ($\frac{1}{2}$, 3) M1 for substitution of ($\frac{1}{2}$, 3) into <i>their</i> $y = mx + c$ oe
(b)(i)	$\left(-\frac{1}{3}, -\frac{22}{27}\right)$ oe and $(-5, 50)$	6	B2 for $3x^2 + 16x + 5$ Or B1 for one correct M1 for derivative = 0 or <i>their</i> derivative = 0 M1 for $[x =] -\frac{1}{3}$ and $[x =] -5$ B1 for $-\frac{22}{27}$ and 50
(b)(ii)	$\left(-\frac{1}{3}, -\frac{22}{27}\right)$ minimum $(-5, 50)$ maximum with correct reasons	3	B2 for one correct with reason or M1 for correct attempt e.g. 2 nd derivatives, gradients or sketching

18. 0580_s20_ms_42 Q: 9

	Answer	Mark	Partial Marks
(a)(i)	$(x+4)^2 - 25$	2	B1 for $(x+k)^2 - 9 - (\text{their } k)^2$ or $(x+4)^2 - h$ or $k = 4$
(a)(ii)	$x + 4 = [\pm] 5$	M1	FT their (a)(i)
	-9 and 1	A1	
(b)	$[b =] 7$ $[c =] -3$	3	B1 for $[b =] 7$ M1 for $b^2 - 4c = 61$
(c)(i)(a)	Correct sketch 	2	B2 for correct quadratic curve with min touching x-axis or B1 for parabola vertex downwards

	Answer	Mark	Partial Marks
(c)(i)(b)	Correct sketch 	2	B2 for correct straight line intersecting curve on y-axis or B1 for straight line with positive gradient and positive y-intercept
(c)(ii)	2.8[0] or 2.795...	7	B3 for $x^2 - \frac{5}{2}x = 0$ oe or M1 for $(x-1)^2 = \frac{1}{2}x + 1$ B1 for $[(x-1)^2 =] x^2 - x - x + 1$ AND B2 for $(0, 1)$ and $\left(\frac{5}{2}, \frac{9}{4}\right)$ oe or B1 $[x =] 0$ and $\frac{5}{2}$ oe AND M1 for $(\text{difference in } x)^2 + (\text{difference in } y)^2$

19. 0580_s20_ms_43 Q: 9

	Answer	Mark	Partial Marks
(a)(i)	$\frac{3}{8}$	2	M1 for $8y = 3x + 20$ or better
(a)(ii)	(0, 2.5) oe	1	
(b)(i)	15.6 or 15.62...	3	M2 for $\sqrt{(9-3)^2 + (-2-8)^2}$ oe seen or M1 for $(9-3)^2$ or $(-2-8)^2$ oe seen
(b)(ii)	$y = -\frac{5}{6}x + 4$ oe	3	M1 for gradient $\frac{-2-8}{9-3}$ oe M1 for substituting (6, -1) into a linear equation oe
(b)(iii)	$y = \frac{6}{5}x - \frac{3}{5}$ oe	4	M1 for gradient -1 / <i>their</i> $\left(-\frac{5}{6}\right)$ B1 for midpoint at (3, 3) M1 for <i>their</i> midpoint substituted into $y = \text{their } m \times x + c$ oe

20. 0580_s19_ms_42 Q: 4

	Answer	Mark	Partial Marks
(a)(i)	1.5 oe	1	
(a)(ii)	(0, 2)	1	
(b)(i)	$y = -2x + 6$ oe final answer	3	B2 for $y = -2x + c$ oe or $y = mx + 6$ oe $m \neq 0$ or for answer $-2x + 6$ or B1 for [gradient =] $-\frac{6}{3}$ oe or $c = +6$ soi
(b)(ii)	$y = 0.5x - 1.5$ oe final answer	3	B1 for [gradient =] -1 divided by <i>their</i> gradient from (b)(i) evaluated soi M1 for substitution of (9, 3) into $y = (\text{their } m)x + c$ seen in working
(c)(i)	12.6 or 12.64 to 12.65	3	M2 for $\sqrt{(8-4)^2 + (5-1)^2}$ oe or M1 for $(8-4)^2 + (5-1)^2$ oe
(c)(ii)	(2, 3)	2	B1 for each

