Q1

1

Remove the square-root sign (by squaring both sides)

$$p^2 = \frac{x+y}{5}$$

[1]

Get $x + y$ on its own (by multiplying both sides by 5)

$$5p^2 = x + y$$

[1]

Get y on its own (by subtracting x from both sides)

$$5p^2 - x = y$$

$\boldsymbol{y = 5p^2 - x}$ [1]

Q2

2

Expand the brackets (by multiplying the terms inside by 2)

$$2d - 2t = 4t + 7$$

Get the t terms on one side (for example, by adding $2t$ to both sides and collecting "like" terms)

$$2d = 4t + 7 + 2t$$
$$2d = 6t + 7$$

[1]

Get $6t$ on its own (by subtracting 7 from both sides)

$$2d - 7 = 6t$$

[1]

Get t on its own (by dividing both sides by 6)

$$\frac{2d-7}{6} = t$$

$\boldsymbol{t = \frac{2d-7}{6}}$ [1]

$t = \frac{7-2d}{-6}$ is also accepted

Q3

3

Remove the square-root sign (by squaring both sides)

$$v^2 = \frac{2E}{m}$$

[1]

Move m out of the denominator (by multiplying both sides by m)

$$mv^2 = 2E$$

[1]

Get m on its own (by dividing both sides by v^2)

$\boldsymbol{m = \frac{2E}{v^2}}$ [1]

Q4

4

Get $3p^2$ on its own (by adding 4 to both sides)

$$y + 4 = 3p^2$$

[1]

Get p^2 on its own (by dividing both sides by 3)

$$\frac{y+4}{3} = p^2$$

Get p on its own (by taking square roots of both sides and writing ±)

$$\pm\sqrt{\frac{y+4}{3}} = p$$

attempt to square root [1]

$\boldsymbol{p = \pm\sqrt{\frac{y+4}{3}}}$ [1]

Q5

5

Remove the square-root sign (by squaring both sides)

$$m^2 = \frac{k+1}{4}$$

[1]

Get $k + 1$ on its own (by multiplying both sides by 4)

$$4m^2 = k + 1$$

[1]

Get k on its own (by subtracting 1 from both sides)

$$4m^2 - 1 = k$$

$\boldsymbol{k = 4m^2 - 1}$ [1]

Q6

6

Get the m terms on to one side (for example, by adding $3m$ to both sides)

$$g = am + 5 + 3m$$

Get the m terms on their own (by subtracting 5 from both sides)

$$g - 5 = am + 3m$$

[1]

am and $3m$ are not "like" terms
Factorise m out of these two terms

$$g - 5 = m(a + 3)$$

[1]

Get m on its own (by dividing both sides by $a + 3$)

$$\frac{g-5}{a+3} = m$$

$$\boldsymbol{m = \frac{g-5}{a+3}}$$ [1]

Q7

7

Isolate the term involving c first, the $\frac{c}{y}$ term by adding $5z$ to both sides.

$$A + 5z = \frac{c}{y}$$

[1]

Isolate c by multiplying both sides by y.

$$y(A + 5z) = c$$

$$\boldsymbol{\therefore c = y(A + 5z)}$$ [1]

Equivalent expressions allowed such as $c = Ay + 5yz$.

Q8

8

Isolate the term involving f, the $\frac{1}{3}ef$ term, by squaring both sides.

$$m^2 = \frac{1}{3}ef$$

[1]

Multiply both sides by 3.

$$3m^2 = ef$$

Isolate f by dividing both sides by e.

$$\frac{3m^2}{e} = f$$

$$\boldsymbol{\therefore f = \frac{3m^2}{e}}$$ [1]

Equivalent expressions allowed such as $f = 3m^2e^{-1}$.

Q9

9

Remove the fraction by multiplying both sides by its denominator (2).

$$2s = at^2$$

[1]

Get t^2 on its own by dividing both sides by a.

$$\frac{2s}{a} = t^2$$

Square root both sides for the final answer.

$$t = \pm\sqrt{\frac{2s}{a}}$$ [1]

The ± sign is not essential but it is good practice if you are not told whether t is positive or negative.

Q10

10

Square both sides of the equation.

$$y^2 = w^3$$

Take the cube root of both sides.

$$\sqrt[3]{y^2} = w$$

$$w = \sqrt[3]{y^2}$$ [1]

If you square both sides and then multiply the powers together on the y, you will get the incorrect answer of $w = y^6$.

If you copy the operations that are initially acting on the w (cube and square root) and copy them on to the y instead, you will get the incorrect answer of $w = \sqrt{y^3}$.

If you square both sides and then add the powers together on the y, you will get the incorrect answer of $w = y^5$.

Q11

11

Start by subtracting 5 from both sides to isolate the term involving c.

$$a - 5 = \frac{b}{c}$$

[1]

Multiply both sides by c to remove the fraction.

$$c(a - 5) = b$$

[1]

To make c the subject, divide both sides by $(a - 5)$.

$$c = \frac{b}{a - 5}$$

$$c = \frac{b}{a-5}$$ [1]

Ensure that " $c =$ " is included in your final answer to gain full marks.

Q12

12

Isolate the term involving a by subtracting ut from both sides of the formula.

$$s - ut = \frac{1}{2}at^2$$

Remove the fraction by multiplying both sides by its denominator, 2.

$$2(s - ut) = at^2$$

[1]

Finally, to isolate a, divide both sides by t^2.

$$\frac{2(s - ut)}{t^2} = a$$

$$\boldsymbol{a = \frac{2(s - ut)}{t^2}}$$ [1]