



This packet is a general review of concepts in this course. In this packet, you'll find:

A) Algebra II / Pre-AP Algebra II Key Concept Review (Chapters 1-8) with solutions at the bottom of each chapter review

What if math teachers are really pirates and just want us to find X so they can get the buried treasure.



someecards  
user card

B) Curriculum based re-teaching lessons broken down by chapter so students can see examples from each chapter if useful

C) Need some math help 24/7? Click on this link to Khan Academy. Search by topic to see examples done on video. For example, students could search "factoring quadratics" or "exponential growth and decay" or "rules of logarithms." No sign in is required.

These videos can be found at: <https://www.khanacademy.org/>

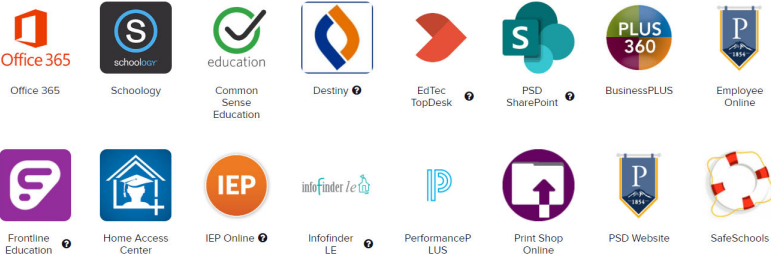
D) Contact your math teacher directly via e-mail or Schoology for questions, help & support. Reach out to your teachers!

## Puyallup School District Virtual Learning Resources

**Virtual Learning Opportunities** – Puyallup Teachers will communicate lessons and activity resources through your child’s Schoology Course or Group. Your child’s teacher is ready to support your student through virtual learning!

**Clever**- a platform that makes it easier for schools to use many popular educational technology products. Essentially, it is a “bookmark” bar for the educational system- curriculum, support, and accessible links are housed in one location. You can access through PSD Favorites folder in the internet browser on a district issued device.

PSD Sites (District)



**Schoology**- The Puyallup School District platform teachers use to communicate, send course updates, collect assignments and assessments, host Schoology conferences (audio and video) and is the electronic gradebook.

Greetings Parents and Guardians:

This school year, all students in the Puyallup School District will have an account in our new Learning Management System called **Schoology**. We encourage all parents to set up an account as well. }

Puyallup School District - Algebra II & Pre-AP Algebra II Key Concept Review



**Chapter 1- Expressions, Equations, and Inequalities**

1. Evaluate  $3(x - 4) + 2x - x^2$  for  $x = 6$       Answer: \_\_\_\_\_
  
2. Simplify  $-(3a - 2b) - 3(-a - b)$       Answer: \_\_\_\_\_
  
3. Simplify  $10x + 2y - 5x^2 + 2x - 5y + 6x^2$       Answer: \_\_\_\_\_
  
4. Solve each equation. Check your answer.
  - a.  $2x - 5 = 17$        $x =$  \_\_\_\_\_      Check:
  - b.  $3(x + 1) = 9 + 2x$        $x =$  \_\_\_\_\_      Check:
  
5. Solve each inequality. Graph the solution.
  - a.  $4 + 3x \geq x + 12$       Solution: \_\_\_\_\_       $\longleftarrow$   $\longrightarrow$
  - b.  $4 - 5x > 2$  *careful!*      Solution: \_\_\_\_\_       $\longleftarrow$   $\longrightarrow$
  - c.  $2(5 + 3x) < x + 4(x + 3)$       Solution: \_\_\_\_\_       $\longleftarrow$   $\longrightarrow$
  
6. Solve each equation. Check for any extraneous solutions by quickly checking your solutions back into the original problem to see if they actually work. 😊
  - a.  $|x - 5| = 3$        $x =$  \_\_\_\_\_ & \_\_\_\_\_
  - b.  $|2x + 1| = 13$        $x =$  \_\_\_\_\_ & \_\_\_\_\_

SOLUTIONS:

- 1) -18      2) 5b      3)  $x^2 + 12x - 3y$       4) a.  $x = 11$       b.  $x = 6$   
5) a.  $x \geq 4$       b.  $x \leq 2/5$       c.  $x < 2$   
6) a.  $x = 2$  & 8      b.  $x = -7$  & 6



