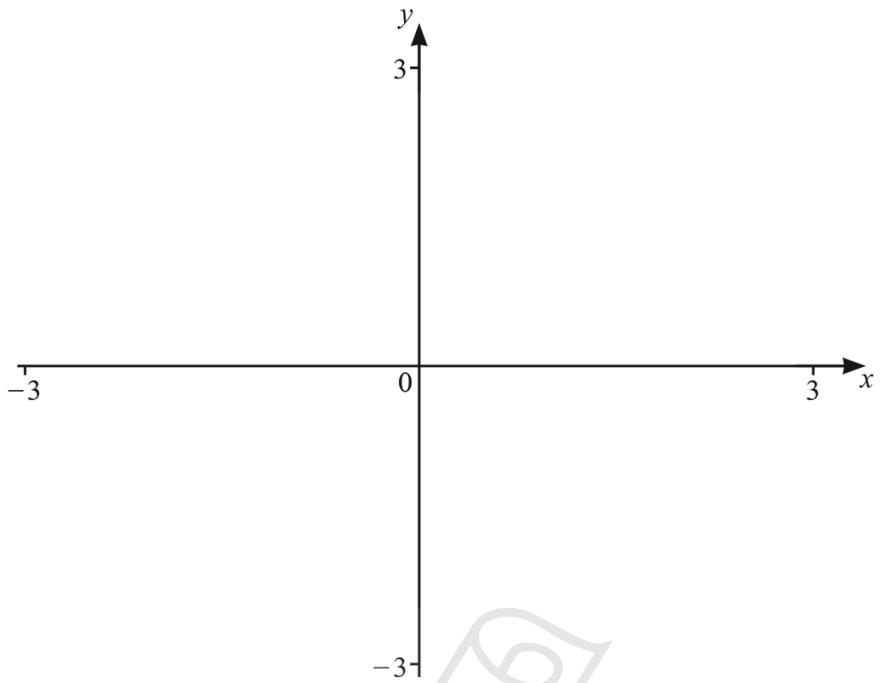
Chapter 4

Coordinate geometry

01. 0607_s24_qp_41 Q: 6



$f(x) = 2 - |1 - 0.5x^2|$

(a) On the diagram, sketch the graph of $y = f(x)$, for values of x between -3 and 3. [3]

(b) The graph cuts the x-axis at points A and B.

Work out the length AB.

$AB =$ ..... [2]

(c) Solve $f(x) = 0.5$.

..... [2]

(d) Write down the coordinates of the minimum point of the graph.

(..... , ...) [1]

(e) The equation $f(x) = k$ has two solutions.

Find the range of values of k.

..... [2]

02. 0607_s24_qp_43 Q: 4

Line L has equation $3y+2x=8$.

(a) Find the gradient and the y-intercept of line L.

gradient .....

y-intercept ..... [3]

(b) Line P passes through the point (2, 10) and is perpendicular to line L.

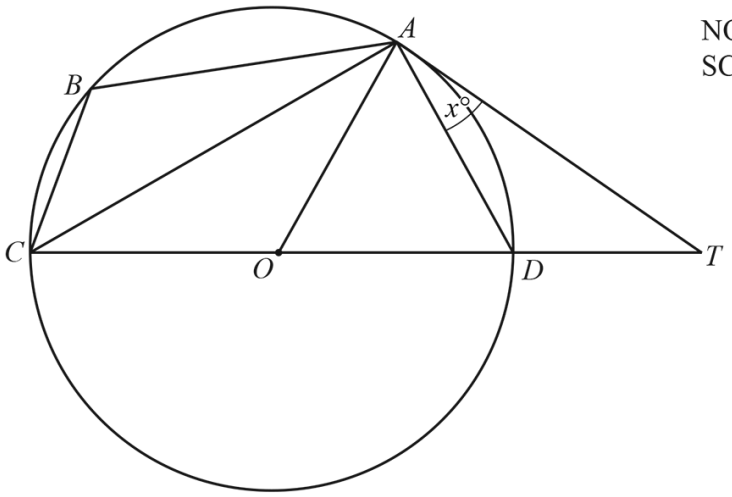
Show that the equation of line P is $2y-3x=14$.

[3]

(c) Find the coordinates of the point where line L and line P intersect.
You must show all your working.

(..... , ...) [4]

03. 0607_m23_qp_42 Q: 3



NOT TO SCALE

A, B, C and D lie on a circle, centre O.
$CODT$ is a straight line.
AT is a tangent to the circle at A.
Angle $DAT = x°$.

(a) Complete the statement.

Angle $CAD = 90°$ because

..... [1]

(b) Find, in terms of x,

(i) angle ACD

Angle ACD = ... [1]

(ii) angle AOD

Angle AOD = ... [1]

(iii) angle AOC

Angle AOC = ... [1]

(iv) angle ADO

Angle ADO = ... [1]

(v) angle ABC.

Angle ABC = ... [1]

(c) Given that angle $DTA = y°$, find y in terms of x.

y = ... [1]

04. 0607_s23_qp_41 Q: 5

(a) The equation of line L is $y = 4x + 7$.

(i) Write down the gradient of line L.

..... [1]

(ii) Write down the coordinates of the point where line L cuts the y-axis.

(..... , ...) [1]

(b) A is the point (3, 1) and B is the point (11, 5).

(i) Calculate the length of AB.

..... [3]

(ii) Find the equation of the perpendicular bisector of the line AB.
Give your answer in the form $y = mx + c$.

$y =$ ..... [5]

05. 0607_w23_qp_43 Q: 12

(a) Find the coordinates of the point where the line $y = 3x + 7$ crosses

(i) the y-axis

(..... , ...) [1]

(ii) the line $y = 2$.

(..... , ...) [2]

(b) A is the point $(-5, 8)$ and B is the point $(1, -2)$.

Find the equation of the perpendicular bisector of AB.

..... [5]

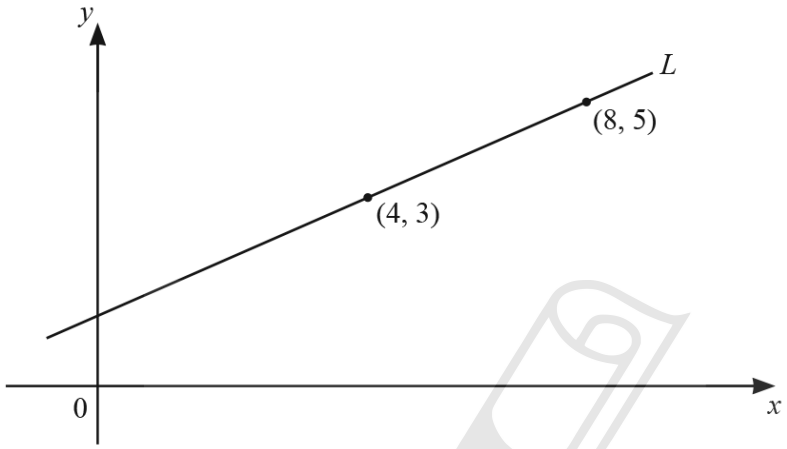
06. 0607_m22_qp_42 Q: 1

(a) Find the gradient and y-intercept of the line with equation $3x+4y=24$.

Gradient = ...

y-intercept = ... [3]

(b)



NOT TO SCALE

The diagram shows line L and the coordinates of two points on the line.

(i) Show that the equation of line L is $2y-x=2$.

[3]

(ii) Find the equation of the line parallel to L that passes through the point (0, 7).
Give your answer in the form $y=mx+c$.

y = ... [2]

07. 0607_m21_qp_42 Q: 3

(a) **(i)** Write down the coordinates of the point where the line $y = -2x + 3$ crosses the y-axis.

