1(a). Solve.

$3x^2 = 75$

$x =$ _____ [2]

(b). Solve.

$4x + 3y = 5$

$2x + 3y = 1$

$x =$ _____

$y =$ _____

[3]

2. Alexander, Reiner and Wim each watch a different film.

- Alexander's film is thirty minutes longer than Wim's film.
- Reiner's film is twice as long as Wim's film.
- Altogether the films last 390 minutes.

How long is each of their films?

Alexander's film _____ minutes

Reiner's film _____ minutes

Wim's film _____ minutes

**[4]**

3. The line $L$ has equation $2y + 3x = 1$.

The line $M$ has equation $4y + 7x = 5$.

Find the coordinates of the point of intersection of lines $L$ and $M$.

(_____ , _____)

**[3]**

4. Solve by factorising.

$x^2 - 2x - 8 = 0$

$x =$ _____ or $x =$ _____

**[3]**

5. Solve.

$12x - 3 = 4x + 15$

$x =$ _____

**[3]**

6. Solve.

$$\frac{8x+5}{3} = 2x - 4$$

$x =$ _____

**[3]**

7. Solve this equation, giving your answers correct to 2 decimal places.

$3x^2 + 5x - 1 = 0$

$x =$ _____ or $x =$ _____

**[4]**

8. Solve.

$y = 2x^2 + 16x - 9$

$y = 5x - 3$

$x =$ _____ $y =$ _____

$x =$ _____ $y =$ _____

**[6]**

9. Solve.

$x^2 = 49$

_____ [2]

10. Solve.

$6x^2 = 150$

_____ [3]

11. Solve these equations.

(i) $2(3x - 1) = 10x - 5$

(i) _____ [4]

(ii) $x^2 - 4 = 60$

(ii) _____ [3]

12. Solve, algebraically, these simultaneous equations.

$x + 3y = 14$

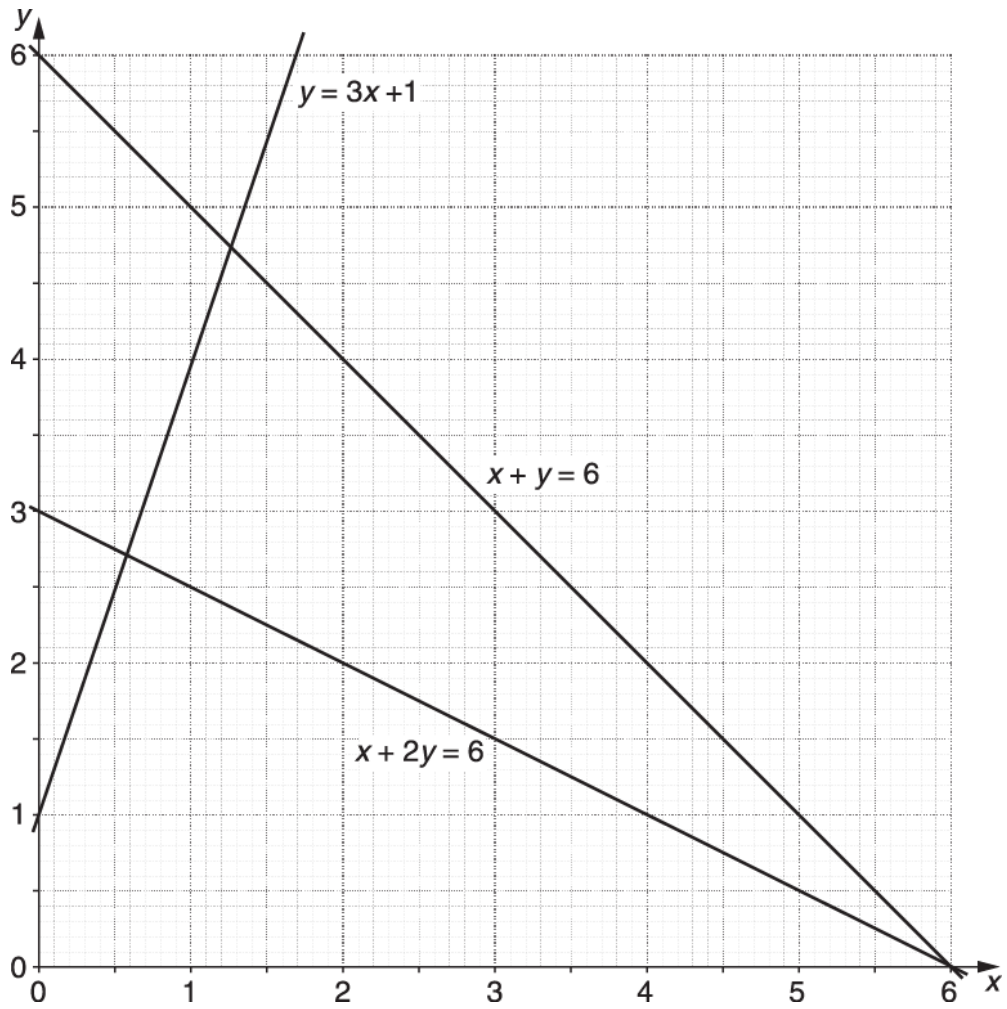
$2x + y = 3$

$x =$ _____

$y =$ _____ [3]

13(a) The graphs of $x + y = 6$, $y = 3x + 1$ and $x + 2y = 6$ are shown below.

.




Use the graphs to solve these pairs of simultaneous equations.

$y = 3x + 1$

$x + 2y = 6$

$x =$ _____

$y =$ _____ [1]

(b). $y = 3x + 1$

$2x + 2y = 12$

$x =$ _____

$y =$ _____ [2]

14. Solve these simultaneous equations.

$$4y + 3x = 3$$
$$2y - x = -2$$

$x =$ _____ $y =$ _____ [3]

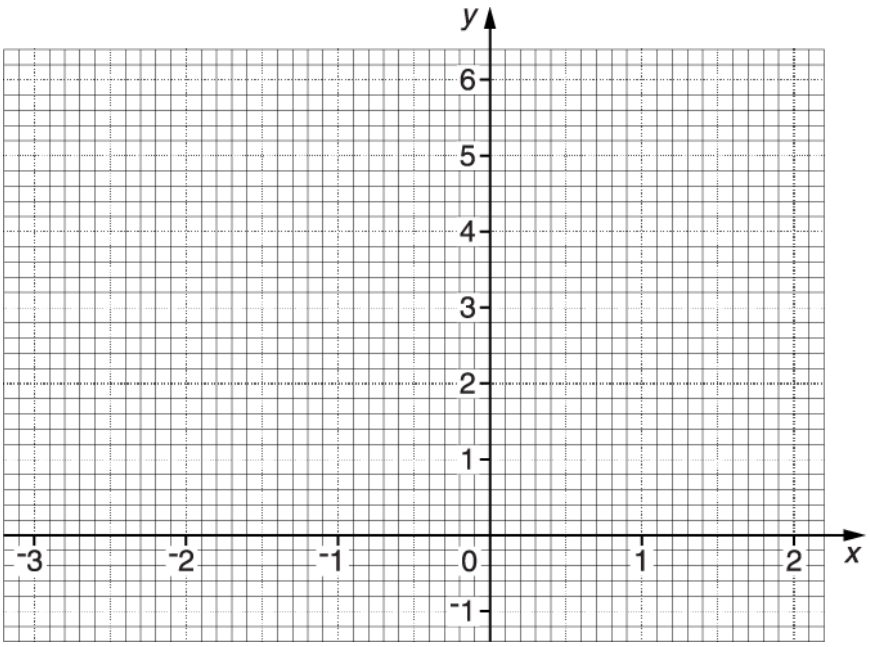
15(a) Complete the table for $y = x^2 + x$.

