

Name \_\_\_\_\_ Date \_\_\_\_\_ Per \_\_\_\_\_

## Algebra 2 - Semester 2 Final Exam Review

### Section 1: Features of a Function

1) Draw 3 graphs that have a y-intercept of 7 and an x-intercept of -3.

2) For  $f(x) = 3x - 5$ , find the following:

a)  $f(3) =$

b)  $f(-4) =$

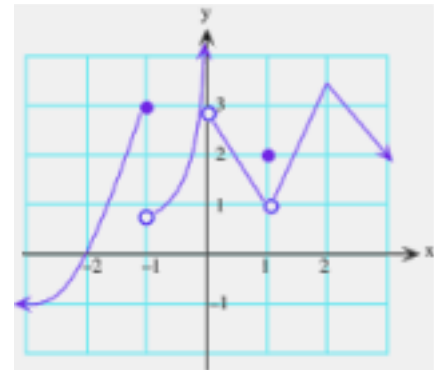
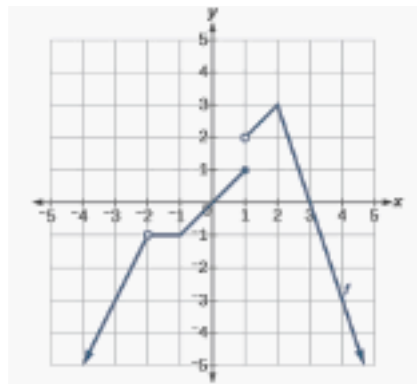
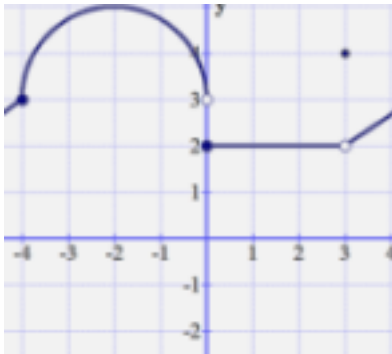
c)  $f(y) =$

3) Which graph(s) show  $f(1) = 2$ ?

a)

b)

c)



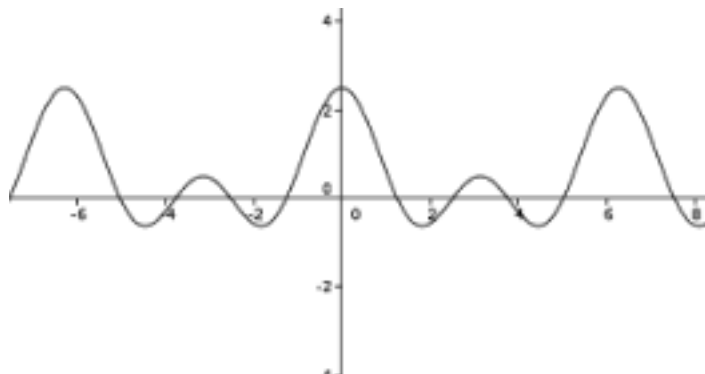
4) At what intervals does this graph increase and then decrease?

a)  $-3 \leq x \leq 0$

b)  $-4 \leq x \leq -2$

c)  $5 \leq x \leq 8$

d)  $-1 \leq x \leq 0$



5) For each type of function, fill out the table below.

Type of Function	Sketch of Parent Graph	How to you find the domain?	Example of an equation	Domain of Example function
Linear				
Absolute Value				
Quadratic				
Square Root				
Rational				
Exponential				
Logarithm				

Which equations could have a zero in its *domain*?

a)  $y = \frac{1}{x} + 3$

b)  $y = 2x - 3$

c)  $y = \sqrt{x} + 5$

d)  $y = \sqrt{x+4} - 1$

e)  $y = \frac{2}{x+1}$

6) Find the **inverse** of each function.

a)  $f(x) = 3x - 5$

b)  $f(x) = 2 + \frac{1}{2}x$

7) Graph Transformations: For each function, fill out the corresponding chart.

Function	Parent Function	Horizontal & Vertical Translations	Vertical stretch or compression? If so, $a = ?$	Reflection?	Sketch/Shape of graph
$f(x) = 2 x - 1  + 3$					
$f(x) = -2(x + 1)^2 + 3$					
$f(x) = \sqrt{x + 3} - 1.5$					
$f(x) = -3(2)^x + 5$					

## Section 2: Radicals and Rationals

8) Complete the table.