## Chapter 2 – Functions, Equations, and Graphs

1. Find the domain and range of each relation.

a.  $\{(-1,3), (0,5), (1,7), (2,9)\}$       D: \_\_\_\_\_ R: \_\_\_\_\_

b.  $\{(-2,0), (0,-1), (4,-3), (6,-4)\}$       D: \_\_\_\_\_ R: \_\_\_\_\_

2. Determine whether each relation is a function.

a.  $\{(0,2), (4,3), (5,5), (4,7)\}$       b.  $\{(-1,0), (-5,2), (0,4), (2,-8)\}$

3. Find the x- and y-intercepts of each line.

a.  $5y - x = 10$

x-intercept: (\_\_\_\_, \_\_\_\_)      y-intercept: (\_\_\_\_, \_\_\_\_)

b.  $3x + 4 = y$

x-intercept: (\_\_\_\_, \_\_\_\_)      y-intercept: (\_\_\_\_, \_\_\_\_)

c.  $2y + 8x = -14$

x-intercept: (\_\_\_\_, \_\_\_\_)      y-intercept: (\_\_\_\_, \_\_\_\_)

4. Write an equation of each line in slope/intercept (s/i) and point-slope (p/s) form.

a. slope is 2, through (1,4)

s/i: \_\_\_\_\_ p/s: \_\_\_\_\_

b. slope is  $-\frac{2}{3}$ , through (6,-9)

s/i: \_\_\_\_\_ p/s: \_\_\_\_\_

c. Passes through (5,8) and (0,-2)

s/i: \_\_\_\_\_ p/s: \_\_\_\_\_

d. Passes through (1,3) and (6,-2)

s/i: \_\_\_\_\_ p/s: \_\_\_\_\_

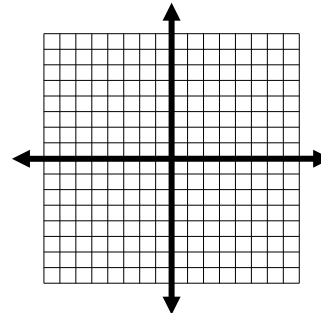
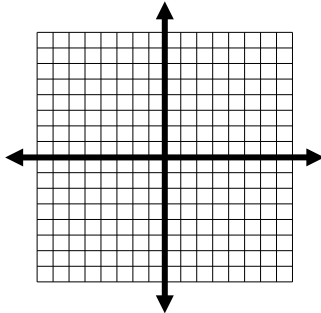
5. Graph each equation.

a.  $5y - 10 = 15x$

b.  $4x - 3y = -2$

s/i: \_\_\_\_\_

s/i: \_\_\_\_\_



6. Describe each transformation of the parent function  $y = |x|$

a.  $y = |x - 1| + 2$  Transformations: \_\_\_\_\_

b.  $y = -4|x| - 1$  Transformations: \_\_\_\_\_

7. Write an equation for each translation of  $y = x^2$

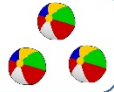
a.  $y =$  \_\_\_\_\_ 4 units down, 1 unit left

b.  $y =$  \_\_\_\_\_ 7 units up, 3 units right

c.  $y =$  \_\_\_\_\_ 2 units down, 6 units right

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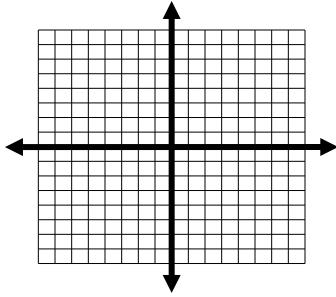
Solutions: 1a.  $\{-1,0,1,2\}$   $\{3,5,7,9\}$  1b.  $\{-2,0,4,6\}$   $\{-4,-3,-1,0\}$   
2a. no 2b. yes 3a.  $(-10,0)$   $(0,2)$  3b.  $(-4/3, 0)$   $(0,4)$  3c.  $(-7/4,0)$   $(0,-7)$   
4a.  $y = 2x + 2$ ,  $(y-4) = 2(x-1)$  4b.  $y = -2/3x - 5$ ,  $(y+9) = -2/3(x-6)$   
4c.  $y = 2x - 2$ ,  $(y-8) = 2(x-5)$  4d.  $y = -1x + 4$ ,  $(y-3) = -1(x-1)$   
5a.  $y = 3x+2$  5b.  $y = 4/3x + 2/3$   
6a. right 1, up 2 6b. reflect over x-axis, vertical stretch, down 1  
7a.  $(x+1)^2 - 4$  7b.  $(x-3)^2 + 7$  7c.  $(x-6)^2 - 2$



