

Rearranging Formulae: Powers, Roots and Brackets

ANSWERS

1

Make x the subject of $y = x^2 + 3$.

$$x \rightarrow \boxed{\text{square}} \rightarrow \boxed{+ 3} \rightarrow y$$

$$x \leftarrow \boxed{\sqrt{}} \leftarrow \boxed{- 3} \leftarrow y$$

backwards: undo each step in reverse order

Answer $x = \sqrt{y - 3}$

2

Make x the subject of $y = \sqrt{x} - 6$.

$$x \rightarrow \boxed{\sqrt{}} \rightarrow \boxed{- 6} \rightarrow y$$

$$x \leftarrow \boxed{\text{square}} \leftarrow \boxed{+ 6} \leftarrow y$$

backwards: undo each step in reverse order

Answer $x = (y + 6)^2$

3

Make a the subject of $P = 2(a + b)$.

$$a \rightarrow \boxed{+ b} \rightarrow \boxed{\times 2} \rightarrow P$$

$$a \leftarrow \boxed{- b} \leftarrow \boxed{\div 2} \leftarrow P$$

backwards: undo each step in reverse order

Answer $a = \frac{P}{2} - b$

4

Make x the subject of $y = \frac{x^2}{4}$.

$$x \rightarrow \boxed{\text{square}} \rightarrow \boxed{\div 4} \rightarrow y$$

$$x \leftarrow \boxed{\sqrt{}} \leftarrow \boxed{\times 4} \leftarrow y$$

backwards: undo each step in reverse order

Answer $x = \sqrt{4y}$

5

Make x the subject of $\sqrt{x - 5} = y$.

$$x \rightarrow \boxed{- 5} \rightarrow \boxed{\sqrt{}} \rightarrow y$$

$$x \leftarrow \boxed{+ 5} \leftarrow \boxed{\text{square}} \leftarrow y$$

backwards: undo each step in reverse order

Answer $x = y^2 + 5$

6

The area of a circle is $A = \pi r^2$, where r is the radius. Make r the subject.

$$r \rightarrow \boxed{\text{square}} \rightarrow \boxed{\times \pi} \rightarrow A$$

$$r \leftarrow \boxed{\sqrt{}} \leftarrow \boxed{\div \pi} \leftarrow A$$

backwards: undo each step in reverse order

Answer $r = \sqrt{\frac{A}{\pi}}$

7

A stone dropped from a bridge falls h metres in t seconds, where $h = 5t^2$.

Make t the subject. Then find t when $h = 45$.

$$t \rightarrow \boxed{\text{square}} \rightarrow \boxed{\times 5} \rightarrow h$$

$$t \leftarrow \boxed{\sqrt{}} \leftarrow \boxed{\div 5} \leftarrow h$$

backwards: undo each step in reverse order

Formula $t = \sqrt{\frac{h}{5}}$

t 3 seconds

8

Make x the subject of $y = 2x^2 + 3$.

$$x \rightarrow \boxed{\text{square}} \rightarrow \boxed{\times 2} \rightarrow \boxed{+ 3} \rightarrow y$$

$$x \leftarrow \boxed{\sqrt{}} \leftarrow \boxed{\div 2} \leftarrow \boxed{- 3} \leftarrow y$$

backwards: undo each step in reverse order

Answer $x = \sqrt{\frac{y - 3}{2}}$

Rearranging Formulae: Powers, Roots and Brackets further practice

ANSWERS

9

Make x the subject of $y = 3x^2 - 4$.

$$x \rightarrow \boxed{\text{square}} \rightarrow \boxed{\times 3} \rightarrow \boxed{- 4} \rightarrow y$$

$$x \leftarrow \boxed{\sqrt{}} \leftarrow \boxed{\div 3} \leftarrow \boxed{+ 4} \leftarrow y$$

backwards: undo each step in reverse order

Answer $x = \sqrt{\frac{y + 4}{3}}$

10

A square paving slab has sides of s cm and an area of A cm². Write a formula for A . Make s the subject. Then find s when $A = 2500$.



$$A = s^2$$

Formula

$$s = \sqrt{A}$$

s 50 cm

11

Make x the subject of $y = (x - 3)^2$.

$$x \rightarrow \boxed{- 3} \rightarrow \boxed{\text{square}} \rightarrow y$$

$$x \leftarrow \boxed{+ 3} \leftarrow \boxed{\sqrt{}} \leftarrow y$$

backwards: undo each step in reverse order

undo square: $\sqrt{y}$, then undo $- 3$

Answer $x = \sqrt{y} + 3$

12

Ravi makes x the subject of $y = x^2 + 1$.

He writes $x = \frac{y - 1}{2}$. What has Ravi done wrong? Write the right answer.

halving does not undo squaring

Answer $x = \sqrt{y - 1}$

13

A plumber charges C pounds for a job that takes h hours, where $C = 40(h + 1)$. Make h the subject. How many hours did a job that cost £200 take?

$$h \rightarrow \boxed{+ 1} \rightarrow \boxed{\times 40} \rightarrow C$$

$$h \leftarrow \boxed{- 1} \leftarrow \boxed{\div 40} \leftarrow C$$

backwards: undo each step in reverse order

Formula $h = \frac{C}{40} - 1$

Hours 4 hours

14

Make x the subject of $y = 10 - x^2$.

add x^2 to both sides: $x^2 + y = 10$

Answer $x = \sqrt{10 - y}$

15

An object of mass m kg moving at v metres per second has a kinetic energy of E joules, where $E = \frac{mv^2}{2}$. Make v the subject.

$$v \rightarrow \boxed{\text{square}} \rightarrow \boxed{\times m} \rightarrow \boxed{\div 2} \rightarrow E$$

$$v \leftarrow \boxed{\sqrt{}} \leftarrow \boxed{\div m} \leftarrow \boxed{\times 2} \leftarrow E$$

backwards: undo each step in reverse order

Answer $v = \sqrt{\frac{2E}{m}}$

16

Is Lily right? Explain.

Lily
 $y = (x + 5)^2$ and $y = x^2 + 5$ use the same two steps, $+ 5$ and square.
So they rearrange to the same thing.

No: the order is different

$x = \sqrt{y} - 5$ and $x = \sqrt{y - 5}$