Perfect Squares (up to $12^2$ )	1, 4,
Perfect Cubes (up to $10^3$ )	1, 8,
Perfect Fourths (up to $5^4$ )	1, 16,

9) Simplify each radical.

a.  $\sqrt{124}$

b.  $\sqrt{147}$

c.  $2\sqrt{7} + 3\sqrt{7}$

d.  $-\sqrt{6} - 3\sqrt{45} + 2\sqrt{96}$

e.  $\sqrt{50} + 3\sqrt{32} - 5\sqrt{18}$

## Section 3: Exponentials and Logarithms

10) Indicate whether the function represents an exponential growth or decay.

a)  $y = \frac{1}{2}(5)^x$

b)  $f(x) = 2.3(.75)^x$

c)  $f(x) = (1.2)^x$

11) Which equation shows a growth of 5% (Only *ONE* answer is correct)?

a)  $y = 200(1.5)^x$

b)  $y = 200(1.05)^x$

c)  $y = 200(5)^x$

12) Which equation shows a decay of 4% (Only *ONE* answer is correct)?

a)  $y = 200(0.4)^x$

b)  $y = 200(.96)^x$

c)  $y = 200(0.6)^x$

**13)** The average price of a movie ticket in 1990 was \$4.22. Since then, the price has increased by approximately 3.1% each year.

a) Write an exponential function to model this situation

b) Find the price of a ticket in 2016.

**14)** Sam bought a brand new car in 2015 for \$36,750. The car depreciates by 12% each year.

a) Write an exponential function to model the situation

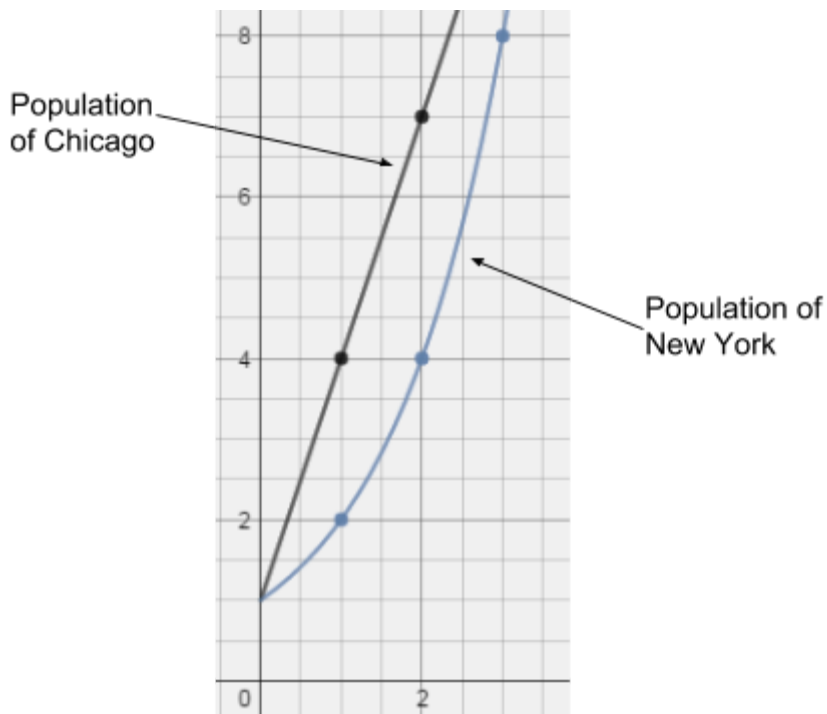
b) Find the value of the car in 2025.

**15)** The populations of both New York and Chicago have been increasingly steadily since the year 2010, as shown on the right, where  $x$  represents the number of years since 2010 and  $y$  represents the population in millions of people.

a) Who has more people in 2012?

b) Based on this data, predict who had more people in 2015? Why?

c) Compare the answers from Part A and Part B. What features of each graph affect your answer?

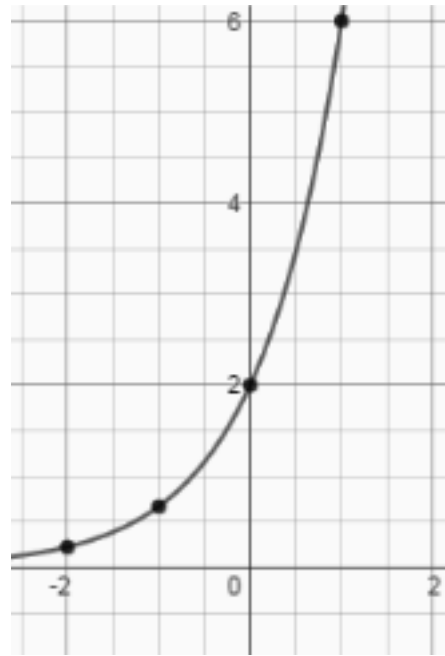


16) Which is the correct graph of  $f(x) = 2(3)^x$ ? (HINT: Use a table if you are unsure)

A.



B.