.

| $x$ | −3 | −2 | −1 | 0 | 1 | 2 |
|---|---|---|---|---|---|---|
| $y$ | 6 | | | 0 | 2 | |

**[2]**

(b). Draw the graph of $y = x^2 + x$ for $^-3 \leq x \leq 2$.




**[3]**

(c). Use your graph to solve $x^2 + x = 3$.

Give your answers correct to 1 decimal place.

_____ **[2]**

(d). Use your graph to solve these simultaneous equations.

$$y = x^2 + x$$
$$y = x + 2$$

Give your answers correct to 1 decimal place.

$x =$ _____ $y =$ _____

$x =$ _____ $y =$ _____ [3]

16. Use the quadratic formula to solve this equation.

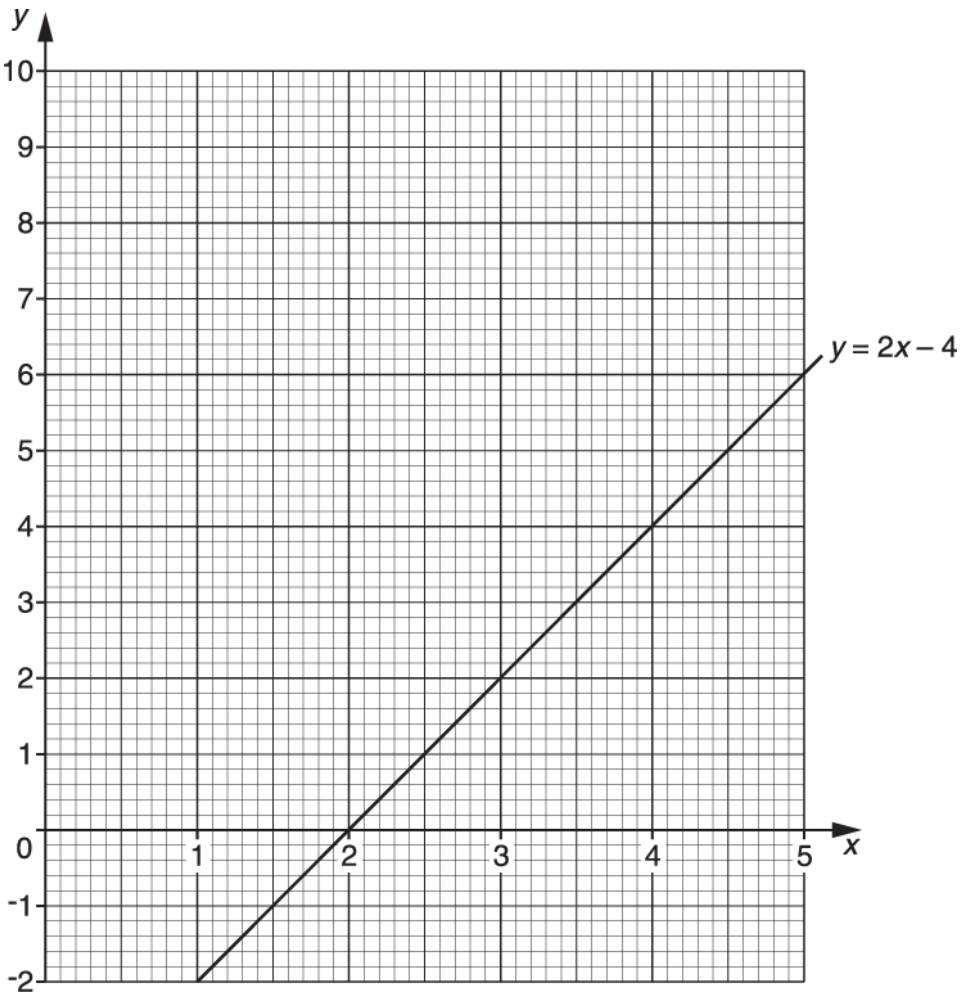
$$x^2 + 5x + 1 = 0$$

Give your answers correct to 2 significant figures.

_____ [3]

17(a) The grid shows the graph of $y = 2x - 4$.

.




Complete the table for $y = x^2 - 4x + 3$.

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| $y$ | 3 | 0 | | 0 | 3 | |

[2]

(b). On the grid, draw the graph of $y = x^2 - 4x + 3$ for $0 \leqslant x \leqslant 5$.

[2]

(c). Use your graphs to solve these simultaneous equations.

$y = 2x - 4$

$y = x^2 - 4x + 3$

$x =$ _____ $y =$ _____

$x =$ _____ $y =$ _____ [2]

18(a) Factorise.

.

$x^2 + 2x - 15$

_____ [2]

(b). Hence solve this equation.

$x^2 + 2x - 15 = 0$

_____ [1]

(c). Simplify fully.

$$\frac{x^2 + 2x - 15}{x^2 - 9}$$

_____ [2]

19. Simon is asked to solve an equation.

Here is his solution.

$$2(3x - 1) = 7$$

$$6x - 2 = 14$$

$$6x = 14 - 2$$

$$6x = 12$$

$$x = \frac{1}{2}$$

Simon has made **three** errors.

Explain the errors that he has made.

1

---

---

2

---

---

3

---

---

**[3]**

20. Solve.

$x^2 + 5 = 21$

_____ [3]

21. Solve.

$x^2 + 4x + 1 = 0$

Give your answers correct to 2 decimal places.

_____ [3]

22. Solve algebraically these simultaneous equations.

$y = x^2 + 6x - 5$

$y = 2x + 7$

$x =$ _____ $y =$ _____

$x =$ _____ $y =$ _____ [6]

23. Solve.

$$\frac{3x - 1}{5} = x - 2$$

$x =$ _____ [3]

24. Solve algebraically these simultaneous equations.

$y = 4x^2 - 9x - 1$

$y = 5 - 4x$

$x =$ _____ $y =$ _____

$x =$ _____ $y =$ _____ [6]

25. Solve.

$5x + 17 = x + 3$

$x =$ _____ [3]

26. Solve.

$7x - 2 = 3x + 20$

$x =$ _____ [3]

27. Solve these simultaneous equations algebraically.

$4x - 2y = 2$

$3x + y = 14$

$x =$ _____

$y =$ _____ [3]

28. Solve.

$$6(2x - 3) = 24$$

$x =$ _____ **[3]**

29. Solve algebraically.

$$5x - 2y = 22$$
$$2x + 3y = 5$$

$x =$ _____

$y =$ _____ **[4]**

30. Solve.

$$\frac{x}{4} = 2 - x$$

$x =$ _____ [3]

31. Solve.

$$2x + 3 = \frac{x}{5}$$

$x =$ _____ [3]

32. Solve this equation.

$3x^2 + 5x - 11 = 0$

Give your solutions correct to two decimal places.

$x =$ _____ or $x =$ _____ [3]

33(a)

. Solve by factorisation.

