

Name: _____

GCSE (1 – 9)

Changing the Subject of a Formula

Instructions

- Use **black** ink or ball-point pen.
- Answer all Questions.
- Answer the Questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each Question are shown in brackets
– *use this as a guide as to how much time to spend on each Question.*

Advice

- Read each Question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every Question.
- Check your answers if you have time at the end

4 $m = 5n + 2p$

Make p the subject of the formula.

$$\begin{array}{r} m = 5n + 2p \\ -5n \quad -5n \\ \hline m - 5n = \frac{2p}{2} \end{array}$$

$$p = \frac{m - 5n}{2}$$

$$p = \frac{m - 5n}{2}$$

(Total for question 4 is 2 marks)

5 $a = 3c - 2$

Make c the subject of the formula.

$$\begin{array}{r} a = 3c - 2 \\ +2 \quad \quad +2 \\ \hline a + 2 = \frac{3c}{3} \end{array}$$

$$c = \frac{a + 2}{3}$$

$$c = \frac{a + 2}{3}$$

(Total for question 5 is 2 marks)

6 $P = 3a + 3b$

Make a the subject of the formula.

$$\begin{array}{r} P = 3a + 3b \\ -3b \quad \quad -3b \\ \hline P - 3b = \frac{3a}{3} \end{array}$$

$$a = \frac{P - 3b}{3}$$

$$a = \frac{P - 3b}{3}$$

(Total for question 6 is 2 marks)

7 Make n the subject of $m = n^2 + 3$

$$m = n^2 + 3$$

-3 -3

$$m - 3 = n^2$$

$$n = \pm \sqrt{m - 3}$$

accept
 $n = \sqrt{m - 3}$

$$n = \pm \sqrt{m - 3}$$

(Total for question 7 is 2 marks)

8 Make a the subject of $v = u + at$

$$v = u + at$$

-u -u

$$\frac{v - u}{t} = \frac{at}{t}$$

$$a = \frac{v - u}{t}$$

$$a = \frac{v - u}{t}$$

(Total for question 8 is 2 marks)

9 Make a the subject of $v^2 = u^2 + 2as$

$$v^2 = u^2 + 2as$$

-u^2 -u^2

$$\frac{v^2 - u^2}{2s} = \frac{2as}{2s}$$

$$a = \frac{v^2 - u^2}{2s}$$

$$a = \frac{v^2 - u^2}{2s}$$

(Total for question 9 is 2 marks)

10 Make b the subject of $a = \sqrt{\frac{b+2}{5}}$

$$a^2 = \left(\sqrt{\frac{b+2}{5}} \right)^2$$

$$5 \times a^2 = \frac{b+2}{5} \times 5$$

$$5a^2 = b+2$$

-2 -2

$$5a^2 - 2 = b$$

$$b = 5a^2 - 2$$

(Total for question 10 is 3 marks)

11 Make b the subject of $A = 3b + 9$

$$A = 3b + 9$$

-9 -9

$$\frac{A-9}{3} = \frac{3b}{3}$$

$$b = \frac{A-9}{3}$$

$$b = \frac{A-9}{3}$$

(Total for question 11 is 2 marks)

12 Make x the subject of $y = 3x - 2$

$$y = 3x - 2$$

+2 +2

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

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

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

.....
(Total for question 12 is 2 marks)

13 Make x the subject of $y = \frac{1}{2}x + 6$

$$y = \frac{1}{2}x + 6$$

-6 -6

$$y - 6 = \frac{1}{2}x$$

x2 x2

$$2(y-6) = x$$

$$\text{OR } x = 2y - 12$$

$$x = 2(y-6)$$

.....
(Total for question 13 is 2 marks)

14 Make x the subject of $y = \frac{2}{5}x - 12$

$$y = \frac{2}{5}x - 12$$

+12 +12

$$y + 12 = \frac{2}{5}x$$

x5 x5

$$\frac{5(y+12)}{2} = \frac{2x}{2}$$

$$x = \frac{5(y+12)}{2}$$

$$x = \frac{5(y+12)}{2}$$

.....
(Total for question 14 is 3 marks)

15 Make x the subject of

$$5x + 6y + 12 = 0$$

$$\quad -6y \quad -6y$$

$$5x + 12 = -6y$$

$$\quad -12 \quad -12$$

$$5x = -6y - 12$$

$$x = \frac{-6y - 12}{5}$$

$$x = \frac{-6y - 12}{5}$$

(Total for question 15 is 2 marks)

16 Make x the subject of

$$y = x^3 - 5$$

$$\quad +5 \quad +5$$

$$y + 5 = x^3$$

$$x = \sqrt[3]{y + 5}$$

$$x = \sqrt[3]{y + 5}$$

(Total for question 16 is 2 marks)

17 Make x the subject of

$$y = \frac{2x + 3}{4}$$

$$\times 4 \quad \times 4$$

$$4y = 2x + 3$$

$$\quad -3 \quad -3$$

$$\frac{4y - 3}{2} = \frac{2x}{2}$$

$$x = \frac{4y - 3}{2}$$

$$x = \frac{4y - 3}{2}$$

(Total for question 17 is 3 marks)

18 Make a the subject of $x = 3(a + 9)$

$$\begin{aligned}x &= 3a + 27 \\-27 & \quad \quad -27 \\ \hline x - 27 &= 3a \\ \hline \frac{x - 27}{3} &= \frac{3a}{3} \\ a &= \frac{x - 27}{3}\end{aligned}$$

$$\text{or } a = \frac{x}{3} - 9$$

$$a = \frac{x - 27}{3}$$

(Total for question 18 is 2 marks)

19 $a = \frac{3 + c}{b}$

Make b the subject of the formula.

$$\begin{aligned}ab &= 3 + c \\ b &= \frac{3 + c}{a}\end{aligned}$$

$$b = \frac{3 + c}{a}$$

(Total for question 19 is 2 marks)

20 $d = \sqrt{\frac{3h}{2}}$

Make h the subject of the formula.

$$d^2 = \frac{3h}{2}$$

$$\frac{2d^2}{3} = \frac{3h}{3}$$

$$h = \frac{2d^2}{3}$$

$$h = \frac{2d^2}{3}$$

(Total for question 20 is 3 marks)