(..... , ...) [1]

(ii) Write down the gradient of the line $y = -2x + 3$.

..... [1]

(b) The line $x + y = 6$ crosses the line $x = -2$ at point A.

Find the y-coordinate of A.

..... [1]

(c) Find the equation of the straight line that passes through the points (3, −1) and (12, 5).

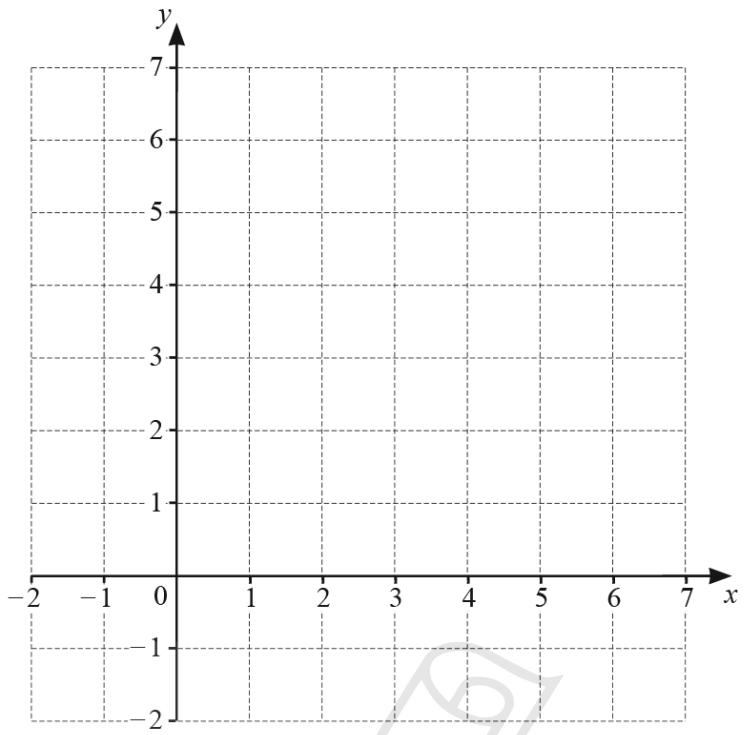
..... [3]

(d) The line L passes through the point (3, 4).
Line L is perpendicular to the line $2y = 5x + 6$.

Find the equation of line L.

..... [4]

(e)

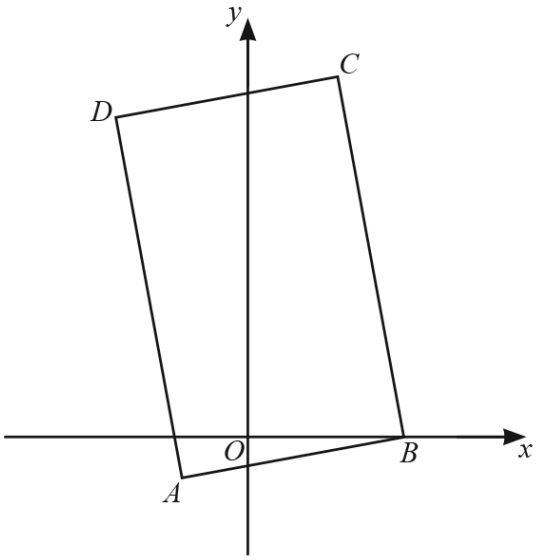


(i) On the grid, draw the lines $y = 4$, $x + y = 3$ and $y = x - 1$. [3]

(ii) By shading the unwanted regions, find and label the region R that satisfies these three inequalities.

$y \leqslant 4$
$x + y \geqslant 3$
$y \geqslant x - 1$ [1]

08. 0607_s21_qp_43 Q: 3



NOT TO SCALE

ABCD is a rectangle.
A is the point (−2, −1) and *B* is the point (5, 0).

(a) Find the equation of *BC*.

..... [4]

(b) *C* is the point (*p*, 14).

Find the value of *p*.

p = ... [2]

(c) Find the coordinates of point D.

(..... , ...) [2]

(d) Find the area of rectangle $ABCD$.

..... [4]

09. 0607_w21_qp_41 Q: 13

(a) Rearrange $y = \frac{ax+b}{ex+f}$ to make x the subject.

$x =$ ..... [4]

(b) $f(x) = 3\sin(2x)°$

(i) Write down the amplitude and the period of $f(x)$.

Amplitude = ...

Period = ... [2]

(ii) The graph of $y = f(x)$ is stretched with the x-axis invariant and scale factor 3 to give the graph of $y = g(x)$.

Find $g(x)$.

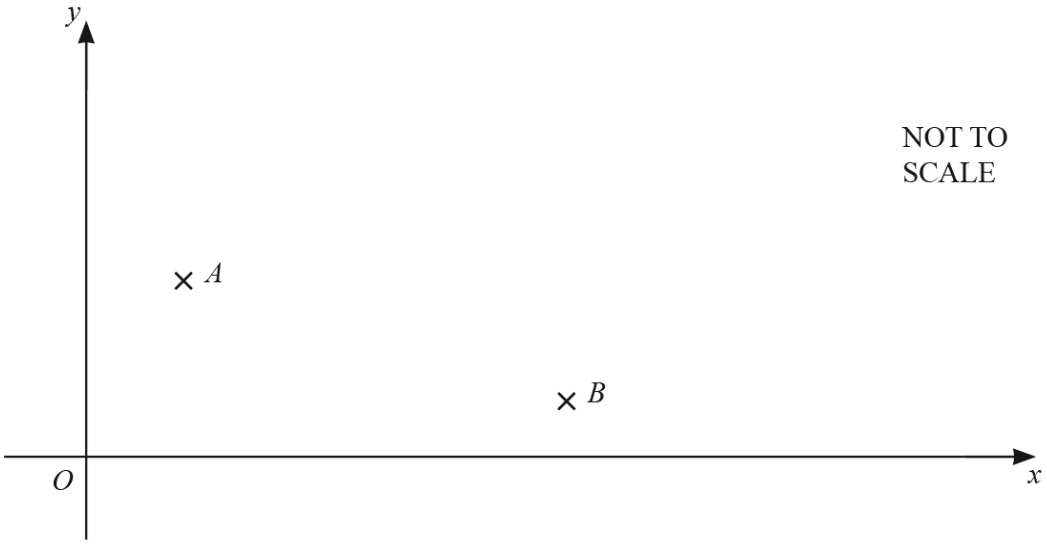
$g(x) =$ ..... [1]

(iii) The graph of $y = f(x)$ is translated through $\begin{pmatrix} -90 \\ 0 \end{pmatrix}$ to give the graph of $y = h(x)$.

Find $h(x)$, giving your answer in its simplest form.

$h(x) =$ ..... [2]

10. 0607_w21_qp_43 Q: 4



The points A (2, 5) and B (10, 1) are shown on the diagram.

(a) Find the gradient of the line AB.

..... [2]

(b) Find the equation of the line AB.
Give your answer in the form $y = mx + c$.

$y =$ ..... [2]

(c) The point C has coordinates $(6, k)$ where $k > 0$.
The line CA is perpendicular to the line AB and $AC = AB$.

Find k.

$k =$ ..... [3]

(d) The point D is such that $ABDC$ is a square.