$2x^2 + 5x - 12 = 0$

$x =$ _____ or $x =$ _____ [3]

(b). Solve this equation.

Give each value correct to 2 decimal places.

$3x^2 + 2x - 3 = 0$

$x =$ _____ or $x =$ _____ [3]

34.

Solve.

$6x + 2 = 5 - 4x$

$x =$ _____ [3]

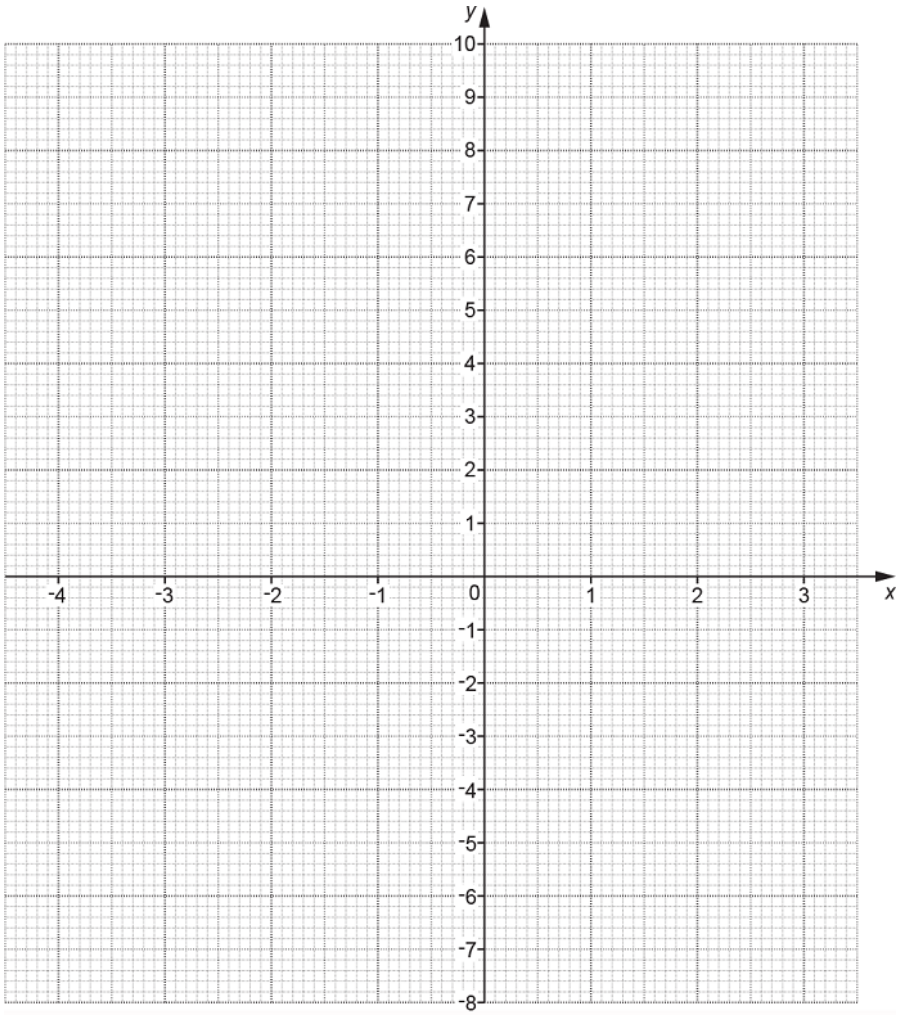
35(a) Complete this table for $y = x^2 + x - 4$.

.

| $x$ | $-4$ | $-3$ | $-2$ | $-1$ | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|---|
| $y$ | | 2 | | $-4$ | $-4$ | | 2 | |

[2]

(b). Draw the graph of $y = x^2 + x - 4$ for $-4 \leq x \leq 3$.




[3]

(c). Use your graph to solve $x^2 + x - 4 = 0$.

**x =** _____ or x = _____ **[2]**

(d). On the same grid, draw the graph of $y = -2x - 1$ for $-4 \leq x \leq 3$.
You may use the table if you wish.

| | | | |
|---|---|---|---|
| $x$ | $-4$ | | |
| $y$ | 7 | | |

**[3]**

(e). Use your graphs to solve the equation $x^2 + x - 4 = -2x - 1$.

**x =** _____ or x = _____ **[2]**

36.

Solve.

