

Algebra 2  
Exam Review 2<sup>nd</sup> Semester

Name \_\_\_\_\_

Chapter 7  
Section 7.1

1. Without graphing, determine whether the function represents exponential growth or exponential decay. Then find the y-intercept.

$$y = 4.6 \left( \frac{3}{2} \right)^x$$

2. The initial population of bacteria in a lab is 240. The number of bacteria doubles every 2 hours. Predict the bacteria population at the end of 8 hours. SHOW WORK
3. The population of Rochester was 17,500 in 1990. The population was projected to grow at a rate of about 4.5% per decade. Predict the population of the city, to the nearest thousand, in the year 2025. SHOW WORK
4. Pat bought a car for \$19,500. The salesperson projected that the value of the car would decline by 18% per year for the next 5 years. What would be the value, to the nearest hundred dollars, of Pat's car after 5 years? SHOW WORK
5. Find the final amount of the investment if \$4000 is invested at 6.2% interest compounded monthly for 8 years. SHOW WORK
6. You deposit \$5500 in an account at 3.6% compounded continuously. How much do you have in the account after 10 years? SHOW WORK

Section 7.3

7. Write the equation in logarithmic form.  $12^2 = 144$

8. Write the equation in exponential form.  $\log_4 \frac{1}{64} = -3$

Solve for x. Show work.

9.  $\log_x \frac{1}{243} = -5$

10.  $\log_{36} x = \frac{1}{2}$

11.  $\log_2 x = 6$

12.  $\log_x 8 = \frac{1}{3}$

Section 7.4

Write each expression as a sum or difference of logarithms. Simplify, if possible.

13.  $\log_7(49y^2z)$

14.  $\log_5 \frac{m^2}{5p}$

Write each expression as a single logarithm. Then simplify, if possible.

15.  $2\log_5 xy + \log_5 100 - \log_5 2$

16.  $\frac{1}{4}\log_2 81 - 2\log_2 4x$

Evaluate the logarithmic expression. Round your answer to the nearest hundredth. **SHOW WORK**

17.  $\log_3 62 + 1$

18. Calculate the pH of a lemon used to make lemonade if  $[H^+]$  is about  $10^{-2.3}$  moles per liter.

(Use the formula  $pH = -\log_{10}[H^+]$ )

### Section 7.5

Solve for x. Round your answer to the nearest hundredth **SHOW ALL WORK**

19.  $\log_{216}(3x-7) = \frac{1}{3}$

20.  $\log_5(3x+10) - 3\log_5 4 = 2$

21.  $\log_2(x+2) + \log_2(x-5) = 3$

Solve each equation for x. Round your answer to the nearest hundredth. **SHOW ALL WORK**

22.  $8^{x+5} = 120$

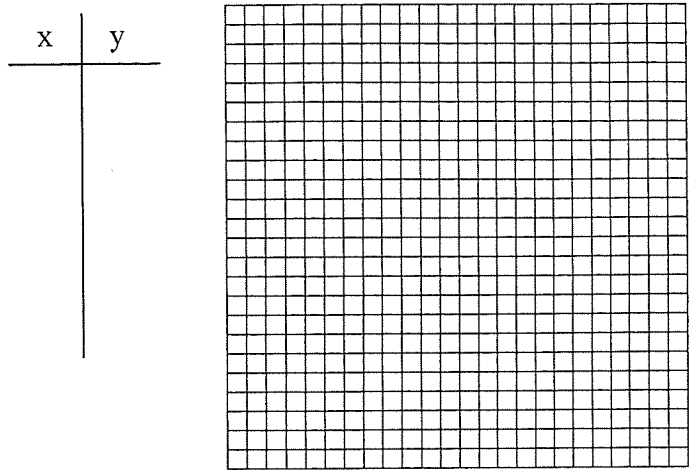
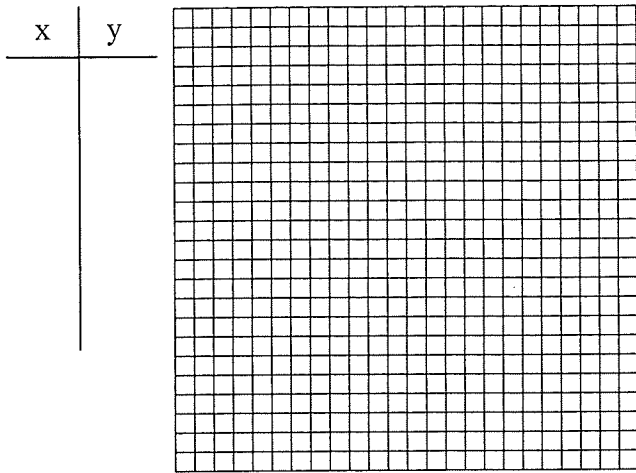
23.  $12 + 5(1.07^x) = 80$

24. In 2007, a painting was evaluated at \$12,500. The assessor believed the value would increase at a rate of 5% per year. At this rate, how many years will it take for the painting to be valued at \$20,000?

