

Math 171 - Quiz 1

August 22, 2013

Name key

Score _____

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

1. (2 points) A line passing through (2, 1) is perpendicular to $y = \frac{2}{3}x + 4$. Find the x - and y -intercepts of that line.

$$y - 1 = -\frac{3}{2}(x - 2)$$

$$y - 1 = -\frac{3}{2}x + 3$$

$$y = -\frac{3}{2}x + 4$$

$$y\text{-INT: } \boxed{(0, 4)}$$

$$x\text{-INT: } y = 0 \Rightarrow 0 = -\frac{3}{2}x + 4$$

$$-4 = -\frac{3}{2}x$$

$$8 = 3x$$

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

$$\boxed{\left(\frac{8}{3}, 0\right)}$$

2. (2 points) Solve for x : $2(x^2 - x)^2 + 4(2x - 5)(x^2 - x) = 0$

$$(x^2 - x)[2(x^2 - x) + 4(2x - 5)] = 0$$

$$(x^2 - x)(2x^2 - 2x + 8x - 20) = 0$$

$$(x^2 - x)(2x^2 + 6x - 20) = 0$$

$$(x^2 - x)(2)(x^2 + 3x - 10) = 0$$

$$x(x-1)(2)(x+5)(x-2) = 0$$

$$\begin{array}{l} x = 0 \\ x = 1 \\ x = -5 \\ x = 2 \end{array}$$

3. (2 points) Rationalize the numerator: $\frac{3 + \sqrt{x-2}}{x-11} \cdot \frac{3 - \sqrt{x-2}}{3 - \sqrt{x-2}}$

$$= \frac{9 - (x-2)}{(x-11)(3 - \sqrt{x-2})}$$

$$= \frac{-1(x-11)}{(x-11)(3 - \sqrt{x-2})}$$

$$= \boxed{\frac{-1}{3 - \sqrt{x-2}}}$$

4. (2 points) Let $y = x^2 + 2x - 4$. Find and simplify the expression for $\Delta y / \Delta x$.

$$\begin{aligned}\frac{\Delta y}{\Delta x} &= \frac{[(x + \Delta x)^2 + 2(x + \Delta x) - 4] - [x^2 + 2x - 4]}{\Delta x} \\ &= \frac{x^2 + 2x\Delta x + \Delta x^2 + 2x + 2\Delta x - 4 - x^2 - 2x + 4}{\Delta x} \\ &= \frac{2x\Delta x + \Delta x^2 + 2\Delta x}{\Delta x} = \boxed{2x + \Delta x + 2}\end{aligned}$$

5. (2 points) A line passes through $(-5, -2)$ and is parallel to $y = 4 - 5(x - 2)$. Find an equation for that line.

$$\underbrace{y = 4 - 5(x - 2)}_{m = -5}$$

$$y + 2 = -5(x + 5)$$

$$y = -5x - 25 - 2$$

$$\boxed{y = -5x - 27}$$