

## Questions

**Q1.**

(a) Simplify  $4m + 2m - m$

(1)

(b) Simplify  $5p \times 7$

(1)

(c) Solve  $8g = 40$

$g =$   
(1)

(d) Solve  $19 - k = 4$

$k =$   
(1)

**(Total for question = 4 marks)**

**Q2.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

(a) Expand and simplify  $(e + 3)(e - 5)$

(2)

(b) Solve  $y = \frac{2y+1}{5}$

Show clear algebraic working.

$y =$   
(3)

(c) Solve  $x^2 + 3x - 18 = 0$

Show your working clearly.

(3)

(Total for question = 8 marks)

**Q3.**

(a) Solve  $5m + 7 = 24$

$m =$   
(2)

(b) Make  $t$  the subject of  $k = \frac{t-e}{2}$

(c) Simplify  $p^8 \div p^3$

(2)

(d) Simplify  $n^0$

(1)

(e) Simplify  $(3x^2y^5)^3$

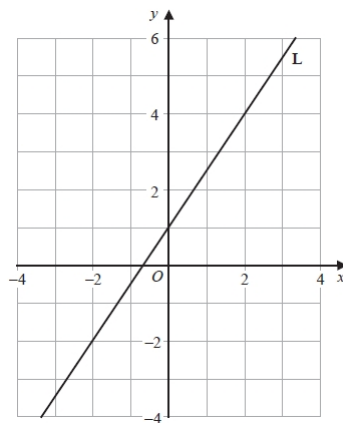
(1)

(2)

(Total for question = 8 marks)

**Q4.**

The line **L** is drawn on the grid.



Find an equation for **L**.

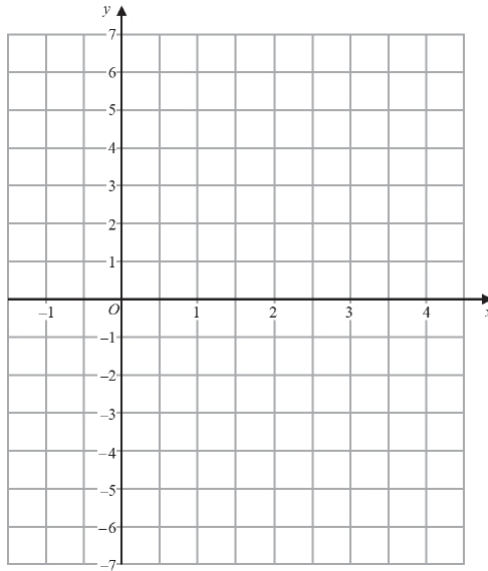
**(Total for question = 3 marks)**

**Q5.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

On the grid, draw the graph of  $y=2x - 3$  for values of  $x$  from  $-1$  to  $4$



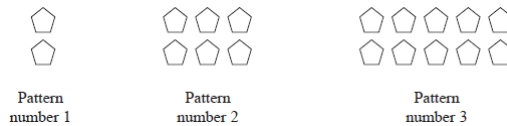
(Total for question = 3 marks)

Q6.

Write your answers in the spaces provided.

You must write down all the stages in your working.

Here is a sequence of patterns made from identical pentagons.



(a) (i) Work out the number of pentagons in Pattern number 4

(ii) Explain how you worked out your answer.

(2)

A different sequence of patterns is made from identical hexagons. The rule below can be used to find the number of hexagons in each pattern of this sequence.

Multiply the Pattern number by 5 and subtract 1

(b) Work out the number of hexagons in Pattern number 7

(1)

A pattern in this sequence has exactly 59 hexagons.

(c) Work out its Pattern number.

(2)

**(Total for question = 5 marks)**

**Q7.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

(a) Simplify  $2e - 3f + 4e - 7f$

(2)

(b) Expand and simplify  $5(4x + 3) - (3x - 1)$

(2)

(c) Factorise fully  $4p + 6pq$

(2)

**(Total for question = 6 marks)**

**Q8.**

Solve the simultaneous equations

$$\begin{aligned}4x + 5y &= 4 \\ 2x - y &= 9\end{aligned}$$

Show clear algebraic working.

$x =$   
 $y =$

(Total for question = 3 marks)

## Mark Scheme

Q1.

Question	Working	Answer	Mark	Notes
(a)		$5m$	1	B1
(b)		$35p$	1	B1
(c)		5	1	B1
(d)		15	1	B1

Q2.

