

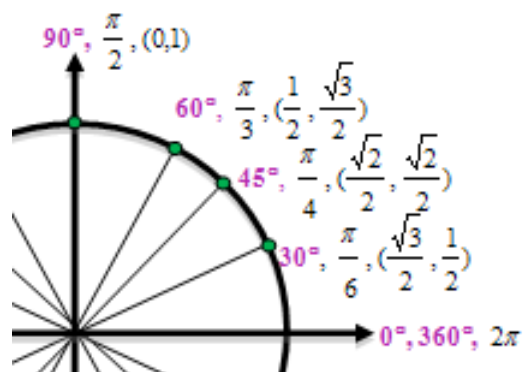
## REVIEW FOR FINAL EXAM

### ALGEBRA 2 CP

Below are formulas provided:

$$P = \frac{2\pi}{\omega}$$

$$\omega = \frac{2\pi}{p}$$



$$A = P(1 + r)^t$$

$$A = P(1 - r)^t$$

$$A = Pe^{rt}$$

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

## Suggested YouTube Videos for Some Topics

### Functions:

Transforming Piecewise functions:

<https://www.youtube.com/watch?v=zJ9PD-y1lWY> – Move  
past beginning for examples  
<https://www.youtube.com/watch?v=YEvYjAzTNUk>

Evaluating from graph using function notation:

[https://www.youtube.com/watch?v=kzYtx\\_AqzjM](https://www.youtube.com/watch?v=kzYtx_AqzjM)  
<https://www.youtube.com/watch?v=uaPm3Tpuxbc>

### Polynomials:

Factoring:

[https://www.youtube.com/watch?v=GMoqg\\_s4Dl4](https://www.youtube.com/watch?v=GMoqg_s4Dl4)  
[https://www.youtube.com/watch?v=GMoqg\\_s4Dl4](https://www.youtube.com/watch?v=GMoqg_s4Dl4)  
[https://www.youtube.com/watch?v=GMoqg\\_s4Dl4](https://www.youtube.com/watch?v=GMoqg_s4Dl4)

Adding and Subtracting Polynomials:

<https://www.youtube.com/watch?v=DMyhUb1pZT0>  
<https://www.youtube.com/watch?v=ZgFXL6SEUil>

Multiplying Polynomials:

<https://www.youtube.com/watch?v=fGThIRpWEE4>  
<https://www.youtube.com/watch?v=gg6vUnElXqo>

Dividing Polynomials (Long and Synthetic):

[https://www.youtube.com/watch?v=4u8\\_AMacu-Y](https://www.youtube.com/watch?v=4u8_AMacu-Y)  
<https://www.youtube.com/watch?v=1byR9UEQJN0>  
[https://www.youtube.com/watch?v=3Ee\\_huKclEQ](https://www.youtube.com/watch?v=3Ee_huKclEQ)

Writing functions from roots, zeroes, x-intercepts:

<https://www.youtube.com/watch?v=anWIXiCR01Y>

Operations with Complex Numbers:

<https://www.youtube.com/watch?v=SfbjqVyQlik>  
<https://www.youtube.com/watch?v=cWn6g8Qqvs4>  
<https://www.youtube.com/watch?v=tvXRaZbljO8>

### Exponentials:

Simplifying with rational (fractional) exponents:

<https://www.youtube.com/watch?v=0z-yIFzpunM>  
<https://www.youtube.com/watch?v=KGSvigZQKZY>

Changing between radical and exponential form:

<https://www.youtube.com/watch?v=jO4wOOQqIVZg>  
<https://www.youtube.com/watch?v=zIRKO21qEpQ>

Graphing Exponentials:

<https://www.youtube.com/watch?v=6WMZ7J0wwMI>

### Probability:

Probability with and without replacement:

<https://www.youtube.com/watch?v=uKTjh-6PFjo> Has an  
ad, sorry

<https://www.youtube.com/watch?v=ShQu-ly3aE4>  
<https://www.youtube.com/watch?v=w34olO5Phb8>

Venn diagrams:

<https://www.youtube.com/watch?v=jAfNg3ylZAI>  
<https://www.youtube.com/watch?v=jAfNg3ylZAI>

Two Way Tables including Conditional Probability:

<https://www.youtube.com/watch?v=ETgYbFmV0Ws>

### Trigonometry:

Evaluating Angles Using the Unit Circle:

<https://www.youtube.com/watch?v=NO4H4YROdqk>  
Ignore end about inverses and functions we do not cover  
<https://www.youtube.com/watch?v=IQID5GTsqOw> Finds  
some angles we didn't look at – only do angles w/in one  
rotation of the circle

