

Note: Show all work. Correct answers without support will receive at most half credit. Incorrect answers without support will receive no credit.

Name: Solution Guide.

Quiz 1

#1 Given the function:

$$f(x) = \begin{cases} \frac{1}{x} & x < 0 \\ 108 & 0 \leq x \leq 3 \\ x^2 + 2 & x > 3 \end{cases}$$

find $f(-1)$, $f(0)$, $f(2)$, $f(3)$, and $f(4)$.

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

$$f(0) = 108$$

$$f(2) = 108$$

$$f(3) = 108$$

$$f(4) = (4)^2 + 2 = 18$$

2 Write the polynomial $4x(x^2 + 3x) - (x - 2)(x + 6)$ in simplified form.

$$4x(x^2 + 3x) - (x - 2)(x + 6) = 4x^3 + 12x^2 - (x^2 + 4x - 12)$$

$$= 4x^3 + 12x^2 - x^2 - 4x + 12$$

$$= 4x^3 + 11x^2 - 4x + 12$$

#3 Let $f(x) = \frac{x+2}{3x}$. Simplify the following expressions:

- a.) $f(y-3)$
- b.) $f(3-y)$
- c.) $y - f(3)$
- d.) $f(y) - f(3)$

$$a.) f(y-3) = \frac{(y-3)+2}{3(y-3)} = \frac{y-1}{3(y-3)}$$

$$b.) f(3-y) = \frac{(3-y)+2}{3(3-y)} = \frac{5-y}{3(3-y)}$$

$$c.) y - f(3) = y - \frac{3+2}{3 \cdot 3} = y - \frac{6}{9}$$

$$d.) f(y) - f(3) = \frac{y+2}{3y} - \frac{5}{9}$$

#4 Determine the zeros and domain of the function $f(x) = \frac{\sqrt{2x+7}}{x-3}$.

Zeros:

The numerator must equal 0. Therefore,

$$\sqrt{2x+7} = 0$$

$$\Rightarrow 2x+7=0$$

$$2x = -7$$

$$x = -\frac{7}{2}$$

Domain:

First we must make sure that:

$$2x+7 \geq 0 \quad (\text{Can't take } \sqrt{\text{ of a negative number}})$$

$$\Rightarrow x \geq -\frac{7}{2}$$

Next we have to be sure that we don't divide by 0. Therefore,

$$x \neq 3.$$

Now, both of these statements must be true. So

$$\boxed{x \geq -\frac{7}{2} \text{ and } x \neq 3.}$$

Or, in interval notation:

$$D: [-\frac{7}{2}, 3) \cup (3, \infty)$$