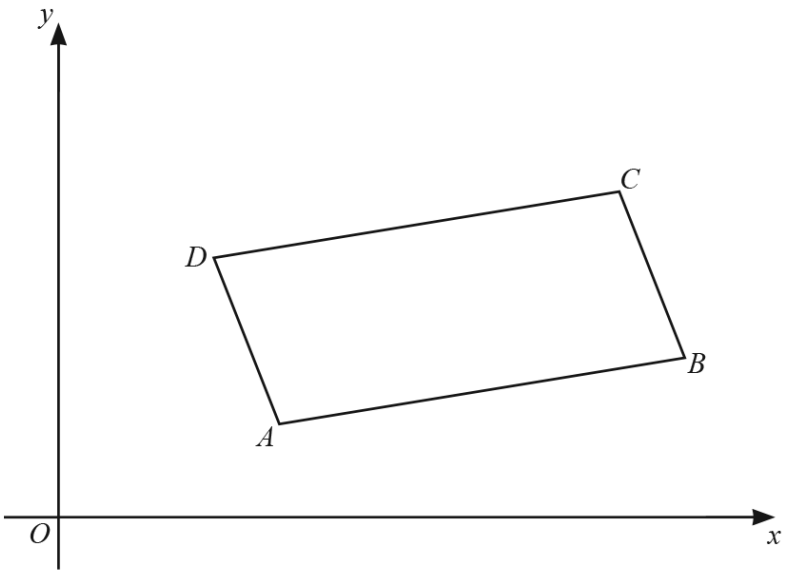
Find the coordinates of D.

(..... , ...) [2]

(e) Find the area of triangle BCD.

..... [3]

11. 0607_s20_qp_41 Q: 3



NOT TO SCALE

ABCD is a parallelogram.
A is the point (3, 1), *B* is the point (10, 2) and *D* is the point (2, 3).

(a) Find the coordinates of *C*.

(..... , ...) [2]

(b) Calculate the length of *AB*.
Give your answer as a surd in its simplest form.

AB = ... [3]

(c) The diagonals of the parallelogram meet at *X*.

Find the coordinates of *X*.

(..... , ...) [2]

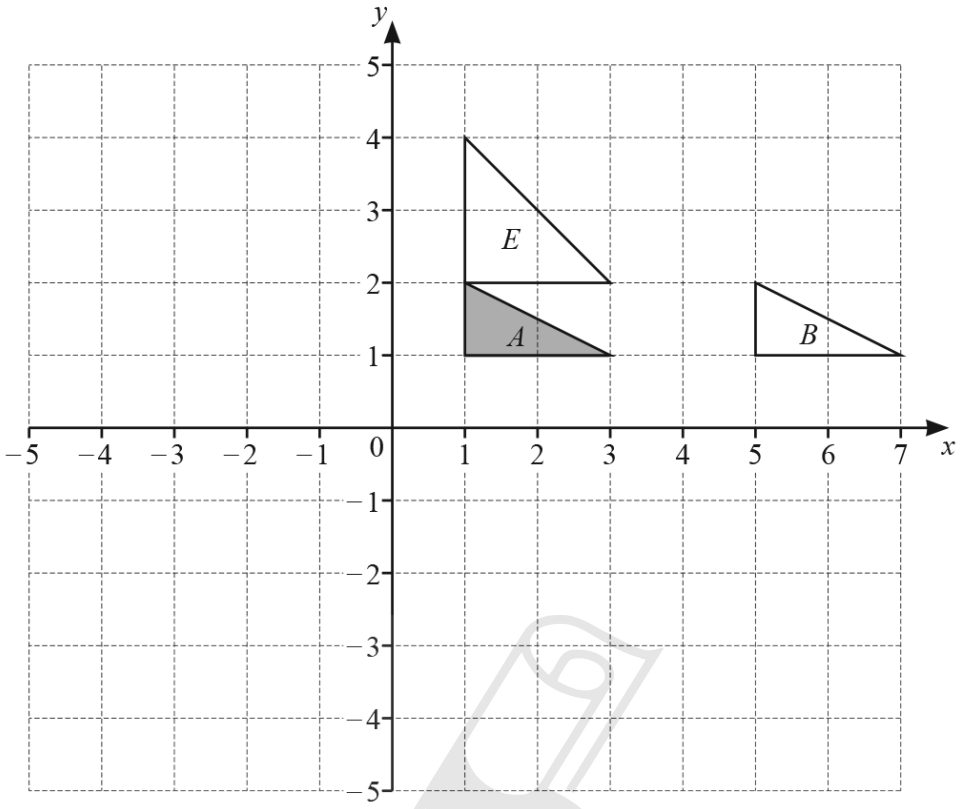
(d) The straight line BA is extended to meet the y-axis at P and the x-axis at Q.

Find the coordinates of P and the coordinates of Q.

P (..... , ...)

Q (..... , ...) [5]

12. 0607_w20_qp_42 Q: 2



(a) Describe fully the **single** transformation that maps triangle A onto triangle B.

.....

..... [2]

(b) Reflect triangle A in the line $y = -x$. Label the image C. [2]

(c) Rotate triangle A through 90° clockwise about centre (1, −1). Label the image D. [2]

(d) Describe fully the **single** transformation that maps triangle C onto triangle D.

.....

..... [2]

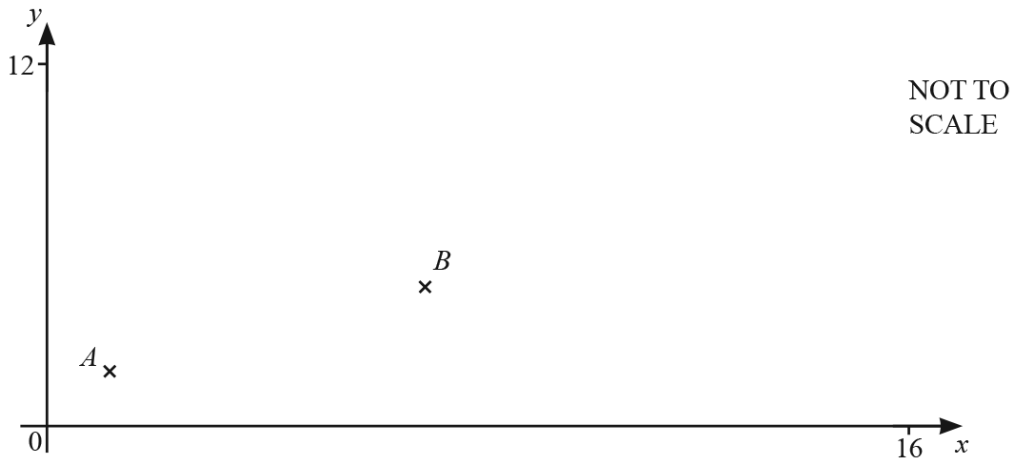
(e) Describe fully the **single** transformation that maps triangle A onto triangle E.

.....

..... [3]

13. 0607_s19_qp_43 Q: 10

The points A (1, 2) and B (7, 5) are shown on the diagram below.



(a) Write $\overrightarrow{AB}$ as a column vector.

( ) [1]

(b) Calculate the length of the line AB.

..... [2]

(c) The point C has co-ordinates $(10, k)$.
$AB = BC$ and $k > 0$.

Show that $k = 11$.

[3]

(d) Find the equation of the line that is perpendicular to AC that passes through the midpoint of AC.
Give your answer in the form $y = mx + c$.

$y =$ ..... [4]

(e) The points A, B, C and D form a rhombus.

Find the co-ordinates of D.

(..... , ...) [3]

---

14. 0607_s18_qp_41 Q: 3

(a) Show that the point $(3, -1)$ lies on the line $y = 2x - 7$.