$x^2 - 6x + 15 = 3x - 5$

$x =$ _____ or x = _____ **[4]**

37. Solve this equation algebraically.
Give your solutions correct to 2 decimal places.

$3x^2 + 5x - 1 = 0$

$x =$ _____ or $x =$ _____ **[4]**

END OF QUESTION PAPER

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 1 | a | | [+]5 –5 | 2 | **M1** for $x^2 = 25$<br>If zero scored **SC1** for 5 seen as answer | |
| | b | | [$x$ =] 2 [$y$ =] –1 | 3 | **M1** for eliminating one variable<br>**M1** for correct substitution of *their* $x$ or $y$ | |
| | | | **Total** | **5** | | |
| 2 | | | Alexander = 120 (minutes)<br>Reiner = 180 (minutes)<br>Wim = 90 (minutes) | 4 | **M1** for any two correct expressions, e.g $r = 2w$, $a = w + 30$, $a + r + w = 390$<br>**M1** for equating one variable, e.g. $w + 30 + 2w + w = 390$ **oe**<br>**A1** for solving for one variable, e.g. $w = 90$ **oe** | |
| | | | **Total** | **4** | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 3 | | | (3, –4) **nfww** | 3 | **M1** for equating coefficients of $x$ or $y$, correct or FT their rearranged eqn in (a)<br>eg $4y + 6x = 2$ or $14y + 21x = 7$<br>and $12y + 21x = 15$<br><br>**M1FT** for correctly subtracting to eliminate one unknown<br>Eg $x = 3$ or $2y = –8$ | Condone one error in each step for all M marks<br><br>For substitution method, M1 for substituting rearranged equation into second equation then M1 for rearrangement to $ax = b$ or $cy = d$<br><br><u>Examiner's Comments</u><br><br>Many candidates did not realise that the coordinates of the point of intersection would be found by solving the simultaneous equations. Those that realised this and attempted an algebraic solution usually reached the correct answer. Many candidates omitted this part completely or attempted to manipulate the equation given for line M to reach a pair of values for $x$ and $y$. Some candidates attempted to sketch the graphs, but this seldom led to any creditworthy work. |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 4 | | | $x = -2$ or $x = 4$ | 3 | **M2** for $(x + 2)(x - 4)$ seen or implied in a table<br>OR<br>**M1** for $(x \pm 2)(x \pm 4)$ seen or $(x + a)(x + b)$ where $ab = -8$ or $a + b = -2$<br>AND<br>**B1** for correct solutions FT *their* quadratic factors | Eg $(x + 8)(x - 1)$<br><br>Must be of form $(x + a)(x + b)$ [= 0] with $a \neq 0$, $b \neq 0$<br><br>Examiner's Comments<br><br>This was well answered with many candidates correctly factorising and following with the correct solutions. Those candidates who did not gain full marks usually gained two marks for the correct factorisation or for giving two solutions that followed through correctly from a factorisation with sign errors. Only a very small number of candidates used the quadratic formula rather than factorisation. |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 5 | | | $\frac{18}{8}$ oe or 2.25 oe | 3 | **M1** for $12x - 4x - 3 = 15$ oe or better<br>**M1** for $12x = 4x + 15 + 3$ oe or better<br>**M1** for $X = \frac{b}{a}$<br>from $ax = b$ ($a \neq 1$) to a maximum of 2 marks | ISW any attempt to simplify a correct answer<br><br>Examiner's Comments<br><br>This was very well answered. Most candidates correctly subtracted $4x$ from both sides and added 3 to both sides. They then divided 18 by 8 correctly. The most common errors were adding $4x$ to $12x$ give $16x$, or even dividing $12x$ by $4x$ to give $3x$, and subtracting, rather than adding, 3 to both sides. Another common error was to invert the division, so an expression in the form $ax = b$ gave an answer of $x = \frac{a}{b}$. In general the expression of division was often very poorly written down. |
| | | | Total | 3 | | |
| 6 | | | –8.5 oe | 3 | **M1** for first correct step eg $8x + 5 = 3(2x - 4)$ or better<br>**M1** for collecting *their x*'s correctly eg $8x$ – *their* $6x + 5$ = *their* $(-12)$ oe or better<br>**M1** for collecting *their* numbers correctly eg $8x$ = *their* $6x$ – *their* $12 - 5$<br>**M1** for $X = \frac{b}{a}$<br>from $ax = b$($a \neq 1$) to a maximum of 2 marks | better means finished<br><br>ISW any attempt to simplify a correct answer<br><br>Examiner's Comments<br><br>It was pleasing to see so many correct solutions set out in a logical way. Common errors were to subtract $2x$ then multiply –4 by 3 or to multiply both sides by 3 so giving $24x + 15 = 6x - 12$. |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 7 | | | [0].18 and ⁻ 1.85 | 4 | **B3** for both correct fuller solutions or one correct answer<br>or<br>**B2** for one fuller solution<br>or<br><br>**M2** for $\frac{-5 \pm \sqrt{5^2 - 4 \times 3 \times -1}}{2 \times 3}$ oe<br><br>condone one error<br>or<br>**M1** for the formula with two errors<br><br>**A1** for each correct answer | Fuller solutions are 0.180[46...] and –1.847[12...]<br><br>i.e. $\frac{-5 \pm \sqrt{37}}{2 \times 3}$ oe<br><br><u>Examiner's Comments</u><br><br>The use of the quadratic formula was the most common method but some attempted to factorise and found that impossible and then they did not complete the question. The requirement to give the answer to a given accuracy was intended as a hint to use the formula. A few tried to use the method 'completing the square' but not one correct solution has been seen. The substitution into the formula was generally good. Some gave the value of *c* as 1 rather than –1 resulting in the square root of 13 instead of 37. Others had short fraction or square root lines. Most gave answers to 2 d.p. with –1.84 as a common error in that process. |
| | | | Total | 4 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 8 | | | $(\frac{1}{2}, -\frac{1}{2})$ and $(^{-}6, ^{-}33)$ | 6 | **M2** for $2x^2 + 11x - 6 = 0$ or<br>**M1** for $2x^2 + 16x - 9 = 5x - 3$ soi<br><br>and<br>**M2FT** for $(2x - 1)(x + 6)$<br>or<br>**M1FT** for two linear factors which give two correct terms,<br>or<br>use of quadratic formula award (**FT** *their quadratic equation* equal 0)<br>**M2FT** for the correct use of the formula condoning one error<br>or<br>**M1FT** for the formula with two errors<br><br>**A1** for two correct $x$ values or a correct pair of $x$ and $y$ values<br>**A1** for two correct $y$ values | **M1** could be other way round and implied by $2x^2 + 11x - 6$ [= $y$]<br><br>FT their quadratic equation<br><br>Accept any correct method especially forming a quadratic equation in $y$.<br><br><u>Examiner's Comments</u><br><br>The candidates who were the most successful were the ones who recognised that if they wrote the two equations equal to each other they could eliminate the y variable. The most common method was to use the quadratic formula, many not realising that the equation would factorise. Unfortunately those who used the formula made errors in the substitution. The most successful method was those who factorised. The greatest misconception came from those who thought they were solving two linear simultaneous equations, trying to incorrectly equate coefficients of $x$ rather than eliminate the $y$ by subtraction. The method of the substitution of $x$ into initial equation was rarely seen and none of these attempts ever led to a correct solution. Few attempted to check their answers. |
| | | | Total | 6 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 9 | | | 7<br><br>–7 | 1<br><br>1 | | Accept ±7 for 2 marks<br><br><u>Examiner's Comments</u><br><br>It was common to see only the positive square root of 49 being considered. |
| | | | Total | 2 | | |
| 10 | | | 5 and –5 | 3 | **B2** for one of these<br>Or **M1** for $x^2 = 25$<br><br>Or **B1** each for embedded answers | |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 11 | | i | 0.75 | 4 | oe, nfww; isw wrong conversion after ¾<br><br>**M1** for $6x - 2$ [$= 10x - 5$] oe<br><br>and **M2** for $3 = 4x$ oe or FT or **M1 FT** for collecting $x$s or numbers correctly FT on opposite sides of equation<br><br>and **M1FT** for *their* final answer FT *their* $ax = b$, dep on at least M1 already earned, for $a \neq 0$ or 1 and $b \neq 0$ (isw wrong conversion) | for dealing with brackets correctly, or division by 2: [$3x - 1 =$] $5x - 2.5$ oe<br><br>award a max. of M3 if answer is not correct |
