

Math 171 - Quiz 1

August 22, 2018

Name key

Score _____

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

1. (2 points) Rationalize the numerator: $\frac{4 - \sqrt{x}}{x + 5}$

$$\frac{4 - \sqrt{x}}{x + 5} \cdot \frac{4 + \sqrt{x}}{4 + \sqrt{x}} = \frac{16 - x}{(x + 5)(4 + \sqrt{x})}$$

2. (2 points) Find an equation of the line that passes through the points $(-1, 4)$ and $(3, 7)$.

$$m = \frac{7 - 4}{3 - (-1)} = \frac{3}{4}$$

Using $(3, 7)$...

$$y - 7 = \frac{3}{4}(x - 3)$$

- OR -

$$y = 7 + \frac{3}{4}(x - 3)$$

- OR -

$$y = \frac{3}{4}x + \frac{19}{4}$$

3. (2 points) Solve for x : $x^3 = 12x - x^2$

$$x^3 + x^2 - 12x = 0$$

$$x(x^2 + x - 12) = 0$$

$$x(x+4)(x-3) = 0$$

$$x = 0 \text{ or } x = -4 \text{ or } x = 3$$

4. (2 points) Find all solutions: $\sin 3x = \frac{1}{2}$

$$3x = \frac{\pi}{6} + 2k\pi$$

or

$$3x = \frac{5\pi}{6} + 2k\pi$$

$$\Rightarrow x = \frac{\pi}{18} + \frac{2}{3}k\pi$$

$$\Rightarrow x = \frac{5\pi}{18} + \frac{2}{3}k\pi$$

For ANY
Integer
 k

5. (2 points) Let $f(x) = 3x^2 - 2x + 5$. Simplify the expression for $\Delta y = f(x + \Delta x) - f(x)$.

$$\Delta y = f(x + \Delta x) - f(x) = [3(x + \Delta x)^2 - 2(x + \Delta x) + 5] - [3x^2 - 2x + 5]$$

$$= 3x^2 + 6x\Delta x + 3\Delta x^2 - 2x - 2\Delta x + 5 - 3x^2 + 2x - 5$$

$$= 6x\Delta x + 3\Delta x^2 - 2\Delta x$$

$$\Delta y = 6x\Delta x + 3\Delta x^2 - 2\Delta x$$