21. 0580_s19_ms_43 Q: 7

	Answer	Mark	Partial Marks
(a)	$[y =] 4x + 5$	3	B2 for answer $[y =] 4x + c$ oe (c can be numeric or algebraic) OR M2 for $\frac{y-9}{x-1} = \frac{9-(-3)}{1-(-2)}$ oe OR M1 for $\frac{9-3}{1-2}$ oe or for M1 for correct substitution of $(-2, -3)$ or $(1, 9)$ into $y = (their\ m)x + c$ oe
(b)	76[.0] or 75.96...	2	M1 for $\tan[] = 4$ oe

	Answer	Mark	Partial Marks
(c)(i)	$[y =] -\frac{1}{4}x + \frac{23}{8}$ oe	3	B2FT for $[y =] -\frac{1}{their\ gradient\ from\ (a)}x + c$ oe (c can be numeric or algebraic) OR M2 for $\frac{y-2}{x-3.5} = -\frac{1}{their\ gradient\ from\ (a)}$ oe OR M1 for $-\frac{1}{their\ gradient\ from\ (a)}$ soi M1 for correct substitution of $(3.5, 2)$ into $y = (their\ m)x + c$ oe
(c)(ii)	$(-4.5, 4)$	2	B1 for each value or for $\begin{pmatrix} -8 \\ 2 \end{pmatrix}$ seen

22. 0580_m18_ms_42 Q: 10

	Answer	Mark	Partial Marks
(a)	10.8 or 10.81 to 10.82	3	M2 for $\sqrt{(6-(-3))^2 + (-2-4)^2}$ oe or M1 for $(6-(-3))^2 + (-2-4)^2$ oe
(b)(i)	$(6, 4)$	2	B1 for each
(b)(ii)	2	2	M1 for $\frac{12-(-4)}{10-2}$ oe
(b)(iii)	$y = -\frac{1}{2}x + 4$ oe final answer	3	M1 for gradient $= -\frac{1}{2}$ or $-\frac{1}{their\ (b)(ii)}$ M1 for $(2, 3)$ substituted into $their\ y = mx + c$ or $y - y_1 = m(x - x_1)$ oe

23. 0580_s18_ms_43 Q: 2

	Answer	Mark	Partial Marks
(a)(i)	1,,,, 16	2	B1 for each
(a)(ii)	14,,,, - 2	2	B1 for each
(b)	Fully correct smooth curves	6	B3 for correct curve of $y = 2^x$ or B2FT for 4 or 5 correct points or B1FT for 2 or 3 correct points B3 for correct curve of $y = 14 - x^2$ or B2FT for 4 or 5 correct points or B1FT for 2 or 3 correct points
(c)(i)	3.5 to 3.7	1	
(c)(ii)	2.65 to 2.8	1	

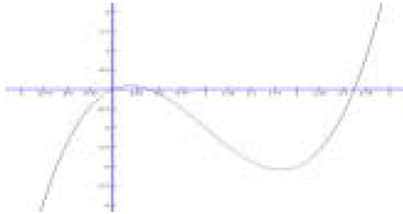
	Answer	Mark	Partial Marks
(d)(i)	Correct line	1	Ruled, through (4, 2) and gradient -4
(d)(ii)	Tangent (2, 10)	2	B1 for each

