NAME:______________________________

Review

DATE:________

Directions: Solve each equation. Remember to check for extraneous solutions.

1) $(\cancel{x+1})\dfrac{x^2+x-6}{\cancel{x+1}} = 6(x+1) - \dfrac{6}{\cancel{x+1}}(\cancel{x+1})$

Denom ≠ 0

$\boxed{\begin{array}{c} x+1 \neq 0 \\ x \neq -1 \end{array}}$

$x^2+x-6 = 6x+6-6$

$x^2-5x-6=0$

$(x-6)(x+1)=0$

$x-6=0 \quad x+1=0$

$x=6 \quad x\neq -1$

$X=6$

2) $\dfrac{1}{n^2+8n+12} = \dfrac{3n+2}{n+2} + \dfrac{6}{n^2+8n+12}$

Denom ≠ 0

$\boxed{\begin{array}{c|c} n+6=0 & n+2=0 \\ n=-6 & n=-2 \end{array}}$

$(\cancel{n+6})(\cancel{n+2})\dfrac{1}{(\cancel{n+6})(\cancel{n+2})} = \dfrac{(3n+2)(n+6)(\cancel{n+2})}{\cancel{n+2}} + \dfrac{6(\cancel{n+6})(\cancel{n+2})}{(\cancel{n+6})(\cancel{n+2})}$

$1 = (3n+2)(n+6)+6$

$1 = 3n^2+2n+18n+12+6$

$1 = 3n^2+20n+18$

$0 = 3n^2+20n+17$

$0 = (3n^2+3n)+(17n+17)$

$0 = 3n(n+1)+17(n+1)$

$0 = (n+1)(3n+17)$

$0 = n+1 \quad 0 = 3n+17$

$-1 = n \quad -17 = 3n$

$-\frac{17}{3} = n$

$n = -\frac{17}{3}, -1$

Directions: Simplify.

3) $\dfrac{8x^2\left(\frac{3}{8} + \frac{3}{x^2}\right)}{8x^2\left(\frac{3x}{4} - \frac{5}{x}\right)} = \dfrac{3x^2+24}{6x^3-40x}$

4) $\dfrac{(x+5)\left(2 + \frac{x}{x+5}\right)}{(x+5)\left(\frac{4}{x+5} + 1\right)}$

$= \dfrac{2x+10+x}{4+x+5}$

$= \dfrac{3x+10}{x+9}$

5) $\dfrac{3x-7}{\sqrt{x}-\sqrt{x-5}} \cdot \dfrac{(\sqrt{x}+\sqrt{x-5})}{(\sqrt{x}+\sqrt{x-5})}$

$= \dfrac{(3x-7)(\sqrt{x}+\sqrt{x-5})}{x-(x-5)}$

$= \dfrac{(3x-7)(\sqrt{x}+\sqrt{x-5})}{5}$

Directions: Find each value and graph.

6) $y = \dfrac{x-4}{x^2-9} = \dfrac{x-4}{(x-3)(x+3)}$

Hole/Vertical Asymptotes:

No Holes

VA @ $x=-3, 3$

$\boxed{\begin{array}{c|c} x-3=0 & x+3=0 \\ x=3 & x=-3 \end{array}}$

Y-Int: $\frac{4}{9}$

$\boxed{y = \dfrac{(0)-4}{(0)^2-9} = \dfrac{-4}{-9} = \dfrac{4}{9}}$

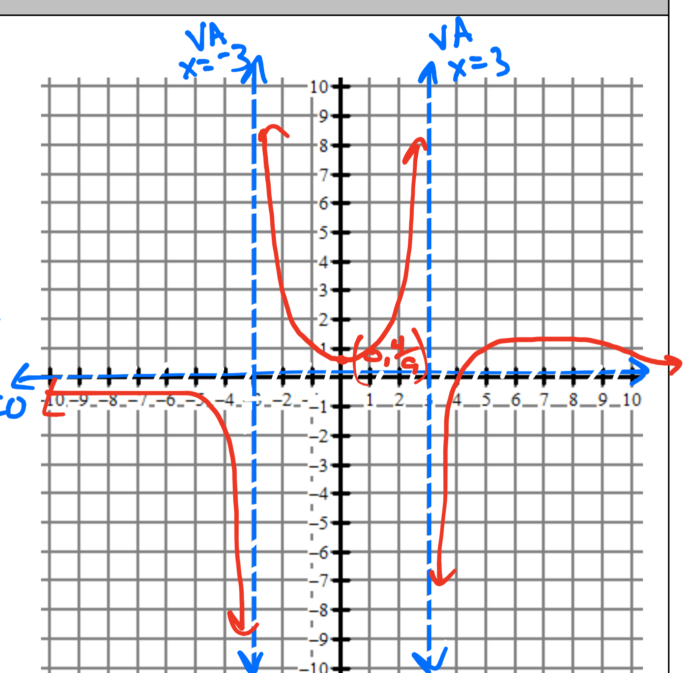
X-int: 4

$\boxed{\begin{array}{c} 0 = x-4 \\ 4 = x \end{array}}$

Horizontal/Slant Asymptote:

HA @ y=0

No SA cuz n≠d+1



DIRECTIONS: Translate each statement into an equation using k as the constant of variation.	Directions: Solve each.
7) Y varies directly with p and q and inversely with the square root of z. $Y = \frac{Kpq}{\sqrt{z}}$	8) The amount of students passing Bean's class, S, varies directly with the square of hours he makes packets, P, and inversely with the amount of students who don't do homework over the weekend, H. If 18 students are passing Bean's class when he works 12 hours and has 24 kids who didn't do homework, then how many students are passing when he spends 16 hours on packets and has only 16 kids who didn't do homework? $S = \frac{KP^2}{H}$ $18 = \frac{K(12)^2}{24}$ $18 = \frac{144K}{24}$ $432 = 144K$ $3 = K$ $S = \frac{3P^2}{H}$ $S = \frac{3\cdot(16)^2}{16}$ $S = 3\cdot 16$ $S = 48$ passing

APPLICATION

9) RATIONALIZING THE NUMERATOR

a) What is the excluded value for the rational function, $f(x) = \frac{\sqrt{x}-5}{x-25}$? , $x \neq 25$

denom≠0
$x - 25 \neq 0$
$x \neq 25$

b) Rationalize by multiplying by the conjugate of the numerator.

$$f(x) = \frac{(\sqrt{x}-5)}{(x-25)}\cdot\frac{(\sqrt{x}+5)}{(\sqrt{x}+5)}$$

$$= \frac{\cancel{x-25}}{(\cancel{x-25})(\sqrt{x}+5)}$$

$$f(x) = \frac{1}{\sqrt{x}+5}$$

c) What value does the function now approach, as x approaches the excluded value you found in part A?

$$\lim_{x\to 25} \frac{1}{\sqrt{x}+5} = \frac{1}{\sqrt{25}+5} = \frac{1}{5+5} = \frac{1}{10}$$

$$\therefore \lim_{x\to 25} \frac{1}{\sqrt{x}+5} = \frac{1}{10}$$

10) FINDING THE DERIVATIVE.

In Calculus the definition of a derivative is $f'(x) = \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$.

Let f(x) = $4x^2 + 10x - 2$

a) Plug f(x) and f(x+h) into the derivative formula and simplify.

$$f'(x) = \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$$

$$= \lim_{h\to 0} \frac{[4(x+h)^2 + 10(x+h) - 2] - [4x^2 + 10x - 2]}{h}$$

$$= \lim_{h\to 0} \frac{4(x^2+2hx+h^2) + 10x + 10h - 2 - 4x^2 - 10x + 2}{h}$$

$$= \lim_{h\to 0} \frac{\cancel{4x^2} + 8hx + 4h^2 + \cancel{10x} + 10h - \cancel{2} - \cancel{4x^2} - \cancel{10x} + \cancel{2}}{h}$$

$$= \lim_{h\to 0} \frac{8hx + 4h^2 + 10h}{h}$$

b) Reduce your simplified function by factoring our a common factor of h. What is the derivative of f(x)?

$$= \lim_{h\to 0} \frac{8hx + 4h^2 + 10h}{h}$$

$$= \lim_{h\to 0} \frac{\cancel{h}(8x + 4h + 10)}{\cancel{h}}$$

$$= \lim_{h\to 0} (8x + 4h + 10)$$

$$= 8x + 4(0) + 10$$

$$f'(x) = 8x + 10$$