25. Graph the function and identify the domain and range. Graph at least **five** points

a.  $f(x) = 2\left(\frac{2}{3}\right)^x$  Section 7.1

b.  $g(x) = -3 - \log_{10} x$  Section 7.3



25. a. D: \_\_\_\_\_

25 b D: \_\_\_\_\_

R: \_\_\_\_\_

R: \_\_\_\_\_

**Chapter 8**

Simplify. **SHOW ALL WORK** and be sure all answers are **REDUCED**.

For problems 1-2, name all restrictions on the variables.

**Section 8.4**

1.  $\frac{x^3 - 6x^2 + 8x}{x^2 - 8x + 16} \div \frac{4 - 2x}{10x^2 - 50x}$

1. \_\_\_\_\_

Restrictions

2.  $\frac{x^2 + 3x}{x^2 - 6x + 8} \cdot \frac{x^2 - 7x + 12}{x^2 - 9}$

2. \_\_\_\_\_

Restrictions

3.  $\frac{x^2 + 4xy - 5y^2}{x^3} \div \frac{x^2 + 7xy + 10y^2}{x^3 + 2x^2y}$

3. \_\_\_\_\_

$$4. \frac{\frac{2x+6}{x^2-9} \cdot \frac{x^2+6x+8}{2x^2+11x+12}}{\frac{x+2}{x+3}}$$

4. \_\_\_\_\_

**Section 8.5**

$$5. \frac{7}{x-3} - \frac{x+4}{x^2-5x+6}$$

5. \_\_\_\_\_

$$6. \frac{x-1}{x+2} + \frac{x}{x+7} - \frac{4x-7}{x^2+9x+14}$$

6. \_\_\_\_\_

$$7. \frac{6 + \frac{2}{x}}{4 - \frac{3}{2x}}$$

7. \_\_\_\_\_

$$8. \frac{3x}{x^2-25} - \frac{5}{5-x}$$

8. \_\_\_\_\_

**Section 8.6**

Solve each equation.

9.  $\frac{x+3}{8} = \frac{3x-5}{4}$

9. \_\_\_\_\_

10.  $\frac{2}{x-2} + \frac{x}{x+4} = \frac{24}{x^2+2x-8}$

10. \_\_\_\_\_

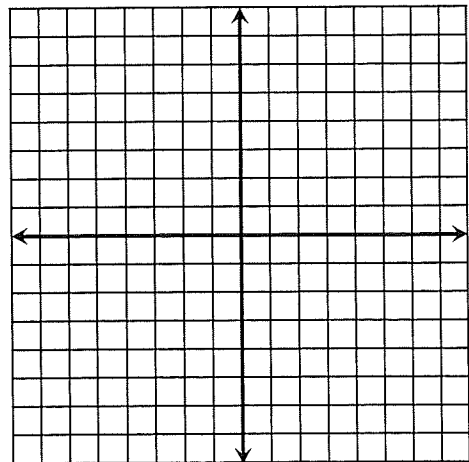
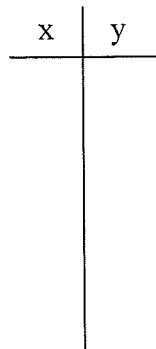
11.  $\frac{4}{x+5} + \frac{4}{x^2+5x} = 3$

11. \_\_\_\_\_

**Section 8.2**

Sketch the asymptotes and the graph of each function. Identify the domain and range.

12.  $y = \frac{4}{x-1} + 3$



VA: \_\_\_\_\_

HA: \_\_\_\_\_

D: \_\_\_\_\_

R: \_\_\_\_\_

Write an equation for the translation of  $y = \frac{5}{x}$  that has the given asymptotes.

13.  $x = 2$  and  $y = -3$

13. \_\_\_\_\_

Write the equation in the form  $y = \frac{a}{x}$ .

14  $3xy + 2 = 0$

14. \_\_\_\_\_

**Section 8.3**

Find the domain of each rational function. Identify all asymptotes and holes in the graph of each rational function.

