

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 9

Question 1. (6 marks) Find the domain, intercepts and any vertical and horizontal asymptotes of the function (state which is which):

$$f(x) = \frac{x^2 - 2}{2x^2 - 8}$$

DOMAIN: $2x^2 - 8 \neq 0$
 $x^2 \neq 4$
 $x \neq \pm 2$

\Rightarrow DOMAIN IS $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

Make sure you show your work.

$$x\text{-int! } y=0$$

$$0 = \frac{x^2 - 2}{2x^2 - 8}$$

$$0 = x^2 - 2$$

$$x = \pm \sqrt{2}$$

$$(\sqrt{2}, 0) \text{ and } (-\sqrt{2}, 0)$$

ARE x-int

$$y\text{-int! } x=0$$

$$y = \frac{0 - 2}{0 - 8} = \frac{1}{4}$$

$$(0, 1/4) \text{ IS}$$

THE y-int

$x = \pm 2$ MAKES DENOMINATOR ZERO

BUT NOT NUMERATOR

$\therefore x = 2, x = -2$ ARE THE V.A.

$$\lim_{x \rightarrow \pm\infty} \frac{x^2 - 2}{2x^2 - 8} = \lim_{x \rightarrow \pm\infty} \frac{1 - 2/x^2}{2 - 8/x^2} = \frac{1 - 0}{2 - 0} = \frac{1}{2}$$

$\therefore y = 1/2$ IS THE H.A.

Question 2. (4 marks) A stone is thrown from the roof of an 80ft building and lands five seconds later. The height (in feet) of the stone at any time t (in seconds), measured from the ground, is given by $h(t) = -16t^2 + 64t + 80$. What is the maximum height the stone reaches? (Justify your answer).

DOMAIN OF $h(t)$ IS $[0, 5]$

$$h'(t) = -32t + 64 = -32(t - 2) = 0$$

$\therefore t = 2$ IS THE C.N.

C.N

$$h(2) = -16(2)^2 + 64(2) + 80$$

$$= 144 \text{ ft}$$

END POINTS

$$h(0) = -16(0)^2 + 64(0) + 80$$

$$= 80$$

$$h(5) = -16(5)^2 + 64(5) + 80$$

$$= 0$$

\therefore THE MAXIMUM HEIGHT IS 144 ft.