NAME : _____

ANSWERS

Quiz 5

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

Question 1: Inverses

[15] • Are the functions $f(x) = -3x + 2$ and $g(x) = \frac{2}{3} - \frac{1}{3}x$ inverses of one another? Justify your answer.

$$f(g(x)) = -3(g(x)) + 2 = -3\left(\frac{2}{3} - \frac{1}{3}x\right) + 2$$

$$= -2 + x + 2 = x \quad \rightarrow \text{they are inverses}$$

[-5] / algebra error.

[15] • Are the functions $f(x) = x^3$ and $g(x) = 1 - x^3$ inverses of one another? Justify your answer.

$$f(g(x)) = [g(x)]^3 = (1-x^3)^3 \neq x$$

NO PARTIAL.

They are <u>not</u> inverses

[15] • If $f(x) = \frac{2x-3}{x+4}$, what is $f^{-1}(x)$? [-3 / algebra error if method is still correct]

$y = \frac{2x-3}{x+4}$ → solve for x $\quad (x+4)y = 2x-3$

$xy + 4y = 2x - 3 \qquad xy - 2x = -4y - 3$

$x(y-2) = -4y - 3$

$$x = \frac{-4y-3}{y-2} = \frac{4y+3}{2-y} = f^{-1}(y)$$

$$\rightarrow \quad f^{-1}(x) = \frac{4x+3}{2-x} \quad \text{or} \quad f^{-1}(x) = \frac{-4x-3}{x-2} \qquad \text{(either fine)}$$

[15] • If $f(x) = \frac{2x-3}{x+4}$, what is $f \circ f^{-1}(x)$?

$f^{-1}(f(x)) = x$ (it's always true for any x)

(no justification needed, just the answer).

Note: • if did it otherway, evaluating $f(f^{-1}(x))$, OK too

• Algebra error: [-5] / error.

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Question 2: Equations of lines

[20] • What is the equation of the line passing through (0,-1) which is parallel to the line $y = -\frac{3}{4}x + 3$. Draw both lines on the same graph.

[10] for line equation, [5] for each line

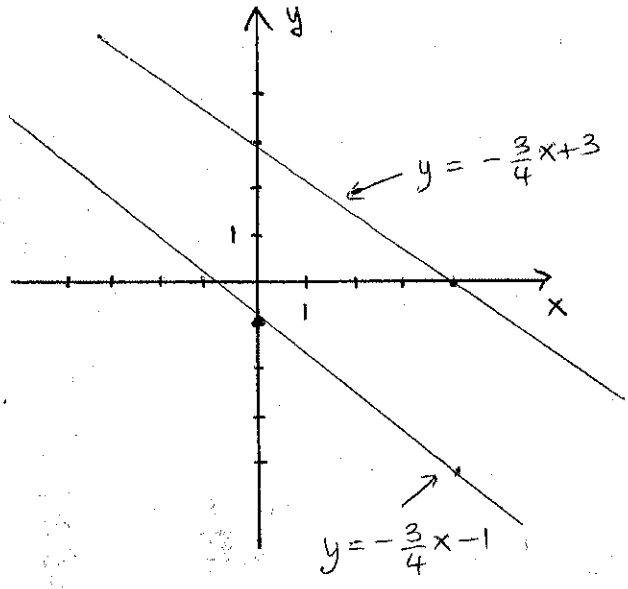
Parallel lines ⇒ same slope
so slope of new line is $-\frac{3}{4}$

Using point-slope formula

$y - (-1) = -\frac{3}{4}(x - 0)$

$y + 1 = -\frac{3}{4}x$

$\boxed{y = -\frac{3}{4}x - 1}$



[20] • What is the equation of the line passing through (3,1) which is perpendicular to the line $y = x + 2$? Draw both lines on the same graph.

[10] for line eq, [5] for each line

Two lines perpendicular ⇒
product of slopes is -1 ⇒
Slope of new line is -1

Using pt-slope formula:

$y - 1 = -(x - 3)$

$y = 1 - x + 3$

$= 4 - x$