Q1. Solve the simultaneous equations

$3x + 4y = 7$
$5x - 2y = 16.$

x = ...

y = ...

(Total 3 marks)

Q2. Solve the simultaneous equations

$3x + 2y = 11$

$2x - 5y = 20$

x = ...

y = ...

(Total 4 marks)

Q3. Solve the simultaneous equations.

$2x + 3y = 0$
$x - 3y = 9$

x=..... , y = ...

(Total 3 marks)

Q4. Solve the simultaneous equations

$x^2 + y^2 = 5$

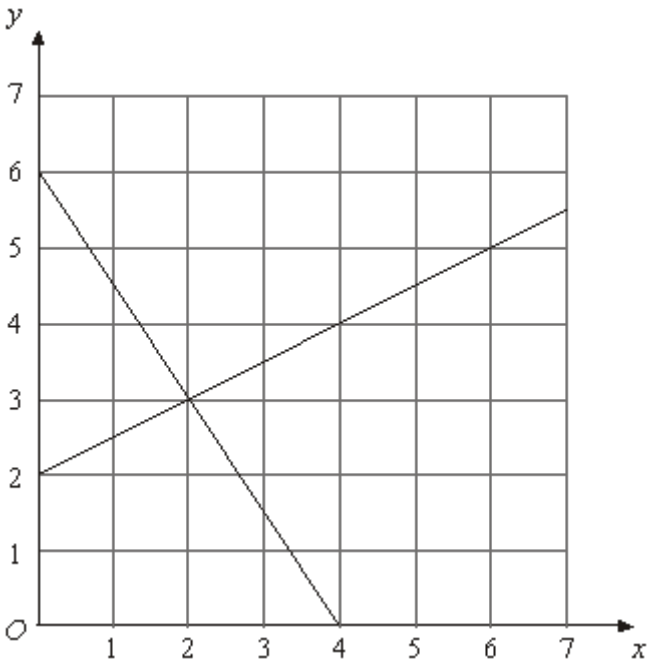
$y = 3x + 1$

x = ... y = ...

or x = ... y = ...

(Total 6 marks)

Q5.



The diagram shows graphs of $y = \frac{1}{2}x + 2$ and $2y + 3x = 12$

(a) Use the diagram to solve the simultaneous equations

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

$$2y + 3x = 12$$

x = ... y = ...

(1)

(b) Find an equation of the straight line which is parallel to the line $y = \frac{1}{2}x + 2$ and passes through the point (0, 4).

.....

(2)
(Total 3 marks)

Q6. (a) Simplify fully $(x^3)^{\frac{1}{2}} \times (x^2)^{\frac{1}{4}}$

.....

(3)

(b) Solve $(x - 1)(x + 2) = 18$

.....

(4)

(c) Solve the simultaneous equations

$y = x^2 - 1$

$y = 5 - x$

.....

.....

(5)
(Total 12 marks)

M1.

Working	Answer	Mark	Additional Guidance
$3x + 4y = 7$ $10x - 4y = 32$ $13x = 39$ $x = 3$ $3 \times 3 + 4y = 7$ $4y = -2$ $x = \frac{7 - 4y}{3}$ $10(\frac{7 - 4y}{3}) - 4y = 32$	$x = 3$, $y = -\frac{1}{2}$	3	**M1** for coefficients of × or y the same followed by correct operation, condone one arithmetical error **M1** (dep) for substituting found value in one equation **A1** cao SC: **B1** for one correct answer only if Ms not awarded **Alternative method** **M1** for rearranging one equation and substituting in other to eliminate one variable(condone one arithmetical error) **M1** (dep) for substituting found value in one equation **A1** cao
			Total for Question: 3 marks

M2.

Working	Answer	Mark	Additional Guidance
$15x + 10y = 55$ $4x - 10y = 40$ $19x = 95$ $x = 5$ $15 + 2y = 11$ $2y = -4$ $y = -2$	$x = 5$ $y = -2$	4	**M1** for correct multiplication and use of correct operation to eliminate either x or y, condone one arithmetical error **A1** for either $x = 5$ or $y = -2$ **M1** (dep) for substitution of found variable into either equation **A1** for correct value of 2nd variable **OR**

			M1 for correct rearrangement of 1 equation and substitution into 2nd **A1** for either $x = 5$ or $y = -2$ **M1** (dep) for substitution of found variable into either equation **A1** for correct value of 2nd variable **OR** **M1** for one line drawn **M1** for second line drawn **A1** for $x = 5$ **A1** for $y = -2$ (SC : If no method marks awarded, score B1 for one value correct)
			Total for Question: 4 marks

M3.