Converting Radians to Degrees and Vice Versa:

<https://www.youtube.com/watch?v=9zspW8u6kQM>

Finding other trigonometric functions, given one and  
quadrant:

<https://www.youtube.com/watch?v=L2tNxipfoQ> Only  
need to find sine, cosine and tangent, ignore other three  
functions

**Calculators will be allowed on questions notated with (\*\*\*)**

**Functions:**

1. Use the function:  $f(x) = 2x^4 - x^3 + 3x^2 - 4x + 6$  to solve each of the following:

- |              |                                  |                                   |             |
|--------------|----------------------------------|-----------------------------------|-------------|
| a) $f(0) =$  | b) $f(1) =$                      | c) $f(-1) =$                      | d) $f(2) =$ |
| e) $f(-2) =$ | f) $f\left(\frac{1}{2}\right) =$ | g) $f\left(-\frac{1}{2}\right) =$ | h) $f(3) =$ |

2. Use the graph below to answer the related questions:

a) Over what interval(s) is the function increasing?

b) Over what interval(s) is the function decreasing?

c) Over what interval(s) is the function constant?

d)  $f(-3) = ?$

e)  $f(x) = -3$  when  $x = ?$

f)  $2f(1) = ?$

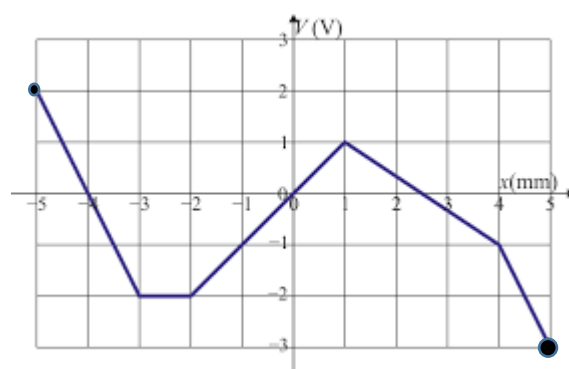
g)  $f(4) + 3 = ?$

h) What is the y-intercept?

i) List the zeroes.

j) Domain:

k) Range:



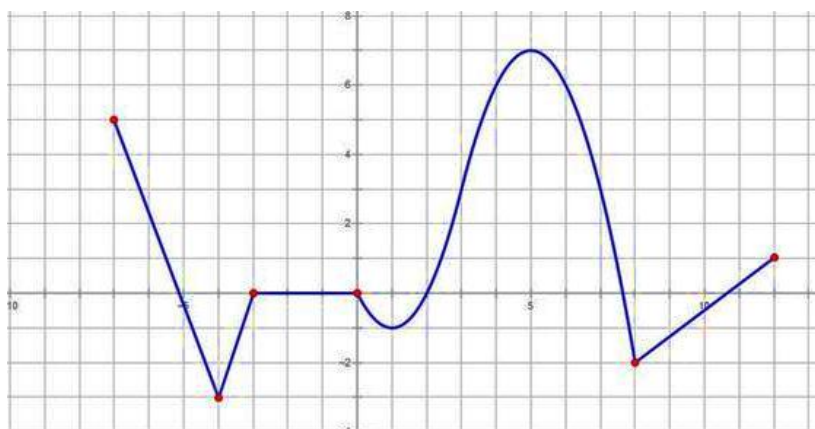
3. Given the graph, identify the

a) Domain:

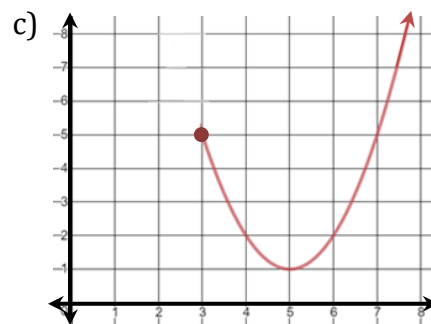
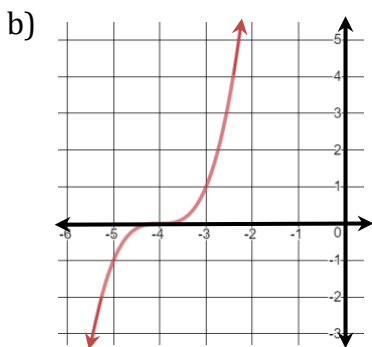
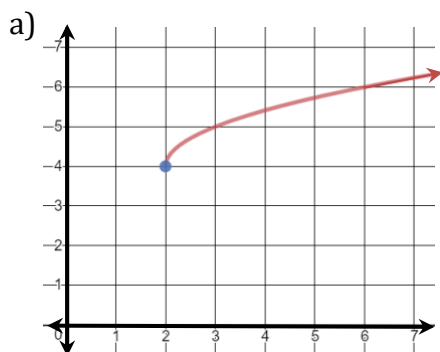
b) Range:

c) Minimums:

d) Maximums:



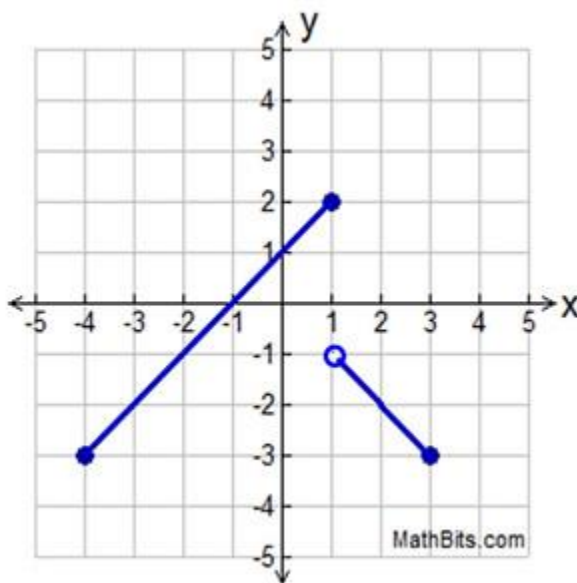
4. Find the domain and range of the graphs below.



5. Use the function  $f(x)$  below to perform the transformations for each of the rewritten functions:

**DO EACH ON A SEPARATE GRAPH**

- a)  $g(x) = f(x + 2)$
- b)  $h(x) = f(x) - 1$
- c)  $a(x) = -f(x)$
- d)  $b(x) = f(x + 2) - 1$
- e)  $c(x) = f(x - 1) + 3$



6. Describe the transformations to a function  $f(x)$ .

a.  $f(x) + 2$

b.  $f(x - 3)$

c.  $f(x) - 1$

d.  $\frac{1}{3}f(x)$

e.  $2f(x + 1) - 3$

f.  $-f(x) + 2$

7. Inverses:

Find a table of values for the function and its inverse.  $f(x) = 3x + 1$

Function		Inverse	
x	f(x)	x	f <sup>-1</sup> (x)

8. Find the inverse of the following functions:

a)  $b(x) = 4x + 5$

b)  $f(x) = \sqrt{4x - 4}$

9. Given the function,  $f$ , determine the following values:  $f(x) = \begin{cases} x + 4, & x < 3 \\ -2x - 4, & x \geq 3 \end{cases}$

a)  $f(-2) =$

b)  $f(10) =$

c)  $f(3) =$

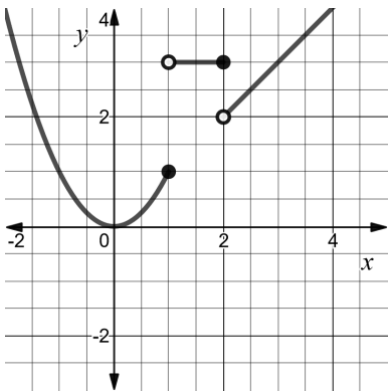
10. Use the graph of  $y = f(x)$  to answer parts a - d.

a)  $f(-1)$  \_\_\_\_\_

b)  $f(1) =$  \_\_\_\_\_

c)  $f(2) =$  \_\_\_\_\_

d)  $f(x) = 1$  \_\_\_\_\_



## Polynomials

1) Perform the indicated operation using the functions given below:

$$f(x) = x^3 + 2x^2 - 3x + 5$$

$$g(x) = 2x^4 + 5x^2 - 10$$

a)  $f(x) + g(x)$

b)  $f(x) - g(x)$

c)  $2f(x) + g(x)$

d)  $f(x) - 3g(x)$

e)  $f(x) \times g(x)$

f)  $2f(x) + 3g(x)$

2) Factor each of the following:

a)  $f(x) = x^3 + x^2 - 9x - 9$

b)  $g(x) = x^4 - 5x^2 + 4$

c)  $h(x) = 2x^2 + x - 10$

d)  $r(x) = x^2 - 16$

e)  $j(x) = x^3 - 4x^2 - x + 4$

f)  $a(x) = 6x^3 + 12x$

3) Perform the indicated operation on the complex numbers, given that  $i = \sqrt{-1}$ .

a)  $(5 - 2i) + (3 + 4i)$

b)  $(3 - i) - (7 + 2i)$

c)  $(1 - 8i)(2 + i)$

4) Perform synthetic division on each of the following, write your result as a polynomial in standard form.