## Chapter 3- Linear Systems

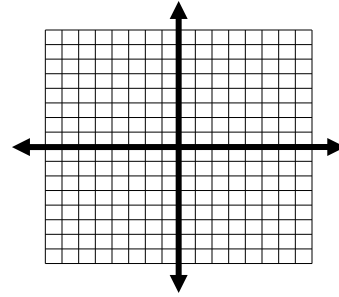
Solve each system by graphing. CHECK YOUR ANSWERS!

$$1. \begin{cases} x + y = 3 \\ y = 3x - 1 \end{cases}$$



(\_\_\_\_,\_\_\_\_)

$$2. \begin{cases} -x + 2y = 2 \\ 3x + 2y = -6 \end{cases}$$



(\_\_\_\_,\_\_\_\_)

Solve each system by substitution. CHECK YOUR ANSWERS!

$$3. \begin{cases} x - 3y = 2 \\ -x + 2y = 5 \end{cases}$$

(\_\_\_\_,\_\_\_\_)

$$4. \begin{cases} a - 3b = 4 \\ a = -2 \end{cases}$$

(\_\_\_\_,\_\_\_\_)

Solve each system by elimination. CHECK YOUR ANSWERS!

$$5. \begin{cases} 3x + 2y = -17 \\ x - 3y = 9 \end{cases}$$

(\_\_\_\_,\_\_\_\_)

$$6. \begin{cases} 5f + 4m = 6 \\ -2f - 3m = -1 \end{cases}$$

(\_\_\_\_,\_\_\_\_)

For each system, choose the solution method that seems easier to use. Explain why you made each choice. Solve each system. CHECK YOUR ANSWERS!

$$7. \begin{cases} b = 2a - 5 \\ b = 3 + a \end{cases}$$

(\_\_\_\_,\_\_\_\_)

$$8. \begin{cases} 4x - 2y = 11 \\ 4x + 3y = 6 \end{cases}$$

(\_\_\_\_,\_\_\_\_)

**ANSWERS:** 1. graph (1,2)    2. graph (-2,0)    3. (-19,-7)    4. (-2,-2)  
 5. (-3,-4)    6. (2,-1)    7. Sub, (8,11)    8. elim (9/4,-1)



## Chapter 4- Quadratic Functions and Equations

Graph each function. How is each function a translation of  $f(x)=x^2$ ?

1.  $f(x) = x^2 + 4$

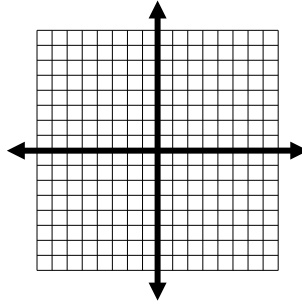
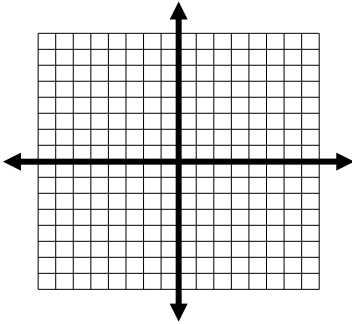
2.  $f(x) = (x - 9)^2 + 2$

V(\_\_\_\_, \_\_\_\_)

V(\_\_\_\_, \_\_\_\_)

Translation(s): \_\_\_\_\_

\_\_\_\_\_



Name the vertex for each function.

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

4.  $f(x) = -(x - 3)^2 + 2$

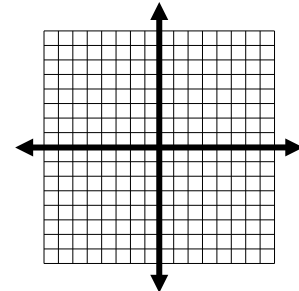
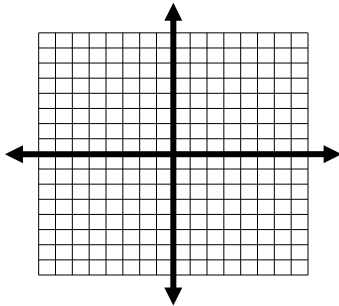
V: (\_\_\_\_, \_\_\_\_)

V: (\_\_\_\_, \_\_\_\_)

Graph each function. Remember, you can find the x-value using  $x = -b/2a$ . Plug answer in to find y.