24. 0580_s18_ms_43 Q: 9

	Answer	Mark	Partial Marks
(a)	$y = -2x + 5$ oe	3	B2 for $-2x + 5$ or M1 for gradient = $-1 \div \frac{1}{2}$ or better M1 for substituting (1, 3) into $y = (their\ m)x + c$ oe If 0 scored SC1 for (1, 3) satisfying their wrong equation ($c \neq 0$) with gradient $\neq \frac{1}{2}$
(b)(i)	$x \geq 2$ oe $y \leq 5$ oe $y \geq \frac{1}{2}x$ oe	4	SC3 for $x > 2$ and $y < 5$ and $y > \frac{1}{2}x$ OR B1 for $x \geq 2$ B1 for $y \leq 5$ B2 for $y \geq \frac{1}{2}x$ or M1 for $y \geq kx$ ($k > 0$) OR SC2 for all three boundary lines identified but with incorrect sign(s) If 0 scored SC1 for one or two correct boundary lines with incorrect sign(s)

	Answer	Mark	Partial Marks
(b)(ii)	(5, 4)	2	M1 for one trial of an integer point inside region or for $3x + 5y = 35$ drawn

25. 0580_w18_ms_41 Q: 3

	Answer	Mark	Partial Marks
(a)	0 -2 0.9	3	B1 for each
(b)	Correct curve 	4	B3 FT for 9 or 10 points or B2 FT for 7 or 8 points or B1 FT for 5 or 6 points
(c)	-0.45 to -0.35 1 2.35 to 2.45	3	FT <i>their</i> graph B1 for each in the correct position If zero scored, SC1FT for 3 correct values
(d)(i)	$y = 1 - x$ oe	2	B1 for $y = 1 - kx$ oe, $k \neq 0$ or $y = k - x$ oe or $1 - x$
(d)(ii)	Correct ruled line and 2.25 to 2.4	3	B2FTdep for correct ruled line or B1 dep for line through (0, 1) when extended but not $y = 1$ or with gradient -1.1 to -0.9 or correct line but freehand or SC2 for $y = x - 1$ ruled after answer [$y =$] $x - 1$ in (d)(i) and B1 for 2.25 to 2.4
(e)	Correct tangent and 1.7 to 3.7	3	No daylight between tangent and curve at $x = -0.25$. Point of contact is the midpoint between two vertices of daylight and this point of contact must be between -0.35 and -0.15 B2 for close attempt at tangent at $x = -0.25$ and answer in range OR B1 for ruled tangent at $x = -0.25$, no daylight Consider point of contact as midpoint between two vertices of daylight, the midpoint must be between $x = -0.35$ and -0.15 and M1 dep on B1 or close attempt at tangent at $x = -0.25$ for $\frac{\text{rise}}{\text{run}}$

	Answer	Mark	Partial Marks
(a)	(5, 6)	1	
(b)	$[y =] -\frac{4}{5}x + 3$ nfw	3	B2 for $[y =] -\frac{4}{5}x + c$ nfw or M1 for $\frac{\text{rise}}{\text{run}}$ using any two of $(-5, 7)$ $(0, 3)$ and $(5, -1)$ and B1 for $[y =]mx + 3$ ($m \neq 0$)

	Answer	Mark	Partial Marks
(c)	$y = -\frac{4}{5}x - 2$ oe	2	FT <i>their</i> gradient from 8(b) B1 for $y = (\text{their gradient})x + c$ (c not 0) or for $y = mx - 2$ ($m \neq 0$) or for $-\frac{4}{5}x - 2$ alone
(d)(i)	$y = \frac{5}{4}x + 4$ oe	3	M1 for $-\frac{1}{\text{their gradient}}$ from 8(b) M1 for $(8, 14)$ substituted into <i>their</i> $y = mx + c$ or $\frac{y-14}{x-8} = m$ or better
(d)(ii)	8.54 or 8.544...	3	M2 for $(14 - \text{their } 6)^2 + (8 - \text{their } 5)^2$ or better or M1 for $14 - \text{their } 6$ and $8 - \text{their } 5$ seen
(d)(iii)	(4, 6)	2	B1 for each