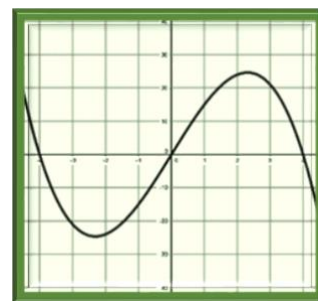
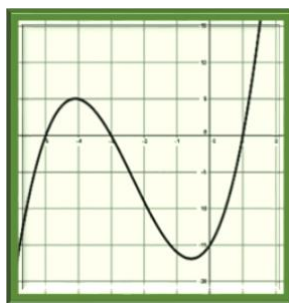
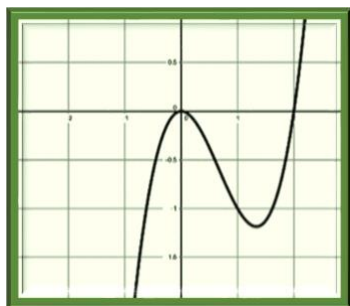
a)  $(x^3 - 23x + 28) \div (x - 4)$

b)  $(x^4 - 3x^3 + 4x^2 - 5x + 10) \div (x + 3)$

c)  $(2x^4 + 13x^3 + 10x^2 - 18x + 35) \div (x + 5)$

d)  $(x^4 - x^3 + 2x^2 - 7x + 5) \div (x - 1)$

5) Match the graph to the function.



1.  $f(x) = (x - 1)(x + 3)(x + 5)$

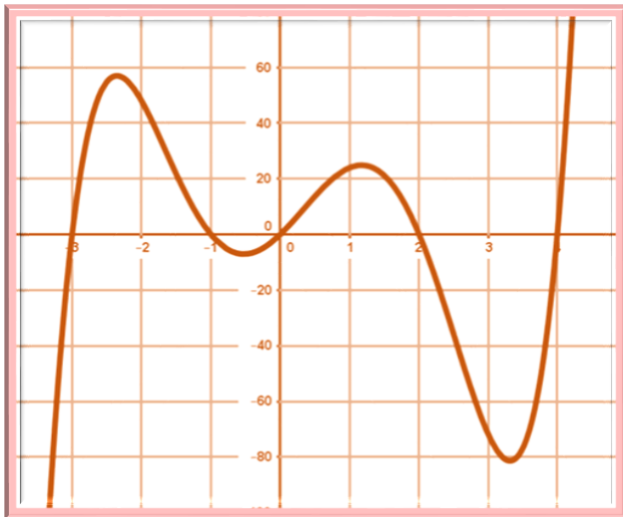
2.  $f(x) = x^2(x - 2)$

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

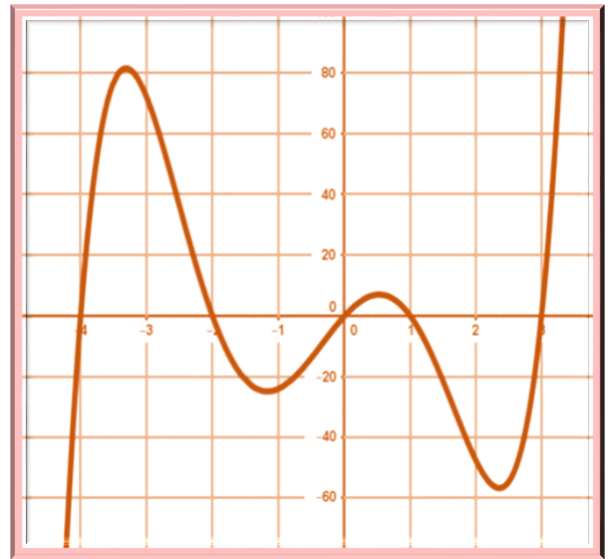
4.  $f(x) = x(x - 1)^2(x + 1)$

6) Write a possible function, in factored form, for the given graph, using the x-intercepts.