| | | ii | 8 or –8 (both required) | 3 | **B2** for one solution or for $x = \pm\sqrt{64}$<br>or **M1** for $x^2 = 64$ or for $(x - 8)(x + 8)$ [$= 0$]<br><br>**or SC1** for $8^2 = 64$ or $8^2 - 4 = 60$<br>**and SC1** for $(-8)^2 = 64$ or $(-8)^2 - 4 = 60$<br><br>**Examiner's Comments**<br><br>Nearly all candidates made a reasonable attempt at solving the equations. In solving the linear equation, most expanded the brackets correctly, but some made errors when collecting terms, although most had one side correct. A good number reached the correct solution of x = 3/4, but some after successfully obtaining 4x = 3 gave a final answer of 4/3 or equivalent. In the last part, quite a few candidates correctly gave both roots 8 and –8, but just giving 8 was more common. | |
| | | | Total | 7 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 12 | | | $x = -1$ oe<br>$y = 5$<br>nfww | 3 | **M1** for multiplying one (or both) equation(s) to get either coefficient equal (allow 1 error)<br>eg<br>$x + 3y = 14$ or $6x + 3y = 9$ $\quad 2x + 6y = 28$ or $2x + y = 3$<br><br>**A1FT** for either $x$ or $y$ correct oe isw<br>$y = 5$ or $x = -1$<br><br>Or if substitution used<br>**M1** for rearranging and attempt at substituting<br>eg $x + 3(3 - 2x) = 14$ or $2(14 - 3y) + y = 3$ or better (allow 1 error) then **A** mark as above<br><br>**Examiner's Comments**<br><br>This was a comparatively straightforward simultaneous equation question, as only one of the equations had to be multiplied, and consequently it was well done. Few were not able to score at least M1 but the A1 was sometimes lost, usually due to incorrectly adding to eliminate one variable. Other errors included giving $x = 1$ following $5x = -5$. A few weaker candidates attempted trial and improvement. | If no more than 1 error in multiplication (and no errors in addition/subtraction) follow through for a maximum of **2** marks<br><br>If separate attempts made to eliminate $x$ and $y$ mark to the candidate's benefit<br>Allow FT if exact or correct to at least 2sf<br><br>Correct $x$ or $y$ with no working implies **M1A1**<br><br>Correct answer with no working scores **3** |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 13 | a | | $x = 0.5 \rightarrow 0.7$<br>$y = 2.6 \rightarrow 2.8$ | 1 | Examiner's Comments<br><br>The majority of answers were correct as candidates recognised that they were looking at the point of intersection of the 2 relevant lines. A number of candidates successfully solved the simultaneous equations to give correct fractions. Others, who attempted this method, were unable to proceed very far. | Accept fractions with in given range |
| | b | | $x = 1.1 \rightarrow 1.4$<br>$y = 4.6 \rightarrow 4.9$ | 2 | M1 for $2x + 2y = 12$ ☐ $x + y = 6$<br>or indication they are using $y = 3x + 1$ and $x + y = 6$ or for one correct value<br><br>Examiner's Comments<br><br>This was less successful as candidates did not realise that the second given equation was the third line drawn on the diagram – extra lines were sometimes seen drawn on the diagram. A number of candidates found coordinates of the correct point of intersection but then doubled their answers to 'compensate' for having divided 2x + 2y = 12 to give x + y = 6 at the start. | Accept fractions with in given range |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 14 | | | $x = 1.4$ $y = –0.3$ | 3 | **B2** for one value correct or for answers reversed<br>OR<br>**M1** for equalising $x$ or $y$ coefficients<br>**M1** for correctly adding or subtracting *their* equations soi<br>OR<br>**M1** for correct rearrangement into $x =$ or $y =$ **M1** for correct substitution<br><br>**Examiner's Comments**<br><br>Though there was some improvement shown in the solution of simultaneous equations, many still struggle with the basic algebra required. Invariably candidates could equalise coefficients of $x$ or $y$ but there was much confusion in the addition or subtraction of the ensuing equations. Though other approaches were seen, they too often failed due to poor algebraic skills. | Allow one error or omission<br>Allow one error or omission<br><br>Allow one error or omission<br>Allow one error or omission |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 15 | a | | …, 2, 0, …, …, 6 | 2 | **B1** for 2 values correct<br><br>**Examiner's Comments**<br><br>Many candidates correctly found the missing values in the table, often using the symmetry of the values to help them. –6 and –2 were common wrong *y* values for the two negative *x* values, possibly due to the incorrect use of the calculator or incorrect arithmetic. | |
| | b | | *Their* 6 points correctly plotted<br><br>Curve through *their* 6 points | 2FT<br><br>1FT | **B1** for 4 of *their* points correctly plotted<br><br>Curve must go below *x* -axis. Not too 'hairy'<br><br>**Examiner's Comments**<br><br>Though points were plotted accurately, the joining of them with a smooth curve was less well done. This was particularly the case between (–1, 0) and (0, 0) where the join was often a horizontal line. | ± ½ small square<br><br>± ½ small square |
| | c | | 1.2 to 1.4 and –2.2 to –2.4 | 2 | **B1** for one value correct<br><br>**Examiner's Comments**<br><br>Many candidates gave one solution only, usually the positive one. | |
| | d | | Ruled graph of $y = x + 2$<br><br>$x = 1.3$ to $1.5$ $y = 3.3$ to $3.5$ | M1<br><br>B1 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| | | | $x = -1.3$ to $-1.5$ $y = 0.5$ to 0.7 | B1 | After **B0**, allow **SC1** for any two of the four values correct and in correct place or for both pairs correct but answers reversed<br><br>Examiner's Comments<br><br>This was not answered well. Few knew to draw a straight line onto the graph and find the points of intersection with the curve. Many used algebra to find the values. Of those who did find values of *x*, many misread the vertical scale when finding the y values. | |
| | | | Total | 10 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 16 | | | –0.21 and –4.8 | 3 | **B3** only after using quadratic formula<br>Or **B2** for one value correct or for –0.20871.. and –4.7912.. rot<br>Or M1<br>$\frac{-5 \pm \sqrt{(5^2 - 4 \times 1 \times 1)}}{2 \times 1}$<br>or for $(x + 2.5)^2 - 6.25 + 1$ oe<br><br>**Examiner's Comments**<br><br>The quadratic formula was well known and could be used successfully. However, few scored full marks as they were unable to give their answers to the required level of accuracy. Most often, both answers were given to either one or two decimal places. Common errors that did arise included having $x$ in the formula or writing the value of a as zero. Less aware candidates tried to factorise the expression and others tried to 'complete the square', with little success. | **B2** or **M1** available after using complete the square |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 17 | a | | .., .., –1, .., .., 8 | 2 | **B1** for one value correct | |
| | b | | *their* 6 points correctly plotted<br><br>U shaped curve through *their* six points | 1<br><br>1 | ± ½ small square<br><br>Within ½ small square of each point | |
| | c | | $x$ = 1.55 to 1.7 $y$ = –0.9 to –0.6<br><br>$x$ = 4.3 to 4.6 $y$ = 4.6 to 5.2 | 1<br><br>1 | After zero : **SC1** for two correct $x$ values<br><br>**Examiner's Comments**<br><br>Very few candidates lost any marks in the first two parts of this question. Values were calculated correctly for the table, points were plotted correctly and, in general, the curve was drawn with care. Though there were many correct answers in part (c), there were also several problems. Some did not know what the question required, some misread the scales and others confused the $x$ and $y$ values. A surprising number mislaid the minus sign when transferring –0.8 into the answer space. | |
| | | | Total | 6 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 18 | a | | $(x + 5)(x – 3)$ final answer | 2 | **B1** for $(x \pm 5)(x \pm 3)$ seen | |
| | b | | –5, (+)3 | FT1 | FT from *their* 2 brackets only | |
| | c | | $\frac{x+5}{x+3}$ final answer | 2 | **B1** for $(x + 3)(x – 3)$ seen<br><br>**Examiner's Comments**<br><br>Part (a) was very often correct. Occasionally, the signs in the brackets were wrong or it was treated as an equation and solutions were found. Less aware candidates only factorised the letter parts of the expression and wrote $x(x + 2)– 15$.<br>Whilst many gave the two correct values, a number only gave the positive solution. Some candidates failed to realise the significance of the word 'hence' and started again, using trial and improvement or the quadratic formula. Better candidates knew to factorise $x^2 – 9$ first, though a significant number 'cancelled' the $x^2$ terms either leaving $\frac{2x-15}{-9}$<br><br>as their answer or going further with spurious cancelling. | |