Working	Answer	Mark	Additional Guidance
e.g. adding equations leads to $3x = 9$ substitute $x = 3$ into eqn(1) leads to $3y = -6$	$x = 3$	3	**M1** for adding equations or for coefficients of x the same followed by subtracting the equations condone one arithmetical error **M1** (dep) for substituting found value in one equation **A1** cao **OR** **M1** for $2(9 + 3y) + 3y = 0$, condone one arithmetic error **M1** (dep) for substituting found value in one equation **A1** cao (SC: **B1** for one correct answer only if Ms not awarded)

	Total for Question: 3 marks

M4.

Working	Answer	Mark	Additional Guidance
$y^2 = (3x + 1)^2$ $x^2 + 9x^2 + 6x + 1 = 5$ $10x^2 + 6x + 1 = 5$ $10x^2 + 6x - 4 = 0$ $2(5x^2 + 3x - 2) = 0$ $2(5x - 2)(x + 1) = 0$	$x = 0.4$ $y = 2.2$ $x = -1$ $y = -2$	6	**M1** for $(3x + 1)^2$ seen or implied by sight of $9x^2 + 1$ **A1** for $x^2 + 9x^2 + 6x + 1 = 5$ or equivalent expanded form **M1** (dep) for correct attempt to solve a 3-term quadratic equation (condone omission of = 0) **A1** for $x = 0.4$, $x = -1$ **M1** (dep on previous Ms) for sub one value of x into either equation **A1** for $y = 2.2$, $y = -2$ (correctly paired with x values) [SC: **B1** for one correct pair of solutions if M0 scored]
			Total for Question: 6 marks

M5.

	Answer	Mark	Additional Guidance
(a)	$x = 2$, $y = 3$	1	**B1** cao
(b)	$y = \frac{1}{2}x + 4$	2	**M1** for $y = mx + 4$ or $y = \frac{1}{2}x + c$, $c \neq 2$, or $\frac{1}{2}x + 4$ **A1** for $y = \frac{1}{2}x + 4$ oe

	Total for Question: 3 marks

M6.

	Working	Answer	Mark	Additional Guidance
(a)	$x^{3/2} \times x^{1/2}$	x^2	3	**B1** $x^{3/2}$ seen **B1** $x^{1/2}$ oe seen **A1** cao
(b)	$x^2 - 1x + 2x - 2 = 18$ $x^2 + x - 20 = 0$ $(x + 5)(x - 4)$	4, –5	4	**M1** Correct expantion **B1** $x^2 + x - 20 = 0$ **B1** $(x + 5)(x - 4)$ **A1** cao
(c)	$x^2 + x - 6 = 0$ $(x + 3)(x - 2)$ $x = -3$, $x = 2$	$x = -3$, $y = 8$ $x = 2$, $y = 3$	5	**M1** Sets equations equal and rearranges **B1** $x^2 + x - 6 = 0$ **B1** $(x - 3)(x + 2)$ **A2** Two correct pair of sollutions **A1** correct set of x values
				Total for Question: 12 marks

E1. The sensible way to solve this pair of simultaneous equations is to double the second and then add to get $13x = 39$, from which $x = 3$. In many cases the candidate started well and made the coefficients of y equal and opposite (or x equal and the same). After this stage however, things began to unravel, often with the wrong operation being carried out – although it was nice to see STOP (Same Take, Opposite Plus) and SSS (Same Signs Subtract) being used as mnemonics. Of course many candidates could not really make a start on the question. There was very little sign of the substitution method.

E3. A surprising number of candidates did not just simply add the equations to eliminate the terms in y. Many chose the much harder route of multiplying the second equation by 2 and then subtracting the equations. This method often produced an error in either the multiplication, e.g. $2x - 6y = 9$, and/or the subtraction, e.g. $3y - (-6y) = -3y$. Most of the candidates who were able to find a value in either x or y and were then able to substitute this value into an equation to find the value of the other variable. Only the best candidates showed any evidence of checking their answer.

E4. Very few candidates attempted to solve the pair of equations by substitution. Of those who did, many expanded $(3x + 1)^2$ incorrectly with $9x^2 + 1$ being the usual error. Correct expansion of

$(3x + 1)^2$ often led to a good solution but this was rare.

The great majority of the candidature employed trial and improvement techniques which if partly successful did sometimes lead to one solution; $x = -1$, $y = -2$, however this only ever gained one mark out of the six available.

E5. Part (a) was answered correctly by almost 60% of the candidates.

Many candidates attempted to solve the simultaneous equations using an algebraic method instead of using the graphs. Most of these attempts were unsuccessful. Part (b) was answered correctly by less than half of the candidates. Many who did not give a fully correct equation were awarded one mark for an equation with either a correct gradient or a correct intercept.