[1]

(b) Find the co-ordinates of the points where the line $y = 8x + 4$ crosses

(i) the x-axis,

(..... , ...) [1]

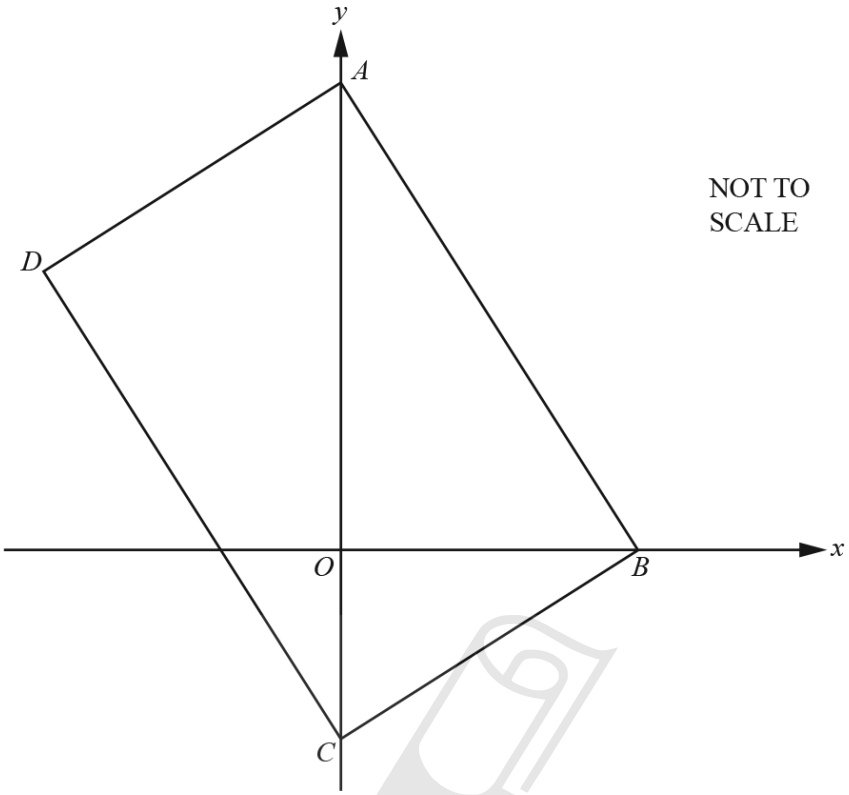
(ii) the y-axis.

(..... , ...) [1]

(c) Find the equation of the straight line that passes through the points (1, 2) and (4, 11).
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

15. 0607_w18_qp_41 Q: 4



NOT TO SCALE

ABCD is a rectangle.

The equation of the line *AB* is $4x + 3y = 24$.

(a) Find the co-ordinates of

(i) point *A*,

(..... , ...) [1]

(ii) point *B*,

(..... , ...) [1]

(iii) the midpoint of *AB*.

(..... , ...) [2]

(b) Rearrange the equation $4x+3y=24$ to make y the subject.

$y =$ ..... [2]

(c) Find the equation of the line BC.
Give your answer in the form $y=mx+c$.

$y =$ ..... [3]

(d) Find the co-ordinates of

(i) point C,

(..... , ...) [1]

(ii) point D.

(..... , ...) [3]

16. 0607_w17_qp_42 Q: 9

(a) **(i)** Find the equation of the line that passes through the points (1, 2) and (3, 12).
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

(ii) Find the equation of the line that passes through the point (0, 2) and is perpendicular to the line in **part (a)(i)**.

..... [2]

(b) **(i)** Solve the equation $3x^2 + 4x - 4 = 0$.
You must show all your working.

$x =$ ..... or $x =$ ..... [3]

(ii) Solve the inequality $3x^2 + 4x - 4 < 0$.

..... [2]

(c) The graph of $y = ax^2 + bx + c$ has its vertex at the point (1, 5) and intersects the y-axis at (0, 1).

Find the values of a, b and c.

$a =$ .....

$b =$ .....

$c =$ ..... [3]

17. 0607_s16_qp_41 Q: 10

A is the point (–2, –1) and B is the point (6, 3).

(a) Calculate $|\overrightarrow{AB}|$.

..... [3]

(b) The point P has co-ordinates (x, y) and $PA = PB$.

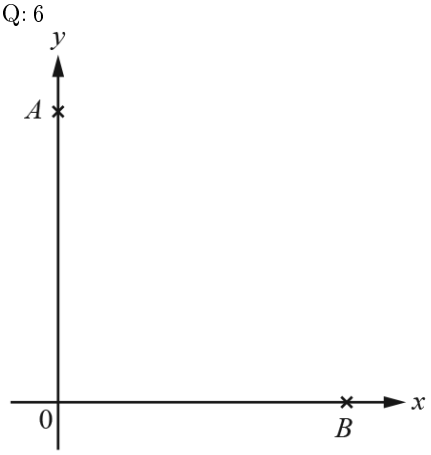
Show that $2x + y = 5$.

[5]

(c) If P is also on the line $y = x$, find the co-ordinates of P.

(....., ...) [2]

18. 0607_w16_qp_41 Q: 6



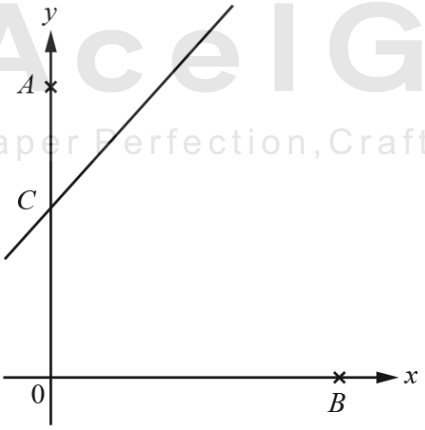
NOT TO SCALE

A is the point (0, 6) and B is the point (4, 0).

(a) Find the equation of the perpendicular bisector of AB.

..... [5]

(b)



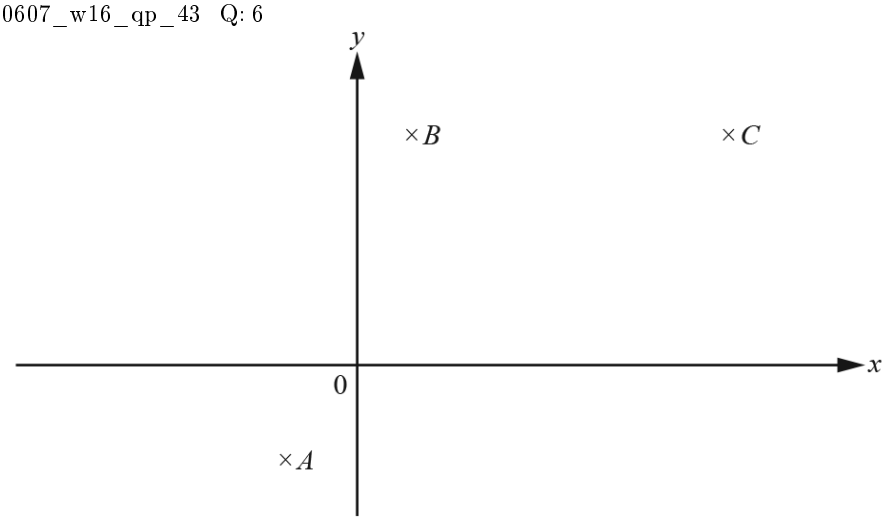
NOT TO SCALE

The line $y = 2x + 3$ cuts the y-axis at C.
The perpendicular bisector of AB cuts the y-axis at D.

Find the length CD.

CD = ... [2]

19. 0607_w16_qp_43 Q: 6



The diagram shows the points A $(-1, -1)$, B $(1, 3)$ and C $(6, 3)$.

(a) The points A, B, C and D are the vertices of a parallelogram.

Write down the co-ordinates of the three possible positions of D.

(..... , ...)

(..... , ...)

(..... , ...) [3]

(b) E is a point such that C is the midpoint of the line AE.

Find the co-ordinates of the point E.