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

15. D: \_\_\_\_\_

VA \_\_\_\_\_

HA \_\_\_\_\_

Holes \_\_\_\_\_

16.  $g(x) = \frac{3x^2+9x}{(x-3)^2}$

16. D: \_\_\_\_\_

VA. \_\_\_\_\_

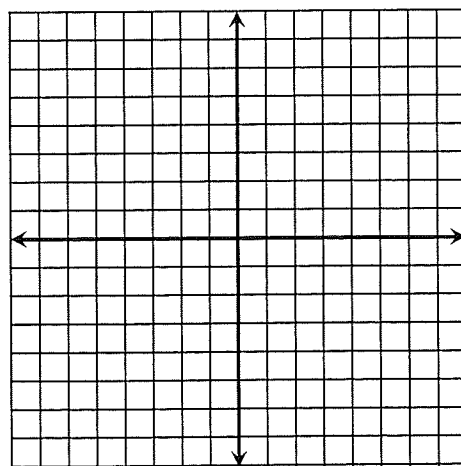
HA \_\_\_\_\_

Holes \_\_\_\_\_

17. Sketch the graph of the rational function. Identify all asymptotes and holes in the graph of the function.

$f(x) = \frac{2x^2-8x}{x^2-x-12}$

x	y



VA. \_\_\_\_\_

HA \_\_\_\_\_

Holes \_\_\_\_\_

**Chapter 9**

**Section 9.2**

1. Generate the first five terms in the sequence using the explicit formula:  $a_n = 12n - 11$

2. Write an explicit formula for the sequence 8, 6, 4, 2, 0, ... then find  $a_{14}$
3. Identify the sequence as arithmetic or geometric. (Sections 9.2 & 9.3)  
a. 192, 96, 48, 24, ...                      b. 13, 20, 27, 34 ...
4. Find the 50<sup>th</sup> term of the sequence 5, -2, -9, -16, ...
5. Find three arithmetic means between 32 and -32

**Section 9.3**

6. Write the explicit formula for the geometric sequence. Then find the 8<sup>th</sup> term.  
-4, 8, -16, ...
7. Find the three geometric means between 486 and 6.
8. Find  $a_{12}$  in the geometric sequence given  $a_3 = 63$  and  $a_5 = 567$ .

**Sections 9.4-9.5**

Find the sum of each series.

9.  $-4 + (-13) + (-22) + \dots + (-76)$                       10.  $1 + 4 + 16 + 64 + \dots + 65536$

Write the series in Summation Notation.

11.  $13 + 11 + 9 + \dots + (-75)$



Find the sum of the indicated series.

12.  $\sum_{n=1}^{10} (3n + 5)$

13.  $\sum_{n=3}^{11} (-2)(3)^n$

Does the series converge or diverge. If it converges, find the sum.

14.  $\frac{1}{2} + 1/16 + 1/128 + \dots$

15.  $\frac{1}{4} + 3/8 + 9/16 + \dots$

Is the series Arithmetic or Geometric. Find the sum

16.  $16 + 22 + 28 + \dots$  for 150 terms

17.  $3.2 - 6.4 + 12.8 - 25.6 + \dots$  for 10 terms

Find the sum of the indicated series.

18.  $\sum_{n=1}^{\infty} \left(\frac{1}{4}\right)^{n+1}$

19. You would like to buy a new car in 3 years. You start with \$60. Each month you plan to save 6% more than the previous month. How much will you have saved at the end of 3 years?

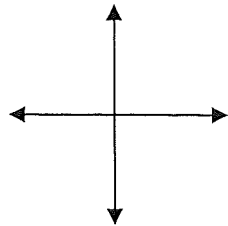
20. An auditorium has sitting for 30 people in the 1<sup>st</sup> row, 33 in the 2<sup>nd</sup> row, 36 in the 3<sup>rd</sup> row, and so on. There are 26 rows in the auditorium. How many seats are there in the auditorium?

### Chapter 13 Section 13.2

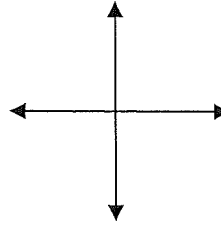
For each angle, find all the coterminal angles such that  $-360^\circ < \theta < 360^\circ$

1.  $-545^\circ$                       2.  $862^\circ$
3. Sketch each angle in standard position.

a.  $-175^\circ$



b.  $\frac{7\pi}{6}$



### Section 13.3

4. Convert  $144^\circ$  to radians.

5. Convert  $\frac{21}{6}\pi$  to degrees.

A circle has a diameter of 64 inches. For each central angle measure, find the length, in inches to the nearest tenth, of the arc intersected by the angle. **SHOW WORK**

