Final Review:

Chapter 11

1. Evaluate $\sum_{n=1}^{16}(2n-4)$

$a_1 = 2(1)-4$ $a_{16} = 2(16)-4$ $S_{16} = \frac{16}{2}(-2+28)$

$a_1 = -2$ $a_{16} = 28$ $S_{16} = 208$

2. Brooklyn sells candy bars. She sells 10 candy bars the first day. Every day after she sells 2 more than the previous day. What is the total number of candy bars Brooklyn sells 20 school days?

$\frac{10}{1}, \frac{12}{2}, \frac{14}{} \cdots \frac{}{20}$

$a_{20} = 10 + (20-1)(2)$ $S_{20} = \frac{20}{2}(10+48)$

$a_{20} = 10 + 38$ $S_{20} = 580$

$a_{20} = 48$

3. A football team has the ball on the opponents 9 yard line. If the other team makes an infinite number of penalties so that the ball moves half the distance to the goal every time, what is the total number of yards in penalties the ball moves?

$4.5, 2.25$ $r = \frac{1}{2}$ $S = \frac{4.5}{1-\frac{1}{2}} \rightarrow S = \frac{4.5}{\frac{1}{2}} \rightarrow 9$

$\frac{}{4.5} \frac{}{2.25} \frac{.25}{1...}$

4. Given the arithmetic sequence 4, 7, 10, … find term closest to 400 but not more than it.

$d = 3$ $400 = 4 + (n-1)3$

$396 = 3n - 3$

$399 = 3n$

$133 = n$

Chapter 10:

5. Given the equation $y = a(b)^x$, if $0<b<1$ what type of exponential model is it?

decay

Use with 6, 7, 8

Tim heats up a rock and puts it into a tub of water at room temperature. The equation that models the temperature of the rock as it becomes the same temp as the water if modeled by: $f(t) = 65 + 20(3)^{-0.4t}$ where f(t) is the temperature of rock and t is the time in minutes, after putting it into the water and until the water and rock are both at room temperature again. The temperature is in Fahrenheit

$y = a b^x + k$

6. What is the initial temp of the rock?

$f(0) = 65 + 20(3)^{-.4(0)}$ $f(0) = 85$

$f(0) = 65 + 20$

$(0, 85)$

7. What is the room water temperature?

65 $f(\infty) = 65 + 0$

$f(\infty) = 65$

65

8. What is the temperature of the rock after 12 minutes?

$f(12) = 65 + 20(3)^{-.4(12)}$

$f(12) = 65.1°$

9. When will the temperature of the rock be 72 degrees Fahrenheit?

$f'(12) = 65 + 20(5)$

$f(12) = 65.1°$

9. When will the temperature of the rock be 72 degrees Fahrenheit?

$72 = 65 + 20(3)^{-.4(t)}$

$7 = 20(3)^{-.4t}$

$.35 = (3)^{-.4t}$

$\log_3(.35) = -.4t$

$\boxed{2.4 = t}$

10. $\frac{1}{16} = 32^{2x-3}$

$2^{-4} = (2^5)^{2x-3}$ $-4 = 10x - 15$

$2^{-4} = 2^{10x-15}$ $11 = 10x$

$\boxed{\frac{11}{10} = x}$

11. $y = a(b)^x$ how can you tell if this equation will be a growth or decay?

$0 < b < 1$ or $-1 < b < 0$ decay

$b > 1$ growth

12. $\log_{.25} 64$

$\log_{(1/4)}(1/4)^{-3}$ $\boxed{-3}$

13. $\log_7 3x = 2$

$7^2 = 3x$

$49 = 3x$

$\boxed{49/3 = x}$

Chapter 9 rational functions:

1. Simplify $\frac{6x^2-6}{6x^2-x-5}$ $= \frac{6(x^2-1)}{(6x+5)(x-1)} = \frac{6(x-1)(x+1)}{(6x+5)(x-1)} = \frac{6(x+1)}{(6x+5)}$

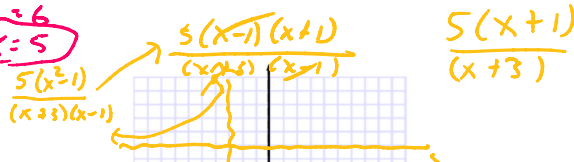2. Solve: $\left[\frac{x-3}{x-2} + \frac{4}{x-2} = \frac{6}{x-2}\right] x-2$