(..... , ...) [2]

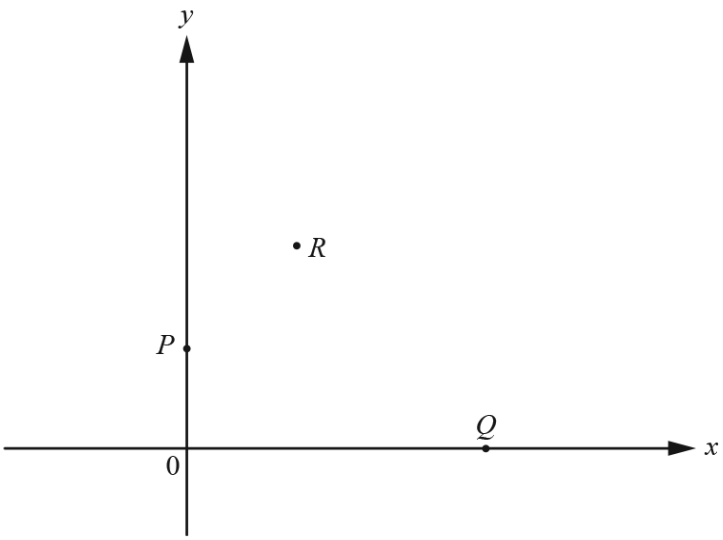
(c) The line L is perpendicular to the line AC and goes through A.

Find the equation of the line L.

..... [4]

20. 0607_s15_qp_43 Q: 4

P is the point (0, 4), Q is the point (6, 0) and R is the point (2, 7).



NOT TO SCALE

(a) S is the point such that $\overrightarrow{RS} = \overrightarrow{QP}$.

Find the co-ordinates of S.

Answer(a) (....., ...) [2]

(b) Calculate $|\overrightarrow{QP}|$.

Answer(b) ..... [2]

(c) Find the equation of the line PQ.

Answer(c) ..... [2]

(d) Write down the co-ordinates of N, the midpoint of PQ.

Answer(d) (....., ...) [1]

(e) Find the equation of the perpendicular bisector of PQ.

Answer(e) ..... [3]

(f) A and B are points on the perpendicular bisector of PQ such that $AN \neq BN$.

What is the mathematical name given to the quadrilateral $PAQB$?

Answer(f) ..... [1]

21. 0607_w15_qp_42 Q: 11

A is the point (2, 6) and C is the point (5, 4).

The equation of the line AB is $y + 4x = 14$.
The equation of the line BC is $y = x - 1$.

(a) B is the point where the lines AB and BC intersect.

Find the co-ordinates of the point B.

Answer(a) (..... , ...) [3]

(b) M is the midpoint of AC.

Find the co-ordinates of M.

Answer(b) (..... , ...) [2]

(c) Find the equation of the line BM.

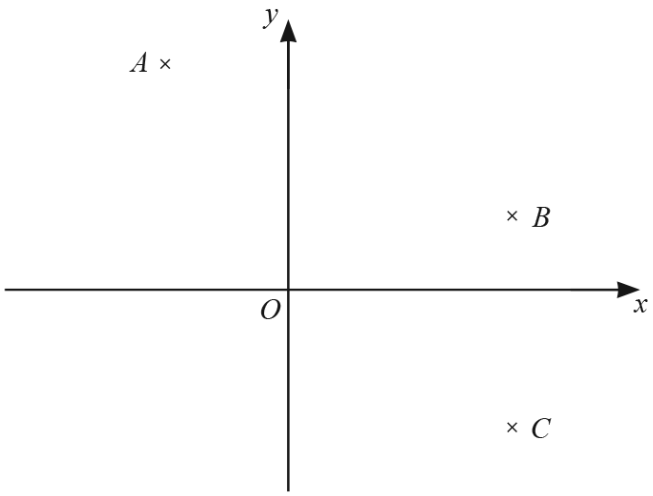
Answer(c) ..... [3]

(d) The point D lies on the line BM.
The co-ordinates of D are $(k, k + 9)$.

Find the value of k.

Answer(d) $k =$ ..... [2]

22. 0607_s20_qp_43 Q: 9



NOT TO SCALE

A is the point $(-2, 6)$, B is the point $(3, 2)$ and C is the point $(3, -4)$.

(a) Write down the equation of BC.

..... [1]

(b) Find the coordinates of the point M, the mid-point of AC.

(..... , ...) [1]

(c) The quadrilateral $ABCD$ has rotational symmetry of order 2 about the point M.

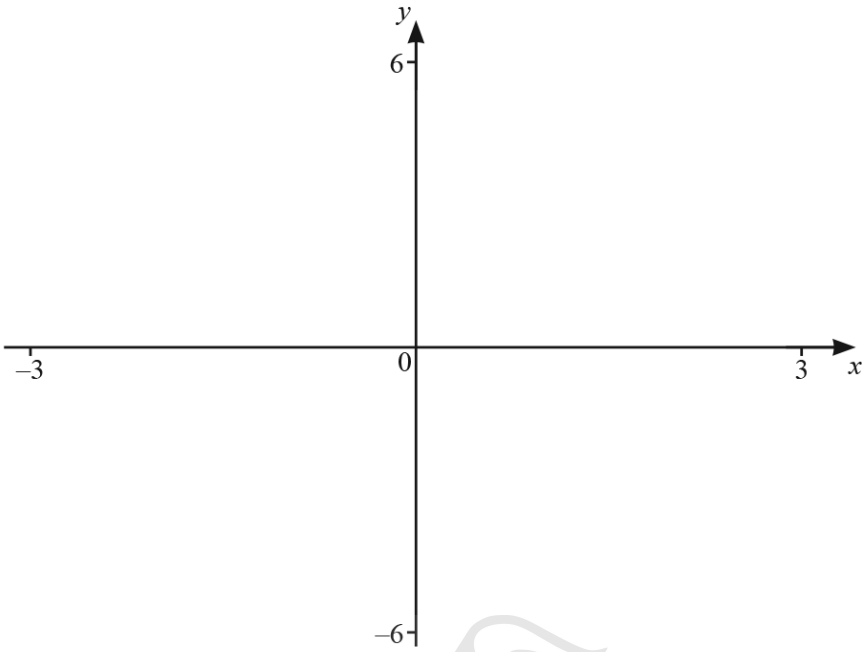
Find the coordinates of the point D.

(..... , ...) [2]

(d) Find the equation of the perpendicular bisector of AC.

..... [4]

23. 0607_s19_qp_43 Q: 8



(a) On the diagram, sketch the graph of $y = f(x)$, where

$$f(x) = |x^2 - 4| \text{ for values of } x \text{ between } -3 \text{ and } 3.$$

[3]

(b) Write down the equation of the line of symmetry of the graph.

..... [1]

(c) Write down the zeroes of $f(x)$.

..... and ..... [1]

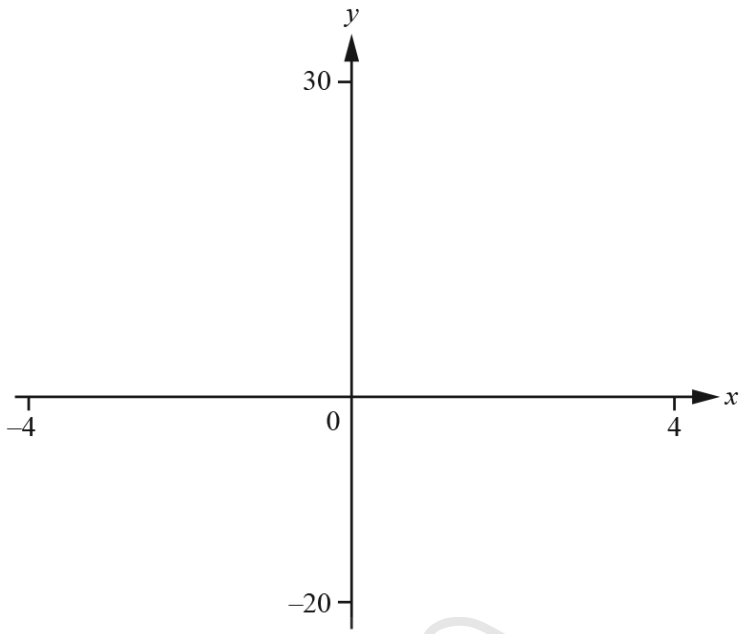
(d) **(i)** Find the value of k when $y = k$ meets the curve $y = |x^2 - 4|$ three times.