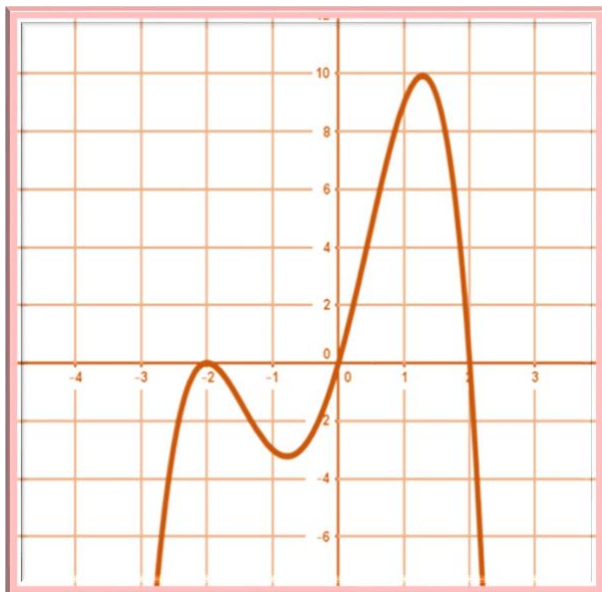
a)



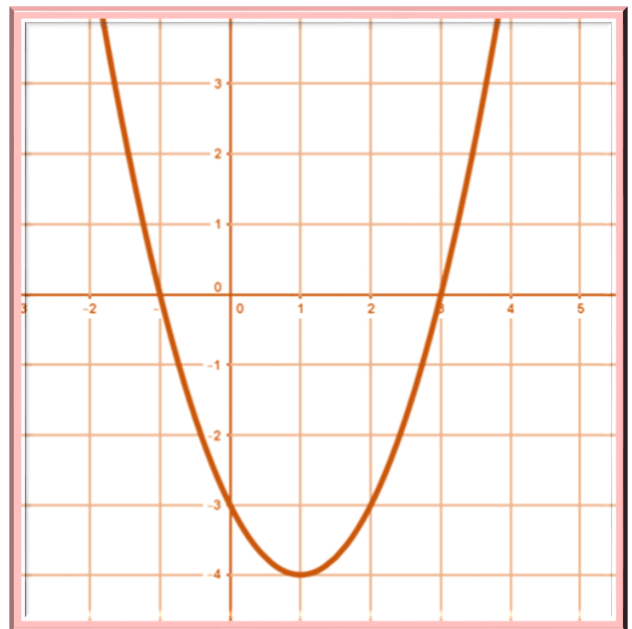
b)



c)

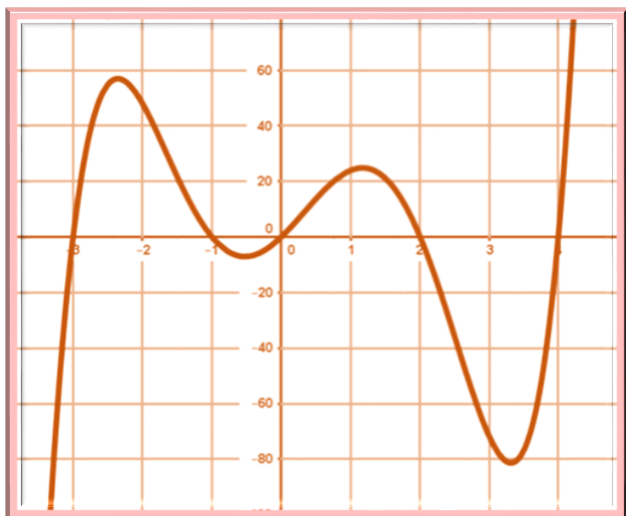


d)

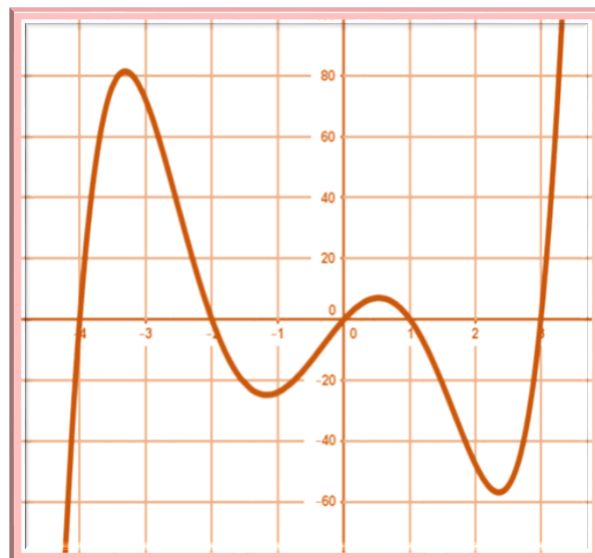


7) Describe the end behavior of each graph using limit notation.