| | | | Total | 5 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 19 | | | Shouldn't multiply 7 by 2 oe<br><br>Should be 14 + 2 oe<br><br>Should be 12 ÷ 6 oe | 1<br><br>1<br><br>1 | Multiplied 7 by 2 (which is wrong)<br><br>He did 14 – 2 (which is wrong)<br><br>He did 6÷12 (which is wrong)<br><br>**Examiner's Comments**<br><br>It was common to see the three errors correctly identified and clearly explained. Some, who failed to find all three errors, resorted to 'the answer is wrong, it should be 1½'. | Any order. Any correct statement,<br><br>no contradiction. |
| | | | **Total** | **3** | | |
| 20 | | | ± 4 | 3 | **B2** for answer (+)4 or answer –4<br>or for (±) $\sqrt{16}$ seen<br>or for $(x – 4)(x + 4)$ [=0]<br>Or **M1** for $x^2 = 16$<br>Or for $x^2 – 16$ [=0]<br><br>**Examiner's Comments**<br><br>Most reached $x = 4$ with only the better candidates giving both solutions. | |
| | | | **Total** | **3** | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 21 | | | –3.73 and –0.273 | 3 | **B2** for one value correct<br>Or **SC2** for –0.26794919 rot and –3.7320508 rot both seen<br><br>Or **M1** for<br>$\frac{-4 \pm \sqrt{(4^2 - 4 \times 1 \times 1}}{2 \times 1}$ oe<br><br>Or for $(x + 2)^2 - 4 + 1$ [=0]<br><br>**Examiner's Comments**<br><br>Many recognised that either the quadratic equation formula or completing the square was needed for the solution of this equation. These, in general, performed the process well and usually obtained the required solutions. Some errors occurred in the application of the quadratic equation formula. These included not having both + and – , only dividing the discriminant by 2*a* and incorrect arithmetic in its evaluation. A small number forgot to round their answers to two decimal places. | Both rot to at least 1 decimal place |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 22 | | | Attempt to equate or subtract | M1 | ***Mark best attempt*** | Attempt to rearrange for $y$ |
| | | | $x^2 + 4x - 12$ [= 0] | A1 | FT for *their* 3 term quadratic – **not** the original | and sub<br>$y^2 - 6y - 55$ [=0] |
| | | | $(x + 6)(x - 2)$ | M2FT | Or for<br>$\frac{-4 \pm \sqrt{(4^2 - 4 \times 1 \times -12)}}{2 \times 1}$<br>oe<br>Or for $-2 \pm \sqrt{16}$<br><br>Or **M1FT** for $(x \pm 6)(x \pm 2)$ seen<br>or for $4^2 - 4 \times 1 \times -12$ seen<br>or for $(x + 2)^2 - 4 - 12$ [=0] | $(y - 11)(y + 5)$ |
| | | | $x = -6$ and $x = 2$ | B1 | After B0 | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| | | | $y = -5$ and $y = 11$ | B1 | SC1 for one correct x,y pair<br><br>Examiner's Comments<br><br>Candidates produced a large number of well set out, succinct solutions to these simultaneous equations. They equated the two expressions in $x$, collected the terms into a quadratic equation and solved, usually by factorising. More adventurous candidates tried to rearrange the linear equation for $y$ and then substituted into the quadratic equation. This approach was rarely successful. Some started by subtracting the two equations but this method was more prone to error. Weaker candidates tried to use linear simultaneous equations techniques, trying to eliminate the $6x$ by multiplying the second equation by 3. Almost inevitably these forgot to multiply the $y$ also by 3. A number of candidates resorted to trial and improvement methods to find a solution, sometimes successfully. | $y = -5$ and $y = 11$<br>$x = -6$ and $x = 2$ |
| | | | Total | 6 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 23 | | | 4.5 | 3 | nfww<br>**M1** for eliminating fraction and expanding bracket<br><br>$3x - 1 = 5x - 10$<br><br>AND<br>**M1** for collecting terms **FT**<br><br>$^{-}1 + 10 = 5x - 3x$<br>AND<br><br>**M1** for $x = \frac{b}{a}$ after $ax = b$ seen<br>**max 2 marks if answer incorrect**<br><br>**Examiner's Comments**<br><br>In part (a) those candidates who attempted to eliminate the denominator first were usually able to make some progress with the solution and gain some credit, even if they made errors in their working. After an incorrect multiplication, the further manipulation of collecting terms and solving $ax = b$ was carried out well, although mistakes in handling negative numbers were seen. Those candidates who attempted to collect terms before removing the fraction usually failed to show anything that was worthy of credit. | condone $3x - 1 = 5x - 2$<br>or $3x - 1 = x - 10$<br>or $0.6x - 0.2 = x - 2$ for M1<br><br>correct collection from $ax + b = cx + d$ to $ax - cx = d - b$<br><br>$a \neq 1$ or 0 and $a \neq b$ and $b \neq 0$ |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 24 | | | $x = {}^{-}0.75$, $y = 8$<br>$x = 2$, $y = {}^{-}3$ | 6 | **M2** for $4x^2 - 5x - 6$ or $6 + 5x - 4x^2$ **soi**<br>OR<br>**M1** for attempting to equate e.g. $5 - 4x = 4x^2 - 9x - 1$ **oe**<br><br>**AND**<br><br>**M2** for correctly factorising *their* quadratic<br>$(4x + 3)(x - 2)$<br><br>OR<br>**M1** for $(4x \pm 3)(x \pm 2)$<br><br>**AND**<br><br>**A1** for $x = 2$ and ${}^{-}0.75$<br>**A1** for $y = {}^{-}3$ and 8<br><br>After **A0** , allow **SC1** for one pair of $x$ and $y$ values correct<br>Or for both $y$ values correctly **FT** their $x$ values substituted into $y = 5 - 4x$<br><br>**Examiner's Comments**<br><br>Some excellent solutions to this question were seen, clearly and economically set out, with accurate work throughout. It was pleasing to see many candidates correctly factorising their quadratic equation rather than attempting to use the formula to solve it on this non-calculator paper. Those candidates who made good attempts at the question knew that the initial two equations should | Or $y^2 - 5y - 24$<br><br>reaching quadratic equation in one variable, need not be simplified<br><br>dependent on at least M1<br>e.g. $(y + 3)(y - 8)$<br>Or for correct **FT** substitution into formula<br><br>with $\frac{5 \pm \sqrt{25 + 96}}{8}$ or better<br><br>seen e.g. $\frac{5 \pm 11}{8}$<br><br>dependent on at least M1<br>Or for attempt to use formula with no more than one error<br><br>allow A marks if solutions clear in working, transferred to wrong places on answer lines |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| | | | | | be equated and rearranged to reach a quadratic equation and this was often done correctly. Some then could not solve this, or made errors, particularly with the signs of the solutions, however they could recover a mark for correctly substituting these solutions to find the values of *y*.<br>Some candidates however were misled by the word 'simultaneous' and tried to eliminate *x* by multiplying the first equation by 4 and the second by 9, failing to realise that they would be left with terms in *y* as well as $x^2$. Alternatively they tried to square the linear equation to give them two equations involving $x^2$. Any trial and error methods usually failed to reach any correct solution. | |
| | | | Total | 6 | | |
| 25 | | | $\frac{-14}{4}$ or $\frac{14}{-4}$ or $^{-}3.5$ oe isw | 3 | **M1** for $5x - x + 17 = 3$ or better<br>**M1** for $5x = x + 3 - 17$ or better<br>**M1** for $x = b/a$ after $ax = b$ ($a \neq 1$) to a maximum of 2 marks<br><br>**Examiner's Comments**<br><br>The x's should be combined by subtraction but some added them and in the same way they dealt with the numbers so the equation was simplified to $6x = 20$ instead of $4x = -14$. | ie collecting x's on one side ie collecting numbers on another side |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 26 | | | 5.5 oe | 3 | **M1** for $7x - 3x + a = b$ oe or better ie correctly combining $x$ 's<br>**M1** for $cx = 20 + 2 + dx$ oe or better ie correctly combining numbers<br>**M1** for $x = f / e$ oe or better after $ex = f$ ($e$ not 1)<br>to a maximum of 2 marks<br><br><u>Examiner's Comments</u><br><br>The collection of terms and numbers was usually done successfully; however, 18 was a common result on the right-hand side in some responses. There was some careless division such as $\frac{22}{4} = 4.5$. Most attempts used algebraic manipulation, which is pleasing to see. | |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 27 | | | [*x*=] 3 and [*y*=] 5 with correct algebraic working | 3 | **M1** for multiplying one or both equations