5.  $y = x^2 + 6x + 5$

6.  $y = x^2 + -7x + 18$



V: (\_\_\_\_, \_\_\_\_)

V: (\_\_\_\_, \_\_\_\_)

Factor each expression. Always try looking for a common factor to bring out front first!

7.  $x^2 - 8x + 12$

8.  $3x^2 + 11x - 20$

9.  $-4x^2 + 14x - 6$

(\_\_\_\_)(\_\_\_\_)

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\_\_\_\_(\_\_\_\_)(\_\_\_\_)

10.  $x^2 + 14x + 40$

11.  $x^2 - 14x + 49$

12.  $9x^2 + 30x + 25$

(\_\_\_\_)(\_\_\_\_)

(\_\_\_\_)(\_\_\_\_)

(\_\_\_\_)(\_\_\_\_)

13.  $36x^2 - 16$

14.  $6x^2 - 24x$

15.  $-14x^2 - 49$

\_\_\_\_(\_\_\_\_)(\_\_\_\_)

\_\_\_\_(\_\_\_\_)

\_\_\_\_(\_\_\_\_)

**What is the quadratic formula?  $x =$  \_\_\_\_\_****Solve each equation by using the quadratic formula. No decimals in solutions. Just fully-simplified square roots, etc. Move all terms to the left and set equal to zero before your put values into formula.**

16.  $3x^2 + 5x - 8 = 0$

17.  $x^2 = 6x - 9$

 $x =$  \_\_\_\_\_ $x =$  \_\_\_\_\_

18.  $x(x - 3) = 4$

19.  $5x^2 - 7x - 3 = 0$

 $x =$  \_\_\_\_\_ $x =$  \_\_\_\_\_Ch. 4 Group Review*SHOW YOUR WORK, NO GRAPHING CALCULATORS*

1.  $V(0,4)$  & 4 up

2.  $V(9,2)$  & 9 right, 2 up

3.  $V(-2,-6)$  &  $x = -2$

4.  $V(3,2)$  &  $x = 3$

5.  $V(-3,-4)$  &  $x = -3$

6.  $V(3.5, 5.75)$  &  $x = 3.5$

7.  $(x-2)(x-6)$

8.  $(x+5)(3x-4)$

9.  $-2(2x-1)(x-3)$

10.  $(x+4)(x+10)$

11.  $(x-7)(x-7)$

12.  $(3x+5)(3x+5)$

13.  $4(3x+2)(3x-2)$

14.  $6x(x-4)$

15.  $-7(2x^2+7)$

16.  $x = 1$  &  $-8/3$

17.  $x = 3$  &  $3 \odot$

18.  $x = 4$  &  $-1$

19.  $x = \frac{7 \pm \sqrt{109}}{10}$





## Chapter 5- Polynomials and Polynomial Functions

1. Write the equation of a polynomial in standard form that has zeros of 5 and 2. *No parenthesis in solution.*

$$f(x) = \underline{\hspace{4cm}}$$

2. Write the equation of a polynomial in standard form that has zeros of -3, 1, and 2.

$$f(x) = \underline{\hspace{4cm}}$$

3. Factor each of the following and then find the zeros of each.

a.  $x^2 - 5x + 6$

Factors:  $(\underline{\hspace{2cm}})(\underline{\hspace{2cm}})$

zeros at  $x = \underline{\hspace{4cm}}$

b.  $x^2 - 7x + 6$

Factors:  $(\underline{\hspace{2cm}})(\underline{\hspace{2cm}})$

zeros at  $x = \underline{\hspace{4cm}}$

c.  $x^2 - 64$

Factors:  $(\underline{\hspace{2cm}})(\underline{\hspace{2cm}})$

zeros at  $x = \underline{\hspace{4cm}}$

d.  $x^3 + 9x^2 + 20x$

Factors:  $\underline{\hspace{1cm}}(\underline{\hspace{2cm}})(\underline{\hspace{2cm}})$