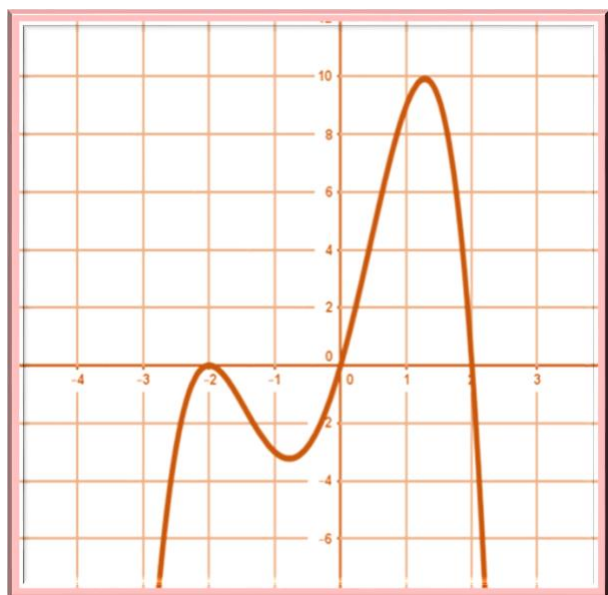
a)  $\lim_{x \rightarrow \infty} f(x) =$        $\lim_{x \rightarrow -\infty} f(x) =$



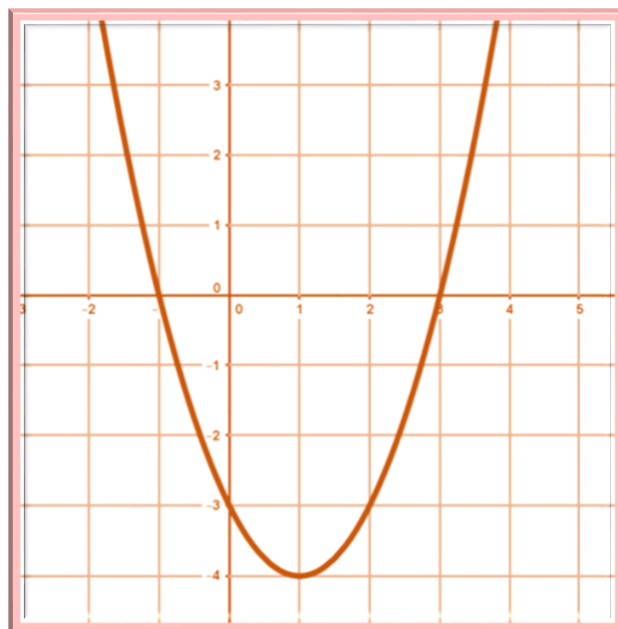
b)  $\lim_{x \rightarrow \infty} f(x) =$        $\lim_{x \rightarrow -\infty} f(x) =$



c)  $\lim_{x \rightarrow \infty} f(x) =$        $\lim_{x \rightarrow -\infty} f(x) =$



d)  $\lim_{x \rightarrow \infty} f(x) =$        $\lim_{x \rightarrow -\infty} f(x) =$



8) List all the possible/potential rational roots for the functions.

a)  $f(x) = 3x^4 + 5x^3 - 7x + 4$

b)  $f(x) = 2x^3 + 6x^2 - x + 9$



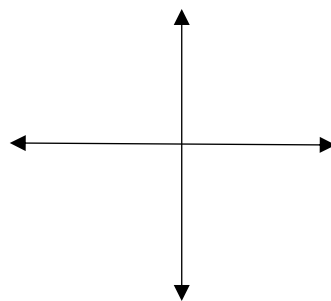
9) State the degree, the leading coefficient, and describe the end behavior.

