

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 $y - 4 = 6(x - 2)$.

$$y - 4 = 6x - 12$$

$$y = 6x - 8$$

$$\boxed{m = 6}$$

$$\boxed{y\text{-int is } (0, -8)}$$

$$x\text{-int: } y = 0 \Rightarrow 0 = 6x - 8$$

$$6x = 8$$

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

$$\boxed{x\text{-int is } \left(\frac{4}{3}, 0\right)}$$

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

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

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

②

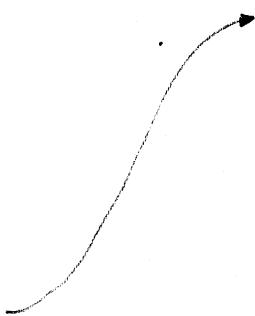
$$y(x-1) = x$$

$$xy - y = x$$

$$xy - x = y$$

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

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



③ INTERCHANGE y & x

To get $y = \frac{x}{x-1}$ or

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

④ DOMAIN OF $f^{-1} = \text{RANGE OF } f$

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

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

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

$$\begin{aligned} \frac{h(x + \Delta x) - h(x)}{\Delta x} &= \frac{[(x + \Delta x)^2 + 3(x + \Delta x) - 2] - [x^2 + 3x - 2]}{\Delta x} \\ &= \frac{x^2 + 2x\Delta x + \Delta x^2 + 3x + 3\Delta x - 2 - x^2 - 3x + 2}{\Delta x} \\ &= \frac{2x\Delta x + \Delta x^2 + 3\Delta x}{\Delta x} = \frac{\Delta x(2x + \Delta x + 3)}{\Delta x} \\ &= 2x + \Delta x + 3 \end{aligned}$$