to get equal coefficients with at most one error in each operation<br>**M1** for correctly choosing the operation to eliminate one variable and adding or subtracting their equations with at most one error<br>Accept any correct method, if substitution:<br>**M1** for rearranging one equation to get x or y as the subject, allowing one error<br>**M1** for substituting their expression into the other equation, allowing one error<br><br>If **0** scored then **SC1** for both answers correct and no algebraic working<br><br><u>Examiner's Comments</u><br><br>Almost all candidates attempted to equate coefficients by multiplying one equation by a scalar, with most correctly dealing with all three elements of the respective equation. The elimination of a variable proved challenging for some and a number chose the wrong operation, however there were the usual errors in dealing with negative numbers. Candidates that equated the coefficient of *y* were usually more successful than those that equated the coefficient of *x* in their elimination. Relatively few attempted to use substitution but usually good manipulation of the equations was seen and any errors made involved | e.g. two of the three terms in each operation must be correct and these terms define the operation<br><br>mark best attempt |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| | | | | | dealing with the directed number or the bracket manipulation. It seems as though fewer candidates have used trial and improvement this time. | |
| | | | Total | 3 | | |
| 28 | | | 3.5 or $3\frac{1}{2}$ or $\frac{7}{2}$ oe | 3 | **B1** for 12 $x$ – 18 or 2 $x$ – 3 = 4<br>**M1** for *their* 12 $x$ = 24 + *their* 18 or better<br>**M1** for $ax = b$ leading to $x = b/a$ ($a \neq 1$) to a maximum of 2 marks<br><br>Examiner's Comments<br><br>This was answered well. The errors were to incorrectly multiply the brackets out, getting 12$x$ – 3, or incorrectly manipulating the equation, usually subtracting the 18 from 24 instead of adding it. | |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 29 | | | ($x$ =) 4<br>($y$ =) $^{-}$1<br>with an algebraic solution | 4 | **M1** for multiplying first equation correctly e.g. $15x - 6y = 66$, allow one error<br>**M1** for multiplying second equation correctly e.g. $4x + 6y = 10$, allow one error<br>**M1** for adding or subtracting the equations appropriately, allow one error<br><br>mark best attempt<br>if 0 scored **SC1** for correct answers with little or no supporting algebraic work<br><br><u>Examiner's Comments</u><br><br>Many gained credit because the method is clearly well known, however there were errors in working them out, particularly if the coefficients of $x$ were made equal as then the subtraction involved negative numbers. The easier way was to equate the coefficients of $y$ and then add, as fewer errors were made using this method. Few candidates checked their solution and that would have highlighted errors. Candidates who make errors also seem unable to find them and rectify them, there was evidence of multiple attempts all making the same error. | substitution:<br>**M1** for rearranging one equation to make $x$ or $y$ the subject, allow one error<br>**M1** for substituting correctly into the other equation<br>**M1** for rearranging to get the value of $x$ or $y$, allow one error |
| | | | Total | 4 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 30 | | | $\frac{8}{5}$<br>1.6 or $\frac{8}{5}$ oe | 3 | M1 for $x = 4(2 - x)$ or better eliminating fraction<br>And<br>M1 for $x + 4x = 8$ or better<br>FT Collecting $x$ terms<br><br>AND<br>M1 for $x = \frac{b}{a}$ after $ax = b$ seen<br><br>**Max 2 marks if answer incorrect**<br><br>**Examiner's Comments**<br><br>This part was found to be more of a challenge. Candidates who attempted to eliminate the fraction first were generally more successful than those who collected the $x$ terms first. In the elimination of the fraction it was common for candidates to multiply only one of the terms by 4, usually the 2 which often led to a final answer of $x = 4$. Again, if correct algebraic steps were seen at any stage in the solution, method marks could be awarded and many candidates gained at least one mark for the final step. | Alternative method for first two M marks<br>M1 for $\frac{x}{4} + x = 2$ or better<br>And<br>M1 for $\frac{5x}{4} = 2$<br><br>$b \neq 0$, $a \neq 1$<br>Accept improper fraction or correct 3 s.f. decimal<br>ISW for incorrect conversion of improper fraction |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 31 | | | $-\frac{5}{3}$oe | 3 | M1 for eliminating fraction $5(2x + 3) = x$<br>M1FT for collecting *their x* terms on one side, *their* constants on other dependent on equation with *x* terms on both sides<br>$10x - x = -15$<br><br>M1FT for $x = \frac{b}{a}$ after $ax = b$ seen<br><br>**max 2 marks if answer incorrect**<br><br>**Examiner's Comments**<br><br>Some clear and correct algebra was seen. Candidates who began by eliminating the fraction often reached the correct result, although some errors in signs were seen when collecting like terms. Candidates are expected to give the exact solution to the equation, so in this case a fraction was more appropriate although answers given using recurring decimal notation or correct to three | ISW incorrect simplification of fraction<br><br>after $x = -\frac{15}{9}$ oe seen<br><br>First two method marks may be awarded in reverse order, with elimination mark awarded for reaching single fraction eg<br><br>M1 for $2x - \frac{x}{5} = -3$<br><br>M1FT for $\frac{9x}{5} = -3$<br><br>$a \neq 1$ or $-1$, $b \neq 0$, but may be products in $ax = b$<br>If decimal, correct to 3sf or better Condone –1.67 or better for final answer |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| | | | | | significant figures were accepted. Some candidates attempted to eliminate the fraction but only multiplied one of the terms on the left-hand side by 5. Method marks were awarded for correct algebra seen, so a correct solution of the resulting equation could gain partial credit. Weaker candidates attempted solution using trial and improvement which was generally unsuccessful. | |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 32 | | | 1.25 and –2.92 | 3 | **M2** for $\frac{-5 \pm \sqrt{5^2 - 4 \times 3 \times -11}}{2 \times 3}$<br><br>or $\frac{-5 \pm \sqrt{157}}{6}$ seen<br><br>or for 1.25 or –2.92 as final answer<br>or for final answer 1.3 and –2.9<br>or for both solutions seen rounded or<br>truncated to 2dp or more<br><br>OR<br>**M1** for use of formula with two errors<br>or $\frac{-5 \pm \sqrt{k}}{6}$<br><br>or one solution seen to 2dp or more<br><br>**Examiner's Comments**<br><br>Many candidates attempted to use the quadratic formula to solve the equation and many substituted the values correctly. The more effective working quoted the quadratic formula, identified the values of *a, b* and *c* in the given equation before substituting them into the formula. Common errors were to omit the negative sign for the value of *c*, not to write the ± symbol in front of the square root or to use a short division line. The quadratic formula is given on the formula sheet on the paper, so candidates should be able to quote it correctly. Most candidates gave their answers to two decimal places as required | Condone formula used with one error for **M2**, examples of one error:<br><br>• *a* substituted wrongly twice<br>• short division line<br>• one error in quoted formula<br><br>but just $\frac{-5 \pm \sqrt{k}}{6}$ where k ≠ 157<br><br>implies more than one error<br><br>For completing the square method award **M2** for<br>$\left(x + \frac{5}{6}\right)^2 = \frac{11}{3} + \left(\frac{5}{6}\right)^2$ **oe**,<br><br>condoning one error<br><br>Exact solutions:<br>1.254994…, –2.92166… |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| | | | | | by the question. Some candidates attempted to factorise the equation or used trial and improvement to find a solution. Candidates who attempted to complete the square were generally unsuccessful. | |
| | | | Total | 3 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 33 | a | | $(2x – 3)(x + 4)$ oe | 2 | **M1** for any two factors that give two correct terms when expanded Correct or **FT** *their* two factors<br>If they use another method then award **B1** for both answers correct. | |
| | | | 1.5 oe and –4 | 1 | | |

