

Clive On Function Notation - Answers

Clive is tackling his functions 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:

If $f(x) = 3x - 2$, find:

- a. $f(2)$
- b. $f(-2)$

Clive's answer:

Substitute $x = 2$.
Answer:
 $f(2) = 4$
 Therefore $f(-2) = -4$

Your answer:

Substitute $x = 2$.
Answer:
 $f(2) = 4$
 Substitute $x = -2$.
Answer:
 $f(-2) = -8$

What mistake has Clive made?

He hasn't substituted in $x = -2$, he has just assumed that $f(-2) = -f(2)$ which it isn't.

Question 2:

Find $g^{-1}(x)$ if $g(x) = 5x + 3$.

Clive's answer:

$g^{-1}(x)$ is the inverse of $g(x)$.
 $y = 5x + 3$
 $\frac{y}{5} = x + 3$
 $\frac{y}{5} - 3 = x$
Answer:
 $g^{-1}(x) = \frac{x}{5} - 3$

Your answer:

$g^{-1}(x)$ is the inverse of $g(x)$.
 $y = 5x + 3$
 $y - 3 = 5x$
 $\frac{y - 3}{5} = x$
Answer:
 $g^{-1}(x) = \frac{x - 3}{5}$
 This can be done using function machines.

What mistake has Clive made?

He didn't divide the 3 by 5, only y .

Question 3:

$$f(x) = 2x + 1$$

$$g(x) = \frac{5}{x+3}$$

Find $fg(7)$ *Clive's answer:*

$$f(7) = 2 \times 7 + 1 = 15$$

Substitute this answer in to $g(x)$:

$$g(15) = \frac{5}{15+3}$$

Answer:

$$fg(7) = \frac{5}{18}$$

Your answer:

We need to do $g(7)$ and substitute that answer in to $f(x)$.

$$g(7) = \frac{5}{7+3} = \frac{5}{10} = \frac{1}{2}$$

$$f\left(\frac{1}{2}\right) = 2 \times \frac{1}{2} + 1$$

Answer:

$$fg(x) = 2$$

What mistake has Clive made?

He has performed the functions in the wrong order. $fg(x)$ means that you do "f of g(x)".

Question 4:Given that $h(x) = 2x^2 - 3$, find $h^{-1}(1)$.

Leave your answer as a surd.

*Clive's answer:*Find the inverse of $h(x)$:

$$y = 2x^2 - 3$$

$$y + 3 = 2x^2$$

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

$$h^{-1}(x) = \frac{\sqrt{x+3}}{2}$$

Substitute $x = 1$ in to $h^{-1}(x)$:

$$h^{-1}(1) = \frac{\sqrt{1+3}}{2} = \frac{\sqrt{4}}{2}$$

Answer:

$$1$$

*Your answer:*Find the inverse of $h(x)$:

$$y = 2x^2 - 3$$

$$y + 3 = 2x^2$$

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

$$h^{-1}(x) = \sqrt{\frac{x+3}{2}}$$

Substitute $x = 1$ in to $h^{-1}(x)$:

$$h^{-1}(1) = \sqrt{\frac{1+3}{2}} = \sqrt{\frac{4}{2}}$$

Answer:

$$\sqrt{2}$$

What mistake has Clive made?

He has found the inverse incorrectly. He should have divided by 2 before square rooting.