a.  $-x^3 + x^2 + 3x - 3$

Degree: \_\_\_\_\_ Leading Coefficient: \_\_\_\_\_

End Behavior:  $\lim_{x \rightarrow -\infty} f(x) \rightarrow$  \_\_\_\_\_

$\lim_{x \rightarrow \infty} f(x) \rightarrow$  \_\_\_\_\_

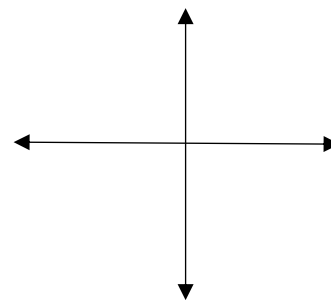


b.  $x^4 - x^3 - 4x^2 + 4$

Degree: \_\_\_\_\_ Leading Coefficient: \_\_\_\_\_

End Behavior:  $\lim_{x \rightarrow -\infty} f(x) \rightarrow$  \_\_\_\_\_

$\lim_{x \rightarrow \infty} f(x) \rightarrow$  \_\_\_\_\_

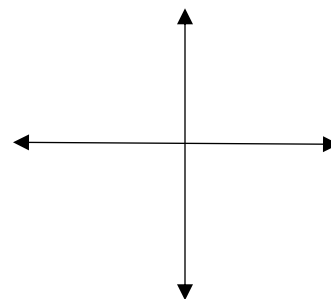


c.  $-3x^2 + 7 + x^3 + 4x^5 + 4x$

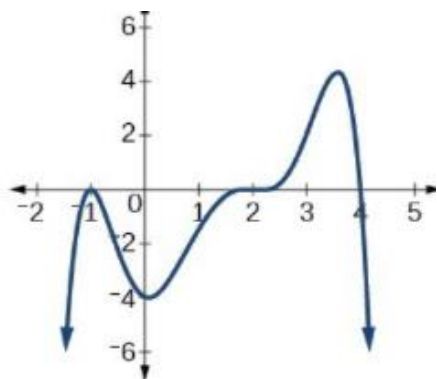
Degree: \_\_\_\_\_ Leading Coefficient: \_\_\_\_\_

End Behavior:  $\lim_{x \rightarrow -\infty} f(x) \rightarrow$  \_\_\_\_\_

$\lim_{x \rightarrow \infty} f(x) \rightarrow$  \_\_\_\_\_



10. What is true about the polynomial function whose graph is shown? (Circle all that apply)



a)  $\lim_{x \rightarrow \infty} f(x) = -\infty$

b)  $\lim_{x \rightarrow \infty} f(x) = \infty$

c) Leading coefficient is positive

d) Degree is even

e) Leading coefficient is negative

f) Degree is odd

## Exponential Functions

1) Simplify each of the following exponential expressions, write answer in RADICAL FORM.

a)  $(x^{7/3})(x^{-2/3})$

b)  $(x^{1/2})(x^{3/4})$

c)  $\frac{(x^{4/3})}{(x^{2/3})}$

d)  $(x^{5/3}y^{1/3})(x^{-2/3}y^{4/3})$

e)  $(x^{5/4}y^{-2/3})(x^{1/4}y^{5/3})$

f)  $(y^{1/3})(y^{4/3})$

2) Solve for x:

a)  $\sqrt[3]{x-5} + 2 = 0$

b)  $\sqrt{2x+7} = 5$

c)  $2\sqrt{x-3} - 6 = 4$

d)  $(2x-4)^{1/2} = 12$

e)  $(x-5)^{2/3} = 4$

f)  $(x-2)^{3/2} = 27$

3) Given each of the functions, answer the related questions.

a)  $A = 1,000(1 + .07)^t$

- 1) Is this growth or decay?
- 2) What is the initial amount?
- 3) What is the percent change?
- 4) How much will there be in 5 years?

b)  $A = 12,000(1 + \frac{.025}{12})^{12t}$

- 1) Is this growth or decay?
- 2) What is the initial amount?
- 3) What is the percent change?
- 4) How many times is the rate compounded?
- 5) How much will there be in 7 years?

c)  $A = 925(1 - .25)^t$

- 1) Is this growth or decay?
- 2) What is the initial amount?
- 3) What is the percent change?
- 4) How much will there be in 11 years?

d)  $A = 1,200e^{-0.0112t}$

- 1) Is this growth or decay?
- 2) What is the initial amount?
- 3) What is the percent change?
- 4) How much will there be in 5 years?

e)  $A = 600e^{0.81t}$

- 1) Is this growth or decay?
- 2) What is the initial amount?
- 3) What is the percent change?
- 4) How much will there be in 15 years?

f)  $A = 1,000e^{0.0058t}$

- 1) Is this growth or decay?
- 2) What is the initial amount?
- 3) What is the percent change?
- 4) How much will there be in 100 years?