27. 0580_w18_ms_42 Q: 5

	Answer	Mark	Partial Marks
(a)	$-3, 17$	2	B1 for each
(b)	Fully correct curve	4	B3 FT for 10 or 11 points or B2 FT for 8 or 9 points or B1 FT for 6 or 7 points
(c)(i)	Correct ruled tangent for <i>their</i> curve through $(0, -17)$	1	
(c)(ii)	$(1.7 \text{ to } 2.2, -1 \text{ to } 2.5)$	1	
(c)(iii)	$[y =] 9x - 17$ final answer	3	M2dep for answer $[y =] 9x[+] - c$ OR M1dep for gradient $= \frac{\text{rise}}{\text{run}}$ for <i>their</i> tangent at any point B1 for answer $[y =] kx[+] - 17$ ($k \neq 0$)
(d)	$y = 3x + 2$ ruled correctly and $-2.2 \dots$ to -2.1 -0.6 to -0.4 2.6 to 2.8	4	B2 for $y = 3x + 2$ ruled or B1 for $[y =] 3x + 2$ soi or $y = 3x + k$ ruled or $y = kx + 2$ but not $y = 2$ B2 for all 3 values or B1 for 2 values

28. 0580_m17_ms_42 Q: 3

	ANSWER	MARK	PARTIAL MARKS
(a)	0 0.5 oe 1.25 oe	1, 1, 1	
(b)	Fully correct smooth curve	4	B3 FT for 7 or 8 points or B2 FT for 5 or 6 points or B1 FT for 3 or 4 points
(c)	3.6 to 3.8	2	M1 for $y = 3.5$ soi
(d)	line $y = x + 1$ ruled -1.55 to -1.40 4.55 to 4.8	M1 A1 A1	If 0 scored SC1 for $y = x + 1$ stated or implied or for 2 correct values given
(e) (i)	Point plotted at (5, 5)	1	
(ii)	Tangent ruled from A	1	
(iii)	1.2 to 1.4	B2	B2 and M1 dep on reasonable attempt at tangent from (5, 5) M1 for change in y / change in x of <i>their</i> ruled line

29. 0580_s17_ms_41 Q: 7

	ANSWER	MARK	PARTIAL MARKS
(a)	$(-0.5, 3)$	2	B1 for one correct value
(b)	$[y =] -2x + 2$ final answer	3	M1 for $\frac{-2-8}{2--3}$ or better M1 for substitution of $(-3, 8)$ or $(2, -2)$ or <i>their</i> midpoint into $y = mx + c$ with <i>their</i> m
(c)	$y = -2x + 7$ oe	2FT	FT <i>their</i> (b) M1 for $y = (their-2)x + k$ ($k \neq 2$) or $y = kx + 7$ ($k \neq 0$) If zero scored, SC1 for $(their - 2)x + 7$
(d)	$x - 2y + 9 = 0$ or $2y - x - 9 = 0$ oe	4	B3 for any correct equivalent in wrong form Or M2 for $y = \frac{1}{2}x + k$ oe (FT negative reciprocal of <i>their</i> gradient in (b)) or M1 for $grad = \frac{1}{2}$ (FT negative reciprocal of <i>their</i> gradient in (b)) M1 for substitution of $(1, 5)$ into $y = mx + c$ oe with <i>their</i> m

30. 0580_w17_ms_43 Q: 8

	ANSWER	MARK	PARTIAL MARKS
(a)(i)	5	1	
(a)(ii)	$-\frac{3}{2}$ oe	1	
(b)	$\left(\frac{4}{5}, 0\right)$ oe	2	M1 for $5x - 4 = 0$ soi

	ANSWER	MARK	PARTIAL MARKS
(c)	$y = -0.2x + 11$ final answer	4	M2 for $y = -0.2x + c$ oe (any form) FT <i>their (a)</i> or B1FT for $\text{grad} = \frac{-1}{\text{their (a)(i)}}$ soi and M1 for substitution of (10, 9) into <i>their</i> equation
(d)	(2, 6)	3	M1 for elimination of one variable A1 for $x = 2$ or $y = 6$
(e)	13	3	M2 for $(4 + 9) \times \text{their } 2 \div 2$ oe or B1 for 9 oe or 4 or -4 seen