Math 157 - Quiz 2
August 28, 2013

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (3 points) Find an equation of the line that passes through $(-2, 8)$ and is perpendicular to $5x - 4y = 8$.

$5x - 8 = 4y$

$\frac{5}{4}x - 2 = y$

$m = \frac{5}{4}$

$m_\perp = -\frac{4}{5}$

Through $(-2,8)$ w/ slope $-\frac{4}{5}$:

$y - 8 = -\frac{4}{5}(x+2)$

$y = -\frac{4}{5}x - \frac{8}{5} + 8$

$y = -\frac{4}{5}x + \frac{32}{5}$

2. (2 points) Find the slope, x-intercept, and y-intercept of the line described by $y - 4 = 6(x - 2)$.

$y - 4 = 6x - 12$

$y = 6x - 8$

$m = 6$

Y-INT IS $(0, -8)$

X-INT: $y = 0 \Rightarrow 0 = 6x - 8$

$6x = 8$

$x = \frac{8}{6} = \frac{4}{3}$

X-INT IS $(\frac{4}{3}, 0)$

3. (2 points) Find the inverse of the function $f(x) = \dfrac{x}{x-1}$.

① Range of f is $\{y : y \neq 1\}$ ← An easy way to get the range is to use your graphing calculator

$y = \dfrac{x}{x-1}$

②
$y(x-1) = x$
$xy - y = x$
$xy - x = y$
$x(y-1) = y$
$x = \dfrac{y}{y-1}$

③ Interchange y & x

To get $y = \dfrac{x}{x-1}$ or $f^{-1}(x) = \dfrac{x}{x-1}$

④ Domain of f^{-1} = Range of f

$$f^{-1}(x) = \frac{x}{x-1}, \quad x \neq 1$$

4. (3 points) Evaluate and simplify the difference quotient $\dfrac{h(x+\Delta x) - h(x)}{\Delta x}$ if $h(x) = x^2 + 3x - 2$.

$h(\ ) = (\ )^2 + 3(\ ) - 2$

$$\frac{h(x+\Delta x) - h(x)}{\Delta x} = \frac{\left[(x+\Delta x)^2 + 3(x+\Delta x) - 2\right] - \left[x^2 + 3x - 2\right]}{\Delta x}$$

$$= \frac{x^2 + 2x\Delta x + \Delta x^2 + 3x + 3\Delta x - 2 - x^2 - 3x + 2}{\Delta x}$$

$$= \frac{2x\Delta x + \Delta x^2 + 3\Delta x}{\Delta x} = \frac{\Delta x\,(2x + \Delta x + 3)}{\Delta x}$$

$$= \boxed{2x + \Delta x + 3}$$