$k =$ ..... [1]

(ii) Find the range of values of k when $y = k$ meets the curve $y = |x^2 - 4|$ four times.

..... [2]

24. 0607_w18_qp_42 Q: 5



$f(x) = x^3 - 12x + 6$

(a) On the diagram, sketch the graph of $y = f(x)$ for $-4 \leqslant x \leqslant 4$. [2]

(b) Find the positive zeros of $f(x)$.

..... [2]

(c) Find the co-ordinates of

(i) the local maximum,

(..... , ...) [1]

(ii) the local minimum.

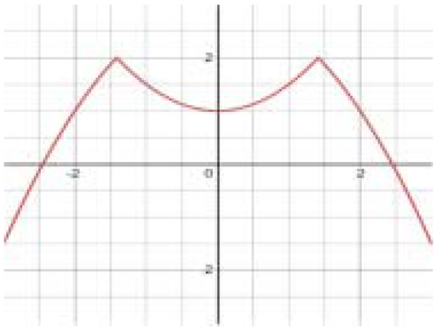
(..... , ...) [1]

(d) Describe fully the symmetry of the graph of $y = f(x)$.

.....

..... [3]

01. 0607_s24_ms_41 Q: 6

Question	Answer	Marks	Partial Marks
(a)	Correct sketch 	3	**B2** if peaks below $y = 1$ (by eye) or rounded at peaks not cusps or outside branches convex from below. or **B1** for graph symmetrical about y-axis and in all 4 quadrants
(b)	4.9[0] or 4.898 to 4.899	2	**B1** for 2.45 or –2.45 or 2.449... or –2.449… seen
(c)	–2.24 or –2.236… 2.24 or 2.236…	2	**B1** for each or for both values seen
(d)	(0, 1)	1	
(e)	$k = 2$ $k < 1$	2	**B1** for each

02. 0607_s24_ms_43 Q: 4

Question	Answer	Marks	Partial Marks
(a)	$-\frac{2}{3}$ oe $\frac{8}{3}$ or $2\frac{2}{3}$ oe	3	**B2** for one correct or **M1** for correctly isolating y oe
(b)	gradient = $\frac{3}{2}$	M1	**FT** $1 \div$ *their* $-\frac{2}{3}$
	substituting (2, 10) into $y =$ *their* $m + c$	M1	**FT** *their* $m \neq -\frac{2}{3}$
	completing to $2y - 3x = 14$ with at least one line of working and no errors	A1	
(c)	Correctly equating coefficients or sketch of one equation with positive slope and positive y-intercept	M1	
	Correct method to eliminate one variable or sketch of other equation with negative slope and positive y-intercept	M1	
	$x = -2$ in correct answer space	A1	
	$y = 4$ in correct answer space	A1	If 0 scored, **SC1** for correct answer with no working

03. 0607_m23_ms_42 Q: 3

Question	Answer	Marks	Partial Marks
(a)	Angle in semicircle	1	
(b)(i)	x	1	
(b)(ii)	$2x$ oe	1	**FT** $2 \times$ *their* **(i)**
(b)(iii)	$180 - 2x$ oe	1	**FT** $180 -$ *their* **(ii)**
(b)(iv)	$90 - x$ oe	1	
(b)(v)	$90 + x$ oe	1	**FT** $180 -$ *their* **(iv)**
(c)	$[y =] 90 - 2x$ oe	1	**FT** $90 -$ *their* **(*b*)(ii)**

04. 0607_s23_ms_41 Q: 5

Question	Answer	Marks	Partial Marks
(a)(i)	4	1	
(a)(ii)	(0, 7)	1	
(b)(i)	8.94 or 8.944...	3	**M2** for $(5-1)^2 + (11-3)^2$ oe soi by $4^2 + 8^2$ or **M1** for $(5-1)$ or $(11-3)$ or $(1-5)$ or $(3-11)$ soi by ± 4 or ± 8

Question	Answer	Marks	Partial Marks
(b)(ii)	$-2x + 17$	5	**B1** for (7, 3) **M1** for gradient $= \frac{5-1}{11-3}$ oe **M1** for perp gradient $= -\frac{1}{their\ \frac{1}{2}} = m$ **M1** for *their* 3 = *their m* $\times$ *their* 7 + *c* oe

05. 0607_w23_ms_43 Q: 12

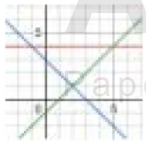
Question	Answer	Marks	Partial Marks
(a)(i)	(0, 7)	1	
(a)(i)	$\left(\frac{-5}{3}, 2\right)$	2	**M1** for $2 - 7 = 3x$ or **B1** for $\frac{-5}{3}$

Question	Answer	Marks	Partial Marks
(b)	$y = \frac{3}{5}x + \frac{21}{5}$ oe	**5**	**B4** for $\frac{3}{5}x + \frac{21}{5}$ oe OR **B1** for midpoint = (–2, 3) **M1** for $m_{AB} = \frac{8-(-2)}{-5-1}$ oe **M1** for $m = \frac{-1}{their(m_{AB})}$ **M1** for substituting *their* (–2, 3) into $y = (their\ m)x + c$ oe

06. 0607_m22_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	$-\frac{3}{4}$ oe	**2**	**M1** for isolating y oe
	6	**1**	
(b)(i)	[grad =] $\frac{5-3}{8-4}$ oe	**M1**	
	Substitution of (4, 3) or (8, 5) into $y = (their\ m)x + c$ or $y - y_1 = m(x - x_1)$	**M1**	
	$y = \frac{1}{2}x + 1$ or $2y - 6 = x - 4$ or $2y - 10 = x - 8$ leading to $2y - x = 2$ without error or omission	**A1**	
(b)(ii)	$[y =]\frac{1}{2}x + 7$	**2**	**B1** for $[y =]\frac{1}{2}x + k,\ k \neq 1$ or for $[y =]jx + 7,\ j \neq 0$

Question	Answer	Marks	Partial Marks
(a)(i)	(0, 3)	**1**	
(a)(ii)	–2	**1**	
(b)	8	**1**	
(c)	$y=\frac{2}{3}x-3$ oe final answer	**3**	**B2** for answer $\frac{2}{3}x-3$ OR **M1** for $\frac{5-(-1)}{12-3}$ oe **M1** for correct substitution of point into $y = (their\ m)x + c$ or e.g. $y - 5 = (their\ m)(x - 12)$

Question	Answer	Marks	Partial Marks
(d)	$y=-\frac{2}{5}x+\frac{26}{5}$ oe final answer	**4**	**B3** for answer $-\frac{2}{5}x+\frac{26}{5}$ oe OR **M1** for gradient $\frac{5}{2}$ **M1** for $m = \frac{-1}{their\left(\frac{5}{2}\right)}$ or better **M1** for (3, 4) substituted into $y = (their\ m)x + c$ or e.g. $y - 4 = (their\ m)(x - 3)$
(e)(i)	3 correct ruled lines 	**3**	**B1** for each line correct
(e)(ii)	Clear indication of correct region	**1**	**FT** if appropriate

08. 0607_s21_ms_43 Q: 3

Question	Answer	Marks	Partial Marks
(a)	$y = -7x + 35$ oe final answer	4	**B3** for $-7x + 35$ as final answer OR **M1** for gradient of $AB = \frac{0--1}{5--2}$ oe **M1** for gradient of $BC = \frac{-1}{\textit{their}\text{ gradient of }AB}$ (m) **M1** for substitution of (5, 0) in $y = (\textit{their}\ m)x + c$ oe
(b)	3	2	**M1** for use of $14 = 2 \times 7$ oe e.g. $\begin{pmatrix} x \\ 14 \end{pmatrix} = 2\begin{pmatrix} 1 \\ -7 \end{pmatrix}$ or $14 = \textit{their}\ (-7p + 35)$
(c)	(–4, 13)	2	**FT** *their* $p - 7$ for x-coordinate **B1** for each.

