

NAME: _____

Quiz 3

Calculators are not allowed. Write your answers on the dashed lines.

[40] Question 1: Solve these equations for x . Write your answer on the dashed line. If there is no solution to the equation, write "no solution" and make sure to show why this is the case in your work.

[20] • $\frac{x-1}{4} + \frac{2x+3}{-1} = 0$

$\Rightarrow \frac{x-1}{4} - (2x+3) = 0$

$\Rightarrow \frac{x-1}{4} = 2x+3 \Rightarrow (x-1) = 4(2x+3)$

$\Rightarrow x-1 = 8x+12 \Rightarrow x-8x = 12+1 \Rightarrow -7x = 13$

ANSWER: $x = -\frac{13}{7}$ _____

[20] • $\frac{1}{x-5} + \frac{1}{x+5} = \frac{2x+1}{x^2-25}$

common denominator: $x^2-25 = (x-5)(x+5)$

$$\frac{x+5}{(x+5)(x-5)} + \frac{x-5}{(x-5)(x+5)} = \frac{2x+1}{(x-5)(x+5)}$$

$$\frac{2x}{(x+5)(x-5)} = \frac{2x+1}{(x-5)(x+5)} \Rightarrow 2x = 2x+1$$

$\Rightarrow 0 = 1 \rightarrow$ not possible

ANSWER: No solution! _____

In these questions

[15] } [10] for correct initial formula
[5] for correct simplification
↳ [-2] / algebra error

[60] Question 2: If $f(x) = 1 - 2x^2$ and $g(x) = x + 1$, write down what the following combinations of functions are. Then, simplify your answers as much as possible. Show all your work.

[15] • $(f \circ g)(x) = \underline{\underline{-2x^2 - 4x - 1}}$

$$\begin{aligned} f \circ g(x) &= f(g(x)) = 1 - 2[g(x)]^2 = 1 - 2(x+1)^2 \\ &= 1 - 2(x^2 + 2x + 1) = 1 - 2x^2 - 4x - 2 \\ &= -2x^2 - 4x - 1 \end{aligned}$$

[15] • $(f \circ f)(x) = \underline{\underline{-1 + 8x^2 - 8x^4}}$

$$\begin{aligned} f \circ f(x) &= f[f(x)] = 1 - 2[f(x)]^2 \\ &= 1 - 2(1 - 2x^2)^2 = 1 - 2[1 - 4x^2 + 4x^4] \\ &= 1 - 2 + 8x^2 - 8x^4 = -1 + 8x^2 - 8x^4 \end{aligned}$$

[15] • $(g \circ f)(x) = \underline{\underline{2 - 2x^2}}$

$$g \circ f(x) = g(f(x)) = f(x) + 1 = 1 - 2x^2 + 1 = 2 - 2x^2$$

[15] • $(g \circ g)(x) = \underline{\underline{x + 2}}$

$$g \circ g(x) = g(g(x)) = g(x) + 1 = x + 1 + 1 = x + 2$$