**Examiner's Comments**

This part stipulates a method, so there is credit for this method as well as credit for the correct answers. Some used the quadratic formula so could not be awarded the marks for the method. Those who tried to use factors could still gain credit for a good attempt. One common error was to see a factor of (2x – 3) leading to an answer of $x = 3$, so it appears some have learned that the number at the end of the bracket is the negative of the answer.

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | | |
|---|---|---|---|---|---|---|---|
| | b | | [0].72<br><br>–1.39 | 3 | **M2** for one correct answer or $\frac{-2\pm\sqrt{2^2-4\times3\times-3}}{2\times3}$ or better<br><br>or<br>**M1** for this formula with at most two errors<br>if **0** scored allow **SC1** for answers [0].720… or [0].721 and –1.38… | for completing the square<br><br>**M1** for $(x+\frac{1}{3})^2-\frac{10}{9}$<br>**M1** for<br><br>$\sqrt{\frac{10}{9}}-\frac{1}{3}$ | |
| | | | | | **Examiner's Comments**<br><br>This part states 'correct to 2 decimal places', which should hint that this part requires the quadratic formula. Some made errors in writing down the formula and substituting the values in, the most common being the fraction line often failing to go under the whole of the numerator. | | |
| | | | **Total** | **6** | | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | | |
|---|---|---|---|---|---|---|---|
| 34 | | | $\frac{3}{10}$oe isw | 3 | M1 for correct first step e.g. $6x + 4x + 2 = 5$<br><br>M1 for $6x + 4x = 5 - 2$<br><br>or FT their $ax = b$ t $x = \frac{b}{a}$ o | Embedded answer scores M2 max<br>If not shown, M1 implied by $\pm 10x = b$ or $ax = \pm 3$<br><br>e.g. M1 for $2x = 7$ leading $\frac{7}{2}$o<br><br>to $x =$ e | |
| | | | | | **Examiner's Comments**<br><br>In part (b), the most common error was with those that reached $10x = 3$ being unable to complete the solution correctly to $\frac{3}{10}$ or 0.3. It is important to note again that showing clear steps of each stage of working is advantageous as follow through marks were available from a previous error in method, provided it was clearly shown. | | |
| | | | Total | 3 | | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 35 | a | | 8 ¯2 ¯2 8 | 2 | B1 for any 2 correct<br>Examiner's Comments<br><br>In part (a) candidates should use symmetry to avoid errors when negative numbers are substituted into quadratic expressions and when they draw the graph in part (b) they should notice the errors when it is not symmetric. Many curves did not go through the points and missed them by quite a wide margin. | |
| | b | | correct curve which dips below the line $y = -4$ | 3 | B2 for 6 or 7 points correctly plotted FT *their* table or B1 for 4 or 5 points correctly plotted FT *their* tolerance ± 2 mm for plotting and the curve through the correct points<br>Examiner's Comments<br><br>In part (a) candidates should use symmetry to avoid errors when negative numbers are substituted into quadratic expressions and when they draw the graph in part (b) they should notice the errors when it is not symmetric. Many curves did not go through the points and missed them by quite a wide margin. | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| | c | | –2.7 to –2.5 1.5 to 1.7 | 2 | B1 for each Correct answer or FT their graph \| tolerance ± 2 mm<br>Examiner's Comments<br><br>In part (c) many knew where to read the figures from the graph.<br>As with part (c) there was some incorrect reading of the scales. | |
| | d | | correct ruled line | 3 | M2 for a correct unruled line or a line of gradient ⁻2 or a line going through (0, ⁻1) or two further correct points in the table or plotted or M1 for one point correctly plotted or one further correct point in the table \| points are<br>$x$ - - - 0 1 2 3<br>3 2 1<br>$y$ 5 3 1 - - - -<br>1 3 5 7<br>tolerance ± 2 mm<br>Examiner's Comments<br><br>In part (d) they often completed the table correctly but did not know that it was a straight line so they plotted the points and connected them with a curve. | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| | e | | ⁻3.9 to ⁻3.7 [0].7 to [0].9 | 2 | B1 for each Correct answer or FT *their* straight line \| tolerance ± 2 mm<br>Examiner's Comments<br><br>In part (e) some did not know that it was the intersection of the line and the curve | |
| | | | Total | 12 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| 36 | | | 4 5 | 4 | B2 for one correct solution<br><br>OR<br><br>B1 for $x^2 - 9x + 20 = 0$<br>M2 for $(x - 4)(x - 5) = 0$ or use of the formula with at most one error<br>or<br>M1 for two factors which when expanded give two terms correctly or use of the formula with at most two errors<br><br>if 0 scored<br>SC1 for correctly factorising *their* quadratic expression<br>Examiner's Comments<br><br>In part (a) candidates needed to form a quadratic equation, equal to zero, which many did not do. The expression factorised but many used the 'formula' and errors were quite common. | |
| | | | Total | 4 | | |

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | | |
|---|---|---|---|---|---|---|---|
| 37 | | | –1.85 [0].18 | 4 | M2 for $\frac{-5\pm\sqrt{5^2-4\times3\times-1}}{2\times3}$ or better and condone one error<br><br>or<br><br>M1 for the formula with at most two errors and A1 for –1.85 or [0].18 or for both answers correct but to more than 2dp. e.g. 0.180… and -1.847… | Accept any correct algebraic method e.g. completing the square $3[x^2+\frac{5}{3}x+\frac{1}{3}]=0$<br>$3[(x+\frac{5}{6})^2-\frac{13}{36}]=0$ | |

Examiner's Comments

The clue is in the question, as the request to write answers to a degree of accuracy is usually a hint to use the 'formula' which many did do. However it is all too common to see the 'formula' used incorrectly and many candidates made errors in the calculation and some made errors in rounding their answers. A few tried to use 'trial and improvement' but this method is no longer tested and will prove extremely difficult to use in this context.

| Question | | | Answer/Indicative content | Marks | Part marks and guidance | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Total | 4 | | |