

Clive On Rearranging Formulae - Answers

Clive is tackling his rearranging formulae homework and knows that he's made mistakes somewhere.

Can you spot and correct the mistakes Clive has made?

Can you explain what mistakes Clive has made, and maybe give him some tips so that he (hopefully) doesn't make them again?

Question 1:

Rearrange the formula below to make x the subject:

$$y = 5x + 2$$

You must show each stage of your working.

Clive's answer:

$$\begin{aligned} y &= 5x + 2 \\ \text{Divide both sides by 5:} \\ \frac{y}{5} &= x + 2 \\ \text{Subtract both sides 2} \\ \text{Answer:} \\ x &= \frac{y}{5} - 2 \end{aligned}$$

Your answer:

$$\begin{aligned} y &= 5x + 2 \\ \text{Subtract both sides by 2:} \\ y - 2 &= 5x \\ \text{Divide both sides by 5} \\ \text{Answer:} \\ x &= \frac{y - 2}{5} \end{aligned}$$

What mistake has Clive made?

He has not divided everything by 5.

Question 2:

Rearrange the formula below to make t the subject:

$$v = u + at$$

You must show each stage of your working.

Clive's answer:

$$\begin{aligned} v &= u + at \\ \text{Add } u \text{ to both sides.} \\ v + u &= at \\ \text{Divide both sides by } a. \\ \text{Answer:} \\ t &= \frac{v + u}{a} \end{aligned}$$

Your answer:

$$\begin{aligned} v &= u + at \\ \text{Subtract } u \text{ from both sides.} \\ v - u &= at \\ \text{Divide both sides by } a. \\ \text{Answer:} \\ t &= \frac{v - u}{a} \end{aligned}$$

What mistake has Clive made?

He should have subtracted u instead of adding it.

Question 3:

The formula to calculate the volume of a sphere is:

$$V = \frac{4}{3}\pi r^3$$

Rearrange to make r the subject, giving your answer in its simplest form.

Clive's answer:

$$V = \frac{4}{3}\pi r^3$$

Divide both sides by $\frac{4}{3}\pi$.

$$\frac{3V}{4\pi} = r^3$$

Remove the power.

Answer:

$$r = \sqrt{\frac{3V}{4\pi}}$$

Your answer:

$$V = \frac{4}{3}\pi r^3$$

Divide both sides by $\frac{4}{3}\pi$.

$$\frac{3V}{4\pi} = r^3$$

Remove the power.

Answer:

$$r = \sqrt[3]{\frac{3V}{4\pi}}$$

What mistake has Clive made?

He has square rooted instead of cube rooting.

Question 4:

Make x the subject of the following formula, showing all your workings:

$$ax + by = c(y - x)$$

Clive's answer:

$$ax + by = c(y - x)$$

Expand the brackets.

$$ax + by = cy - cx$$

Subtract by from both sides.

$$ax = cy - cx - by$$

Divide both sides by a .

Answer:

$$x = \frac{cy - cx - by}{a}$$

Your answer:

$$ax + by = c(y - x)$$

Expand the brackets.

$$ax + by = cy - cx$$

Subtract by from both sides.

$$ax = cy - cx - by$$

Add cx to both sides.

$$ax + cx = cy - by$$

Factorise $ax + cx$.

$$x(a + c) = cy - by$$

Divide both sides by $a + c$.

Answer:

$$x = \frac{cy - by}{a + c}$$

The top of the fraction could also be factorised.

What mistake has Clive made?

You can't have the "subject" on both sides. The x needs isolating so that it doesn't appear on both sides of the formula.