zeros at  $x = \underline{\hspace{4cm}}$

e.  $x^3 - 10x^2 + 25x$

Factors:  $\underline{\hspace{1cm}}(\underline{\hspace{2cm}})(\underline{\hspace{2cm}})$

zeros at  $x = \underline{\hspace{4cm}}$

f.  $x^3 - 25x$

Factors:  $\underline{\hspace{1cm}}(\underline{\hspace{2cm}})(\underline{\hspace{2cm}})$

zeros at  $x = \underline{\hspace{4cm}}$

g.  $x^3 + 3x^2 - 10x$

Factors: \_\_\_\_\_(\_\_\_\_\_) (\_\_\_\_\_) zeros at  $x =$  \_\_\_\_\_

4. FACTORING BY GROUPING  $x^3 - 3x^2 - 4x + 12$

Factors: (\_\_\_\_\_) (\_\_\_\_\_) Zeros:  $x =$  \_\_\_\_\_

5. Use SYNTHETIC DIVISION to divide the following polynomials. *Remember place holders!*

a.  $x^3 + 5x^2 - x - 5$  by  $(x + 5)$

b.  $2x^3 + 14x^2 - 58x$  by  $(x + 10)$

Quotient: \_\_\_\_\_ Remainder: \_\_\_\_\_ Quotient: \_\_\_\_\_ Remainder: \_\_\_\_\_

6. Factor completely using the given factor and synthetic division.

$y = x^3 - 4x^2 - 11x - 6$  if  $(x + 1)$  is a factor.

Factors:  $(x + 1)$  (\_\_\_\_\_) (\_\_\_\_\_)

7. Factor completely using the given factor and synthetic division.

$y = x^3 - 6x^2 + 11x - 6$  if  $(x - 1)$  is a factor.

Factors:  $(x + 1)$  (\_\_\_\_\_) (\_\_\_\_\_)

- Solutions: 1)  $x^2 - 7x + 10$  2)  $x^3 - 7x - 6$  3a)  $(x-2)(x-3)$   $x = 2$  &  $3$  3b)  $(x-1)(x-6)$   $x = 1$  &  $6$   
 3c)  $(x-8)(x+8)$   $x = 8$  &  $-8$  3d)  $x(x+4)(x+5)$   $x = 0, -4$  &  $-5$  3e)  $x(x-5)(x-5)$   $x = 0, 5$  &  $5$   
 3f)  $x(x-5)(x+5)$   $x = 0, 5$  &  $-5$  3g)  $x(x+5)(x-2)$   $x = 0, -5$  &  $2$  4)  $(x-3)(x+2)(x-2)$   $x = 3, -2, 2$   
 5a) Put  $-5$  in corner,  $1$   $5$   $-1$   $-5$  across top, etc. Q:  $x^2 - 1$  R:  $0$  5b) Q:  $2x^2 - 6x + 2$  R:  $-20$   
 6)  $(x+1)(x-2)(x-3)$  7)  $(x-1)(x-2)(x-3)$



## Chapter 6- Radical Functions and Rational Exponents

Find all of the REAL roots of each number WITHOUT a calculator.

1.  $\sqrt{36}$

2.  $\sqrt[3]{-64}$

3.  $\sqrt[3]{\frac{-8}{125}}$

4.  $\sqrt{25y^2}$

5.  $\sqrt{49x^4}$

6.  $\sqrt[3]{-8x^9}$

Multiply, divide, add, or subtract - then simplify final answer.

7.  $\sqrt[3]{2x} \cdot \sqrt[3]{4x^5}$

8.  $\sqrt{2x} \cdot \sqrt{18xy^2}$

9.  $3\sqrt{180} + \sqrt{45} - 8\sqrt{20}$

10. Simplify the following using factor trees, etc. NOT calculators...

a.  $\sqrt[4]{81x^4y^{12}}$

b.  $\sqrt[3]{\frac{27x^6}{8y^3}}$

11. Multiply then simplify.

a.  $(1 - \sqrt{5})(2 - \sqrt{5})$

b.  $(1 - \sqrt{7})(1 + \sqrt{7})$

12. Let  $f(x) = x^2 - x - 12$  and  $g(x) = x - 4$

a. Domain of  $f(x)$ : \_\_\_\_\_ Domain of  $g(x)$ : \_\_\_\_\_

c.  $f(x) - 2g(x) =$  \_\_\_\_\_ Domain: \_\_\_\_\_

d.  $f(x) \cdot g(x) =$  \_\_\_\_\_ Domain: \_\_\_\_\_

e.  $\frac{f(x)}{g(x)} =$  \_\_\_\_\_ Domain: \_\_\_\_\_

g.  $f(g(7)) =$  \_\_\_\_\_ h.  $g(f(2)) =$  \_\_\_\_\_

Solutions:

1. 6      2. -4      3. -2/5      4. 5y      5.  $7x^2$

6.  $-2x^3$       7.  $2x^2$       8. 6xy      9.  $5\sqrt{5}$

10. a.  $3xy^3$       b.  $3x^2/2y$       11. a.  $7 - 3\sqrt{5}$       b. -6

12. a.  $\mathcal{R}$       b.  $\mathcal{R}$       c.  $x^2 - 3x - 4$       d.  $x^3 - 5x^2 - 8x + 48$       e.  $x + 3$       g. -6      h. -14



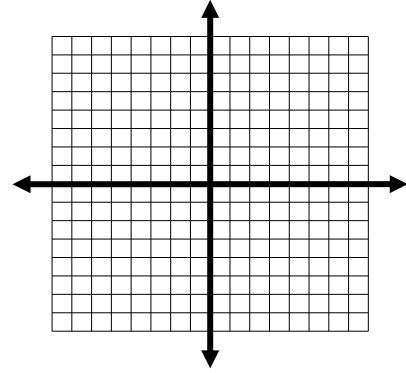
## Chapter 7- Exponential and Logarithmic Functions

1.  $y = 2^{(x-1)} + 1$

x	y
-2	
-1	
0	
1	
2	

y-intercept @ (0, \_\_\_\_\_)

asymptote @  $y =$  \_\_\_\_\_



Evaluate the expressions **WITHOUT** using a calculator. Show set-up on the right.

2.  $x =$  \_\_\_\_\_  $\log_{16}4 = x$

3.  $x =$  \_\_\_\_\_  $\log_2(.5) = x$

4.  $x =$  \_\_\_\_\_  $\log_{1/2}(4) = x$

5.  $x =$  \_\_\_\_\_  $\log_31 = x$

6.  $x =$  \_\_\_\_\_  $\ln e = x$

7.  $x =$  \_\_\_\_\_  $\log_525 = x$

8.  $x =$  \_\_\_\_\_  $\log_2(1/32) = x$

9.  $x =$  \_\_\_\_\_  $\log_464 = x$

10.  $x =$  \_\_\_\_\_  $\log_93 = x$

Solve the equations **WITHOUT** using a calculator.

11.  $x =$  \_\_\_\_\_  $4^{3x+1} = 32$

12.  $x =$  \_\_\_\_\_  $10^{3x+5} = 10^{x-3}$

13.  $x =$  \_\_\_\_\_  $\log_3(2x-1) = 2$

14.  $x =$  \_\_\_\_\_  $\log_5(4x+1) = \log_5(2x+7)$

15. a. Does  $f(x) = 4 \left(\frac{3}{2}\right)^x$  represent exponential growth or decay ?

b. How about  $f(x) = 3 \left(\frac{2}{3}\right)^x$ ? growth or decay?

16. Condense & simplify the following expressions as far as possible.

a. \_\_\_\_\_  $3 \log x + \log 7$

b. \_\_\_\_\_  $2 \log x - \log 5$

c. \_\_\_\_\_  $3 \log 2 - 2 \log 4$

17. Expand the expressions.

a. \_\_\_\_\_  $\ln 3xy$

b. \_\_\_\_\_  $\log x^2y$

18. Use the change-of-base formula to evaluate the expressions to four decimal places of accuracy.

a. \_\_\_\_\_  $\log_5 10$

b. \_\_\_\_\_  $\log_8 2$

Each of these four formulas assumes you have an initial amount that gains or loses a certain percentage over a certain period of time, but they are each a little different.