Question	Answer	Marks	Partial Marks
(d)	100 nfww	4	**M3** for $\sqrt{200} \times \sqrt{50}$ oe or **M2** for $\sqrt{7^2 + 1^2}$ oe or $\sqrt{(-2)^2 + 14^2}$ oe or **M1** for $(5--2)^2 + (0--1)^2$ oe or $(-4--2)^2 + (14-0)^2$ oe OR **M3** for $9 \times 15 - 2 \times \frac{1}{2} \times 2 \times 14 - 2 \times \frac{1}{2} \times 7 \times 1$ or **M1** for 9×15 and **M1** for $\frac{1}{2} \times 2 \times 14$ or $\frac{1}{2} \times 7 \times 1$

09. 0607_w21_ms_41 Q: 13

Question	Answer	Marks	Partial Marks
(a)	$\frac{b - fy}{ey - a}$ or $\frac{fy - b}{a - ey}$ final answer	4	**M1** for $y(ex + f) = ax + b$ **M1FT** for $eyx + fy = ax + b$ **M1FT** for $eyx - ax = b - fy$ **M1FT** for factorise and divide correctly Max of 3 marks if answer incorrect
(b)(i)	[Amplitude] 3 [Period] 180	2	**B1** for each
(b)(ii)	$9\sin(2x)$	1	

Question	Answer	Marks	Partial Marks
(b)(iii)	$-3\sin(2x)$ cao	2	**B1** for $3\sin(2(x \pm 90))$ oe

10. 0607_w21_ms_43 Q: 4

Question	Answer	Marks	Partial Marks
(a)	–0.5 oe	2	**M1** for $\frac{1-5}{10-2}$ oe
(b)	$[y =] -0.5x + 6$	2	**M1** for substituting (2, 5) or (10, 1) into $y = their(-0.5)x + c$
(c)	13	3	**M1** for grad perp $= \frac{-1}{their(-0.5)}$ **M1** for $\frac{k-5}{6-2} = their\,2$ OR **M2** for $(k-5)^2 = 64$ or **M1** for $(10-2)^2 + (1-5)^2$ $[= (6-2)^2 + (k-5)^2]$
(d)	(14, 9)	2	**B1** for each

Question	Answer	Marks	Partial Marks
(e)	40	3	**M2** for $0.5\times[(10-2)^2 + (1-5)^2]$ oe or **M1** for $(10-2)^2 + (1-5)^2$ oe

11. 0607_s20_ms_41 Q: 3

Question	Answer	Marks	Partial Marks
(a)	(9, 4)	2	**B1** for each
(b)	$5\sqrt{2}$ cao	3	**M1** for $(10-3)^2 + (2-1)^2$ or better **A1** for 50 If 0 scored, **SC1** for simplification of a surd if seen and if possible.
(c)	(6, 2.5)	2	**B1** for each

Question	Answer	Marks	Partial Marks
(d)	$\left(0, \frac{4}{7}\right)$ oe (–4, 0)	5	**M1** for gradient = $\frac{1}{7}$ **M1** for subst (3, 1) or (10, 2) into $y = (\textit{their } m)\,x + c$ **A1** for $y = \frac{1}{7}x + \frac{4}{7}$ **B1 FT** for $\left(0, \frac{4}{7}\right)$ **B1 FT** for (–4, 0)

12. 0607_w20_ms_42 Q: 2

Question	Answer	Marks	Partial Marks
(a)	Translation $\begin{pmatrix} 4 \\ 0 \end{pmatrix}$	2	**B1** for each
(b)	Triangle at (–1, –1), (–2, –1), (–1, –3)	2	**B1** for reflection in $y = x$
(c)	Triangle at (3, –1), (4, –1), (3, –3)	2	**B1** for rotation 90° clockwise, wrong centre or rotation 90° anti-clockwise about (1, –1)
(d)	Reflection $x = 1$	2	**B1** for each
(e)	Stretch x-axis invariant oe [factor] 2	3	**B1** for each

13. 0607_s19_ms_43 Q: 10

Question	Answer	Marks	Partial Marks
(a)	$\begin{pmatrix} 6 \\ 3 \end{pmatrix}$	1	
(b)	6.71 or 6.708… or $\sqrt{45}$ oe	2	**M1** for $(7-1)^2 + (5-2)^2$ oe

Question	Answer	Marks	Partial Marks
(c)	$k-5=\sqrt{(their\mathbf{(b)})^2-3^2}$	**M2**	**M1** for $(k-5)^2+(10-7)^2=(their\mathbf{(b)})^2$ oe Reverse process scores 0.
	$k-5=6$	**A1**	
(d)	$[y=]-x+12$ oe	**4**	**M1** for grad $AC=\frac{11-2}{10-1}$ oe **M1** for grad perp $=-\frac{1}{their\ \text{grad}}$ **B1** for midpoint (5.5, 6.5)
(e)	(4, 8)	**3**	**M2** for $\begin{pmatrix}10\\11\end{pmatrix}-\begin{pmatrix}6\\3\end{pmatrix}$ or $\begin{pmatrix}7\\5\end{pmatrix}-\begin{pmatrix}-3\\3\end{pmatrix}$ oe or **M1** for $CD=\begin{pmatrix}6\\3\end{pmatrix}$ or $BD=\begin{pmatrix}-3\\3\end{pmatrix}$ oe

14. 0607_s18_ms_41 Q: 3

Question	Answer	Marks	Partial Marks
(a)	$2\times3-7=-1$ oe	**1**	Correct substitution
(b)(i)	$\left(-\frac{1}{2},\ 0\right)$ oe	**1**	
(b)(ii)	(0, 4)	**1**	
(c)	$[y=]\ 3x-1$	**3**	**M1** for gradient $=\frac{11-2}{4-1}$ oe or better **M1** for substituting (1, 2) or (4, 11) into $y = (their\ m)x + c$

15. 0607_w18_ms_41 Q: 4

Question	Answer	Marks	Partial Marks
(a)(i)	(0, 8)	**1**	
(a)(ii)	(6, 0)	**1**	
(a)(iii)	(3, 4)	**2**	**FT** *their* **(i)** and **(ii)** **B1FT** for each co-ordinate
(b)	$[y =] -\frac{4}{3}x + 8$ oe	**2**	**M1** for correct isolating y term or for correct division
(c)	$y = \frac{3}{4}x - 4.5$ oe	**3**	**FT** *their* **(a)(ii)** **B2** for $y = \frac{3}{4}x + k, \quad k \neq 0$ or **M1** for gradient = 0.75 oe and **M1** for correct subst of *their* **(a)(ii)** into $y = mx + c$
(d)(i)	(0, –4.5)	**1**	**Strict FT** *their* **(c)** and only if in form $y = mx + c$
(d)(ii)	(–6, 3.5)	**3**	**FT** *their* **(a)**, **(d)(i)** **B2** for one correct co-ordinate or **M1** for $\begin{pmatrix} -6 \\ -4.5 \end{pmatrix}$ or $\begin{pmatrix} 6 \\ 4.5 \end{pmatrix}$ soi