6.  $\frac{8\pi}{3}$  radians                      7.  $540^\circ$

8. A 3.2 m pendulum swings through an angle of  $64^\circ$ . What distance does the tip of the pendulum travel?

### Section 13.2

9. Find each trigonometric function value. Give **exact** answers. (Use a unit circle.)

a.  $\sin(-240^\circ) =$  \_\_\_\_\_

b.  $\sec\left(\frac{5\pi}{3}\right) =$  \_\_\_\_\_

c.  $\tan(-90^\circ) =$  \_\_\_\_\_

d.  $\cot(690^\circ) =$  \_\_\_\_\_

10. Find each trigonometric function value. Give **exact** answers. (Use a unit circle.)

e.  $\cos 2\pi =$  \_\_\_\_\_

f.  $\sin\left(\frac{7\pi}{6}\right) =$  \_\_\_\_\_

g.  $\cos(-405^\circ) =$  \_\_\_\_\_

h.  $\csc\left(\frac{4\pi}{3}\right) =$  \_\_\_\_\_

**Sections 13.4-13.5**

11. Identify the amplitude, if it exists, and the period of each function.

a.  $y = 2 \cos(\theta + 60^\circ)$

b.  $y = -\frac{1}{2} \sin 5(\theta - 30^\circ) + 4$

amplitude : \_\_\_\_\_

amplitude: \_\_\_\_\_

period : \_\_\_\_\_

period : \_\_\_\_\_

12. Find the period, amplitude, maximum, and minimum value of each function. Then **graph** at least one period of the function. Label your graphs.

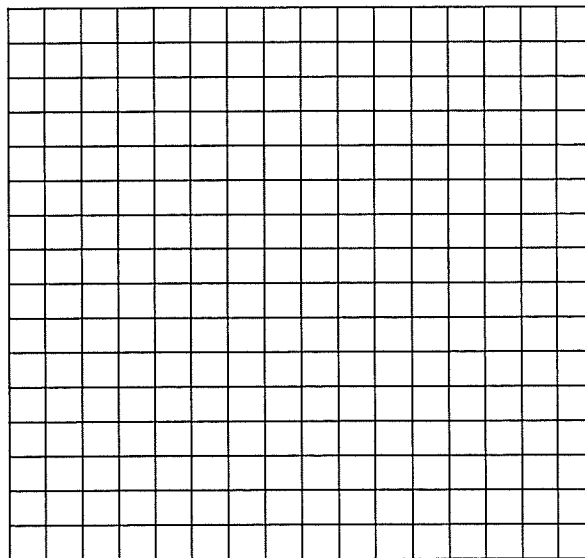
$y = -2 \sin(\theta - 180^\circ) - 3$

period \_\_\_\_\_

amplitude \_\_\_\_\_

maximum \_\_\_\_\_

minimum \_\_\_\_\_



13. Find the period, amplitude, maximum, and minimum value of each function. Then **graph** at least one period of the function. Label your graphs.

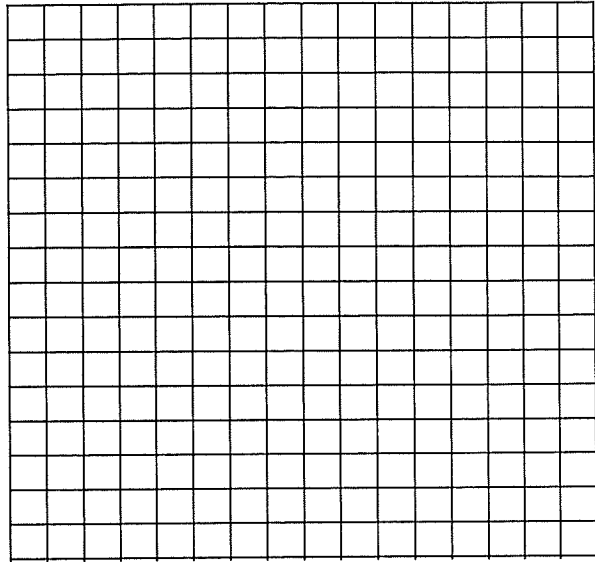
$$y = \frac{1}{2} \cos(\theta + 60^\circ) + 1$$

period \_\_\_\_\_

amplitude \_\_\_\_\_

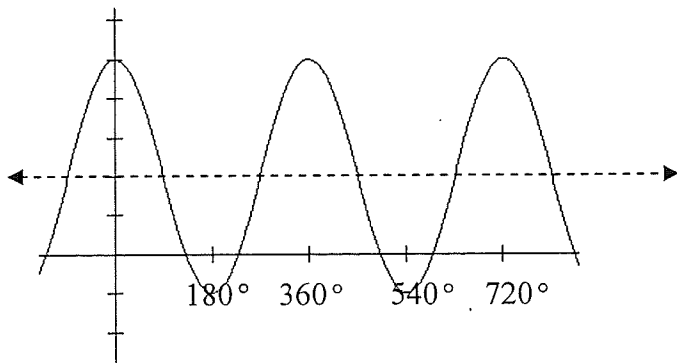
maximum \_\_\_\_\_

minimum \_\_\_\_\_



14. Each graph shown is the graph of an equation using either sine or cosine. Write an equation to match. The equations may have amplitude changes and/or vertical shifts. All scales on the y-axis go by 1.

a. \_\_\_\_\_



b. \_\_\_\_\_