$A = Pe^{rt}$  growth - gains percentage compounding continuously

$A = P(1 + r/n)^{nt}$  annually growth - gains percentage compounded a certain # of times per year

$A = P(1 + r)^t$  growth - gains percentage compounded

$A = P(1 - r)^t$  decay - loses percentage compounded annually

19. The value of a new car purchased for \$22,000 decreases by 10% per year. How much will it be worth after 5 years?

\$ \_\_\_\_\_

20. You deposit \$1000 in an account that pays 6% annual interest, compounded CONTINUOUSLY. Find the balance after 5 years.

\$ \_\_\_\_\_

21. You deposit \$6000 in an account that pays 5% annual interest, compounded MONTHLY. Find the balance after 10 years.

\$ \_\_\_\_\_

22. You deposit \$2000 in an account that pays 12% annual interest, compounded QUARTERLY. Find the balance after 4 years.

\$ \_\_\_\_\_

23. 4000 mg of a substance is present initially, but it is decaying slowly. It loses 7% of its mass per year. How much will be present after 40 years?

\_\_\_\_\_ mg

Chapter 7 INDIVIDUAL Review Solutions

- |                                    |                        |                       |                |                   |
|------------------------------------|------------------------|-----------------------|----------------|-------------------|
| 1. y-int (0,2) asymptote @ $y = 1$ | 2. $\frac{1}{2}$       | 3. -1                 | 4. -2          | 5. 0              |
| 6. 1                               | 7. 2                   | 8. -5                 | 9. 3           | 10. $\frac{1}{2}$ |
| 11. $\frac{1}{2}$                  | 12. -4                 | 13. 5                 | 14. 3          | 15. Growth, Decay |
| 16. a) $\log 7x^3$                 | b) $\log x^2/5$        | c) $\log \frac{1}{2}$ |                |                   |
| 17. a) $\ln 3 + \ln x + \ln y$     | b) $2 \log x + \log y$ |                       |                |                   |
| 18. a) 1.4307                      | b) .3333               | 19. \$12,990.78       | 20. \$1,349.86 |                   |
| 21. \$9,882.06                     | 22. \$3,209.41         | 23. 219.5             |                |                   |

**8**

**Chapter 8- Rational Functions**

Simplify the following expressions. For #4, you will need to factor the cubic using SOAP

4.  $\frac{4m^2n^5}{10mn^2}$

5.  $\frac{-2x}{x-x^2}$

6.  $\frac{9r+rs}{3r}$

7.  $\frac{x^3-8}{x-2}$

Perform the indicated operation and simplify the result.

8.  $\frac{3xy^5}{x^2y^3} \cdot \frac{y^2}{2x^2}$

9.  $\frac{x^2-x-6}{4x^3} \cdot \frac{4x^2+4x}{x^2+5x+6}$

10.  $\frac{33x^3y}{y^9} \div \frac{11x^4}{y^6}$

11.  $\frac{x-3}{2x-8} \div \frac{x^2-9}{6x^2-96}$

12.  $\frac{2x}{x+5} + \frac{7}{x+5}$

13.  $\frac{6x^2}{x-2} - \frac{12x}{x-2}$

14.  $\frac{6}{4x^2} + \frac{2}{5x}$

15.  $\frac{8x-1}{x^2+x-6} - \frac{4}{x-2}$

Solve the following equations. Be sure to check your solutions.

18.  $\frac{3}{2} + \frac{1}{x} = 2$

19.  $\frac{2}{3x} + \frac{2}{3} = \frac{8}{x+6}$

20.  $\frac{6x}{x+4} + 4 = \frac{2x+2}{x-1}$

21.  $\frac{x-2}{x+2} = \frac{3}{x}$

### Solutions:

4.  $2mn^3$

5.  $\frac{-2}{1-x}$

6.  $(9+s)/3$

7.  $x^2 + 2x + 4$

8.  $\frac{3y^4}{2x^3}$

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

10.  $\frac{3}{xy^2}$

11.  $\frac{3(x+4)}{(x+3)}$

12.  $\frac{2x+7}{x+5}$

13.  $6x$

14.  $\frac{15+4x}{10x^2}$

15.  $\frac{4x-13}{(x+3)(x-2)}$

18.  $x = 2$

19.  $x = 2 \text{ \& } 3$

20.  $x = 2 \text{ \& } -3/2$

21.  $x = 6 \text{ \& } -1$