$x - 3 + 4 = 6$

$x + 1 = 6$
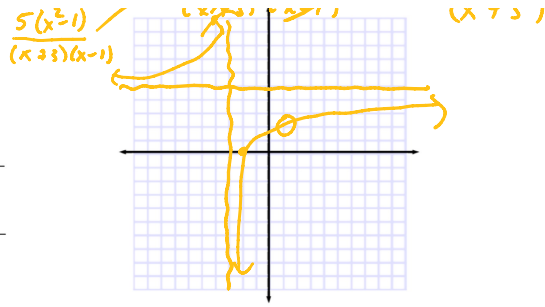
$\boxed{x = 5}$

3. $f(x) = \frac{5x^2-5}{x^2+2x-3}$

$\frac{5(x^2-1)}{(x+3)(x-1)}$ $\frac{5(x-1)(x+1)}{(x+3)(x-1)}$ $\frac{5(x+1)}{(x+3)}$

VA: $\underline{X = -3}$

3. $f(x) = \frac{5x^2-5}{x^2+2x-3}$ $\frac{5(x^2-1)}{(x+3)(x-1)}$

VA: $X = ^-3$

HA: $Y = 5$

Holes: $X = 1$

4. $\left[\frac{30}{x^2+2x-3} + \frac{x}{x+3} = \frac{6}{x-1}\right] (x+3)(x-1)$
$(x+3)(x-1)$

$30 + x(x-1) = 6(x+3)$
$30 + x^2 - x = 6x + 18$
$x^2 - 7x + 12 = 0$

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

$x-4=0 \quad x-3=0$
$x=4 \quad\quad x=3$

5. Explain why there is no real solution for each.

$\frac{3}{x+2} = \frac{5}{x+2},$ $\frac{x^2}{2x^2+8} = -8,$ $4x^2 + 16 = 0$

$3 \neq 5$ $\frac{Pos}{Pos} \neq neg$ $Pos + Pos \neq 0$

6. Write and equation of a rational function with vertical asymptote x=3, a horizontal asymptote of y = 2, and reflected over x axis.

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

7. $\frac{x-2}{x+6} \div \frac{2x-4}{x-5}$

$\frac{x-2}{x+6} \cdot \frac{x-5}{2(x-2)} = \frac{x-5}{2(x+6)} = \frac{x-5}{2x+12}$

8. $\frac{6}{x^2-49} - \frac{8}{x-7}$

$\frac{6}{(x-7)(x+7)} - \frac{8(x+7)}{(x-7)(x+7)} \Rightarrow \frac{6}{(x-7)(x+7)} - \frac{8x+56}{(x-7)(x+7)} \rightarrow \frac{-8x-50}{(x-7)(x+7)}$

9. Suppose the number of goats a farmer can raise at his farm is modeled by
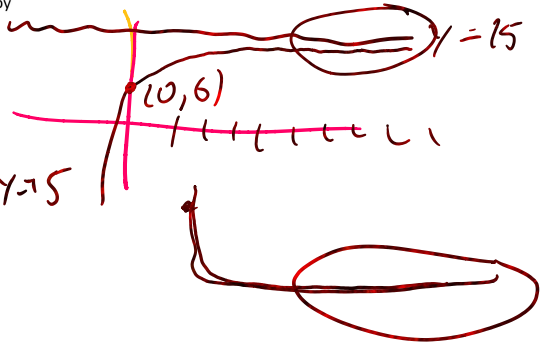
$(x-\,)(x+\,)$ $(x-7)(x+7)$

9. Suppose the number of goats a farmer can raise at his farm is modeled by the following equation:

$$G(x) = \frac{45x^2 + 6}{3x^2 + 1}$$

Where (x) is the number trees on the land he owns.

What is the number of goats the farmer can raise if he does not have any trees?

$$g(0) = \frac{45(0) + 6}{3(0)^2 + 1} = \frac{6}{1} = 6$$

$y = \frac{45}{3}$ $y = 15$

$(0,6)$ $y = 15$

What is the maximum number of goats the farmer can raise?

★ what is the horizontal asymptote?

10. $\frac{3}{x-1} = \frac{2}{x-2} + \frac{-x^2+3x+4}{x^2-3x+2}$

$$\left[\frac{3}{(x-1)} = \frac{2}{(x-2)} + \frac{-x^2+3x+4}{(x-2)(x-1)}\right](x-2)(x-1)$$

$3(x-2) = 2(x-1) + -x^2+3x+4$

$3x-6 = 2x-2 + -x^2+3x+4$

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

$x^2-2x-8 = 0$

$(x-4)(x+2) = 0$

$x-4=0 \quad x+2=0$

$x=4 \qquad x=-2$