17) Evaluate each logarithm. Round to the nearest thousandth when needed.

a.  $\log_6 \frac{1}{36}$

b.  $\log_4 1$

c.  $\log_9 243$

d.  $\log 56$

#### Section 4: Trigonometry and the Unit Circle

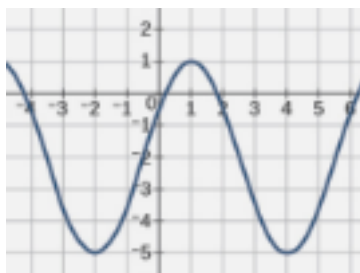
18) Match the trig ratios with their reciprocal trig ratio:

Sin	Cos	Tan

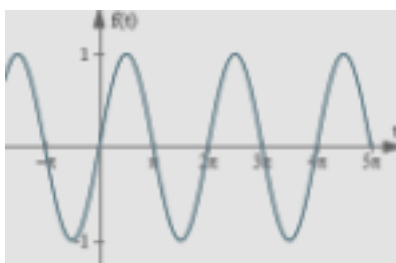
19) Draw a graph that has a midline of 3, an amplitude of 5 and a period of 2.

20) Which equations have an amplitude of 3?

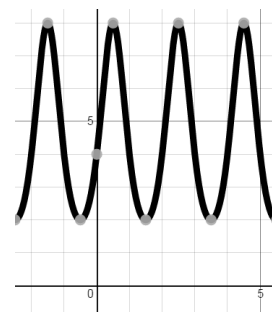
a)



b)



c)



21) Which angles are coterminal with  $55^\circ$  (Choose **ALL** that are correct)?

A.  $305^\circ$

B.  $-305^\circ$

C.  $405^\circ$

D.  $415^\circ$

E.  $775^\circ$

22) In the unit circle, what are  $\cos \theta$  and  $\sin \theta$  equal to?

23) Find the exact values:

a.  $\sec 30^\circ$

b.  $\sin \pi$

c.  $\csc 45^\circ$

d.  $\cot 60^\circ$

e.  $\cos (-120^\circ)$

24) In the unit circle, at what angles are the values of  $\cos$  and  $\sin$  equal?

25) At what angle measurements is the value of  $\tan$  undefined?

26) At what angles (measured in degrees) does the value of  $\sin = \frac{1}{2}$  or  $-\frac{1}{2}$ ?

27) Write each measure in radians. Express the answers in terms of  $\pi$ .

a.  $150^\circ$

b.  $-220^\circ$

28) Write each measure in degrees.

a.  $\frac{-5\pi}{36}$

b.  $\frac{7\pi}{4}$

29) At what angles (measured in radians) does the value of  $\cos = \frac{\sqrt{3}}{2}$  or  $\frac{-\sqrt{3}}{2}$ ?

30) Find the period and amplitude of each function.

a.  $y = -4 \cos x$

b.  $y = 3 \sin 2\theta$

c.  $y = \pi \cos \pi\theta$

Amplitude: \_\_\_\_\_

Amplitude: \_\_\_\_\_

Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

Period: \_\_\_\_\_

Period: \_\_\_\_\_

31) Find the amplitude, period, and write an equation for each function described.

a. Amplitude: \_\_\_\_\_

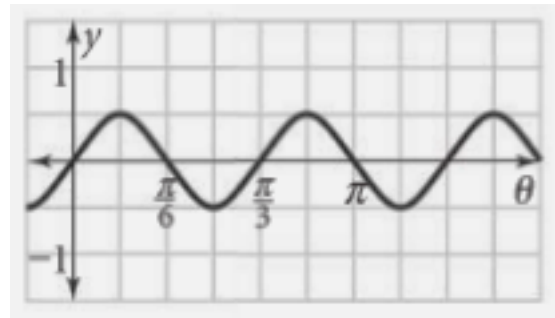
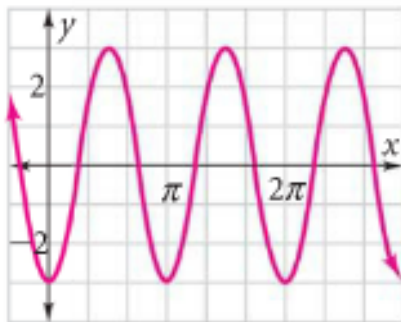
b. Amplitude: \_\_\_\_\_

Period: \_\_\_\_\_

Period: \_\_\_\_\_

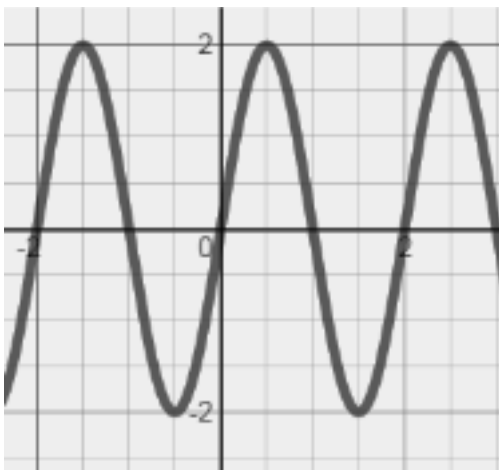
Equation: \_\_\_\_\_

Equation: \_\_\_\_\_



32) What is the correct graph of  $f(x) = 2\sin(\pi x)$ ?

a)



b)