Question	Working	Answer	Mark	Notes
(a)	$e^2 + 3e - 5e - 15$			M1 for 3 correct terms or for 4 correct terms ignoring signs or $e^2 - 2e + k$ for non-zero $k$ or $\dots - 2e - 15$
(b)	$5y = 2y + 1$ or $y = \frac{2y}{5} + \frac{1}{5}$ E.g. $5y - 2y = 1$ or $3y = 1$ or $3y - 1 = 0$ or $\frac{3y}{5} = \frac{1}{5}$	$e^2 - 2e - 15$	2	A1 for a correct first step M1 for collecting terms in $y$ in a correct equation
(c)	$(x+6)(x-3) = 0$ or $x(x+6) - 3(x+6) = 0$ or $x(x-3) + 6(x-3) = 0$ $(x+6)(x-3) = 0$ or for $x+6 = 0$ oe and $x-3 = 0$ oe	$\frac{1}{3}$ oe	3	A1 dep on at least M1 for $\frac{1}{3}$ oe e.g. $0.\dot{3}$ , $0.3333\dots$
		$x = -6, x = 3$	3	M1 for $(x \pm 6)(x \pm 3) = 0$ or for $(x+a)(x+b)$ with $ab = -18$ or $a+b = 3$ A1 for correct factors B1 ft dep on at least M1

Q3.

Question	Working	Answer	Mark	Notes
(a)	$5m = 24 - 7$ or $m + \frac{7}{5} = \frac{24}{5}$	3.4 oe	2	M1 A1 for 3.4 oe e.g. $\frac{17}{5}$
(b)	$2k = t - e$	$t = 2k + e$	2	M1 A1 NB: $2k + e$ only on answer line scores M1 unless $t = 2k + e$ in working and then M1A1
(c)		$p^5$	1	B1
(d)		1	1	B1
(e)		$27x^6y^{15}$	2	B2 If not B2 then B1 for any two correct terms in a product

Q4.

Question	Working	Answer	Mark	Notes
	$3 \div 2 (=1.5)$ or eg $\frac{4-1}{2(-0)}$ or $c = 1$  $y = "1.5"x + c$ or $y = mx + 1$ or eg $y - 4 = m(x - 2)$	$y = 1.5x + 1$ oe	3	M1 for correct method to find gradient or the correct value of $c$ . For gradient, may see a correct calculation, $3/2$ with evidence on diagram oe or $1.5x (+c)$ . For value of $c$ , allow $c = 1, y = 1, (L =) mx + 1$ oe  M1 for use of $y = mx + c$ with either $m$ or $c$ or for $(L =) 1.5x + 1$ (NB: $m \neq 0$ ) A1 oe eg $y - 4 = \frac{3}{2}(x - 2)$

Q5.

Question	Working	Answer	Mark	Notes
	$(-1, -5), (0, -3), (1, -1), (2, 1), (3, 3), (4, 5)$  $(-1, -5), (0, -3), (1, -1), (2, 1), (3, 3), (4, 5)$	Correct line	3	B3 for a correct line between $x = -1$ and $x = 4$  If not B3 then B2 for a line segment through at least 3 of $(-1, -5), (0, -3), (1, -1), (2, 1), (3, 3), (4, 5)$ or all points correctly plotted or a line drawn through $(0, -3)$ and with clear intention to use gradient of 2 E.g. a line through $(0, -3), (0.5, -1)$  If not B2 then B1 for at least 2 correct points stated or plotted (ignore incorrect points) or a line drawn with a positive gradient through $(0, -3)$ but not a line through $(0, -3)$ and $(2, 0)$ or a line with gradient 2

Q6.

Question	Working	Answer	Mark	Notes
(a)(i)		14	1	B1
(a)(ii)		Added 4	1	B1 Accept +4, 4 more, jumped forward by 4, difference = 4 or sight of $4n - 2$
(b)		34	1	B1
(c)	$(59 + 1) \div 5$ or $59 = 5n - 1$ or 4, 9, 14, 19, ..... 54, 59 (may start at 34 or 39)		2	M1 or for $12 \times 5 - 1$ A1

**Q7.**

Question	Working	Answer	Mark	Notes
(a)		$6e - 10f$ oe	2	M1 for $6e$ or $-10f$ A1 do not award if in incorrect attempt at simplification is seen eg $-4ef$
(b)	$20x + 15 - 3x + 1$	$17x + 16$	2	M1 for 3 correct terms A1 SC : B1 for $5x + 20$
(c)		$2p(2 + 3q)$	2	B2 If not B2 then award B1 for $2(2p + 3pq)$ or $p(4 + 6q)$ or $2p$ (a two term expression) or $x(2 + 3q)$ where $x \neq 2p$

**Q8.**

Question	Working	Answer	Mark	Notes
	e.g. $4x + 5y = 4$ $4x - 2y = 18$ with the operation of subtraction  $4x + 5y = 4$ $10x - 5y = 45$ With the operation of adding  $y = 2x - 9$ and $4x + 5(2x - 9) = 4$	$x = 3.5$ oe, $y = -2$	3	M1 for correct method to eliminate one variable – multiplying one or both equations so the coefficient of $x$ or $y$ is the same in both with the intention to add or subtract to eliminate one variable (condone one arithmetic error) or isolating $x$ or $y$ in one equation and substituting into the other equation  M1 (dep) for substitution of found variable into one equation or correct method to eliminate second variable A1 dep on M1