16. 0607_w17_ms_42 Q: 9

Question	Answer	Marks	Partial Marks
(a)(i)	$[y =]\ 5x - 3$	3	**M1** for gradient = $\frac{12-2}{3-1}$ oe **M1** for substituting (1, 2) or (3, 12) into $y = mx + c$ OR **M2** for $\frac{y-2}{x-1} = \frac{12-2}{3-1}$ oe
(a)(ii)	$y = -\frac{1}{5}x + 2$ oe	2	**FT** *their* gradient in (i) **M1** for answer in form $y = mx + 2$ oe or for $y = \frac{-1}{their\ 5}x + c$ oe
(b)(i)	$-2,\ \frac{2}{3}$ oe with correct working	3	**B2** for sketch with one –ve and one +ve zero or **B1** for sketch of parabola vertex downwards OR **B2** for $(3x - 2)(x + 2)$ or **B1** for $3x(x + 2) - 2(x + 2)$ or $x(3x - 2) + 2(3x - 2)$ or for $(3x + a)(x + b)$ where $ab = -4$ or $a + 3b = 4$ OR **B2** for $\frac{-4 \pm \sqrt{4^2 - 4(3)(-4)}}{2(3)}$ oe or **B1** for $\sqrt{4^2 - 4(3)(-4)}$ or $\frac{-4 \pm \sqrt{.....}}{2(3)}$ If 0 or B1 scored, then + **B1** for $-2,\ \frac{2}{3}$
(b)(ii)	$-2 < x < \frac{2}{3}$	2	**FT** *their* (b)(i) **B1** for $-2 < x$ or for $x < \frac{2}{3}$ seen If 0 scored **SC1 FT** for $-2 \leqslant x \leqslant \frac{2}{3}$
(c)	$[a =] -4,\ [b =] 8,\ [c =] 1$	3	**M2** for $y = a(x-1)^2 + 5$ or **M1** for use of $y = a(x-h)^2 + k$ or for $c = 1$ or $-\frac{b}{2a} = 1$

17. 0607_s16_ms_41 Q: 10

Question	Answer	Mark	Part Marks
(a)	8.94 or 8.944... or $4\sqrt{5}$	3	**M2** for $8^2 + 4^2$ **M1** for 8 and 4 seen
(b)	Gradient of $AB = \frac{1}{2}$ oe	1	
	Gradient of perpendicular = –2 oe	1FT	
	$y = (their\text{–}2)x + c$	M1	
	midpoint (2, 1)	B1	May be on diagram
	Substitute (2, 1) to reach $c = 5$	A1	
	OR		
	$(x + 2)^2 + (y + 1)^2$ oe	B1	
	$(x – 6)^2 + (y – 3)^2$ oe	B1	
	equating above two expressions	M1	
	3 correct expansions	B1	
	correct completion with no errors or omissions	A1	
(c)	$\left(\frac{5}{3}, \frac{5}{3}\right)$ oe	2	**M1** for $x + 2x = 5$ oe

18. 0607_w16_ms_41 Q: 6

Qu.	Answer	Mark	Part Marks
(a)	$y = \frac{2}{3}x + \frac{5}{3}$ oe	5	**B1** for (2, 3) seen **B1** for gradient of $AB = -\frac{3}{2}$ **B1FT** for gradient = $\frac{2}{3}$ **M1** for correct method in finding c.
(b)	$1\frac{1}{3}$ oe	2	**FT** 3 – *their* $\frac{5}{3}$ in (a) (but not if 0) **M1** for 3 – *their* $\frac{5}{3}$ in (a)

19. 0607_w16_ms_43 Q: 6

Question	Answer	Mark	Part Marks
(a)	(4, –1), (–6, –1), (8, 7)	3	**B1** for each
(b)	(13, 7)	2	**B1** for each co-ordinate
(c)	$y = -\frac{7}{4}x - \frac{11}{4}$ oe	4	isw correct 3 term equation **B1** for $\frac{4}{7}$ **B1FT** for $-\frac{7}{4}$ **M1** for correct method of finding 'c'.

20. 0607_s15_ms_43 Q: 4

Qu.	Answer	Mark	Part Marks
(a)	(–4, 11)	1, 1	or **M1** for $\begin{pmatrix}2\\7\end{pmatrix}+\begin{pmatrix}-6\\4\end{pmatrix}$ or **SC1** for (8, 3)
(b)	7.21 or 7.211... or $2\sqrt{13}$	2	**M1** for $\sqrt{4^2+6^2}$
(c)	$y=-\frac{2}{3}x+4$ oe	2	**B1** for gradient $=-\frac{2}{3}$ or **SC1** for $y=mx+4$
(d)	(3, 2)	1	
(e)	$y=\frac{3}{2}x-\frac{5}{2}$ oe	3	**M1** for grad $=\frac{-1}{\textit{their}\text{ gradient}}$ **M1** for subs of *their* **(d)** into $y = mx + c$ oe
(f)	Kite	1	

21. 0607_w15_ms_42 Q: 11

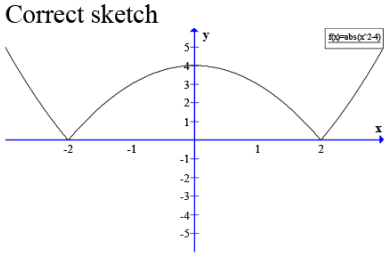
Question	Answer	Mark	Part Marks
(a)	Correctly eliminate 1 variable $x=3$ $y=2$	M1 B1 B1	or appropriate sketch If **B0** scored, **M1** for correct substitution to find 2nd variable.
(b)	(3.5, 5)	2	**B1** for each
(c)	$y=6x-16$ oe	3	**M1** for gradient $=\frac{3}{0.5}$ oe soi **M1** for substitution B or M into $y = mx + c$ oe
(d)	5	2	**M1** for $(k, k + 9)$ substituted into *their* **(c)** if linear

22. 0607_s20_ms_43 Q: 9

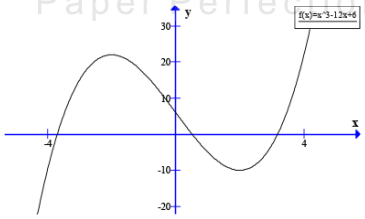
Question	Answer	Marks	Partial Marks
(a)	$x=3$ oe	1	
(b)	$\left(\frac{1}{2}, 1\right)$ oe	1	
(c)	(–2, 0)	2	**B1** for each coordinate

Question	Answer	Marks	Partial Marks
(d)	$y = \frac{1}{2}x + \frac{3}{4}$ oe	**4**	3 term equivalent **M1** for gradient of $AC = \frac{-4-6}{3-(-2)}$ **M1** for $m = \frac{-1}{their\text{gradient}}$ **M1** for substituting *their* (b) into *their* $y = mx + c$

23. 0607_s19_ms_43 Q: 8

Question	Answer	Marks	Partial Marks
(a)	Correct sketch 	**3**	**B1** for no part of graph below x-axis **B1** for symmetry about y-axis
(b)	$x = 0$	**1**	
(c)	–2, 2	**1**	Accept $x = -2$, $x = 2$ but not (–2, 0) or (2, 0)
(d)(i)	4	**1**	
(d)(ii)	$0 < k < 4$ **cao**	**2**	**B1** for 0 and 4 seen or $k < 4$ or $k > 0$

24. 0607_w18_ms_42 Q: 5

Question	Answer	Marks	Partial Marks
(a)	Correct sketch 	**2**	**B1** for any cubic with max on left of min
(b)	0.511 or 0.5111... 3.18 or 3.180...	**2**	**B1** for each
(c)(i)	(–2, 22)	**1**	
(c)(ii)	(2, –10)	**1**	
(d)	Rotation[al] [Order] 2 [About] (0, 6)	**3**	**B1** for each