4) Graph each of the following, create a table of values using Domain  $\{-2, -1, 0, 1, 2\}$ .

a)  $f(x) = 2^x$

b)  $f(x) = -2^x$

c)  $f(x) = 2^x + 1$

d)  $f(x) = 3^x$

e)  $f(x) = -3^x$

f)  $f(x) = 3^x - 2$

5) Simplify the following:

a)  $\sqrt{3} \cdot \sqrt{6}$

b)  $2\sqrt{12} \cdot \sqrt{2}$

c)  $100\sqrt{5} \cdot -2\sqrt{6}$

6) Rewrite the expressions in the opposite form. (radical notation  $\leftrightarrow$  rational exponent notation)

a)  $x^{\frac{1}{3}}$

b)  $4^{\frac{7}{5}}$

c)  $\sqrt[7]{x^4}$

d)  $(\sqrt[8]{y})^3$

$(16x^4)^{\frac{1}{2}}$

7) Evaluate the expressions.

a)  $8^{\frac{2}{3}}$

b)  $64^{\frac{1}{2}}$

c)  $(\sqrt[5]{32})^3$

d)  $27^{\frac{4}{3}}$

8) Assuming all variables represent positive real numbers, simplify the expressions completely.

a)  $\sqrt[3]{64x^{15}y^7}$

b)  $\sqrt[5]{32x^{20}y^{17}}$

9) Solve for x. **Check for extraneous solutions.**

a)  $\sqrt{2x - 6} = 2$

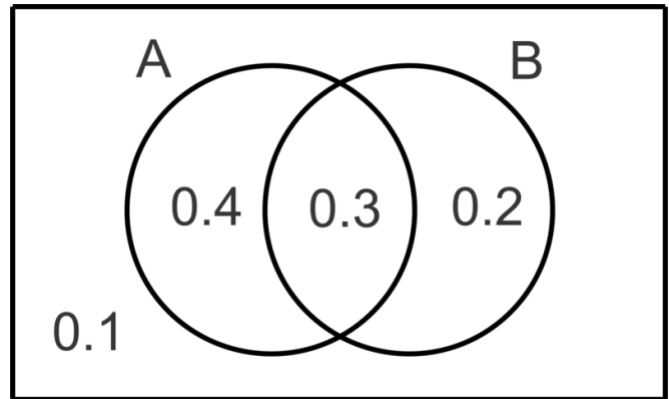
b)  $4(x + 4)^{1/4} = 8$

c)  $\sqrt[3]{x - 1} + 4 = 8$

### Probability

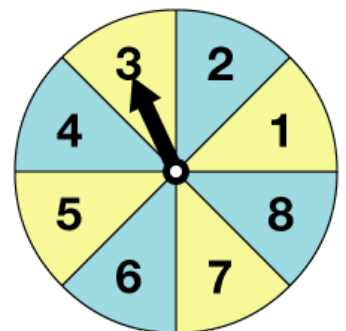
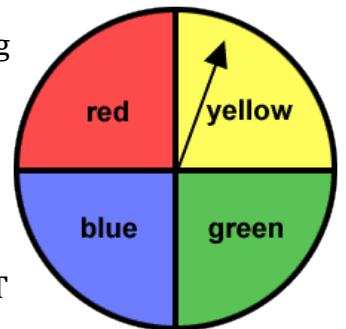
- 1) \*\*\* Use the given Venn diagram of the probability of an accident on I-95 [ $P(A)$ ] is 70 % and the probability of an accident on the Merritt [ $P(B)$ ] is 50%, to answer the related questions?

- Find  $P(A \cup B)$ :
- Find  $P(A \cap B)$ :
- Find  $P(A^c)$ :
- Find  $P(A \cup B)^c$ :
- Explain a – d in context of the problem



- \*\*\* In a class of 25 students, 11 study History and 12 study Geography. There are 5 students who study both History and Geography. How many students study History or Geography? (Drawing a Venn diagram my aid you)
- \*\*\* In a group of 100 students, it was found that 40 study Math A, 30 study Drama and 54 study neither. How many students study Math A or Drama? (Drawing a Venn diagram my aid you)
- \*\*\* In a class it was found that 64% of the students like apples, 48% like bananas and 9% like neither. How many students like both apples and bananas? (Drawing a Venn diagram my aid you)
- \*\*\* Use the spinners below to answer the related questions. (Put answer in: reduced fraction, percent rounded to hundredth or decimal rounded to thousandth)

- Using the color spinner, what is the probability of the pointer landing on green?
- Using the number spinner, what is the probability of the pointer landing on a prime number (1 is NOT prime)?
- Using the color spinner and number spinner, what is the probability of the pointer landing on red or an even number?
- Using the number spinner, what is the probability of the pointer NOT landing on 8?
- Using the color spinner and number spinner, what is the probability of the pointer landing on green or 6?



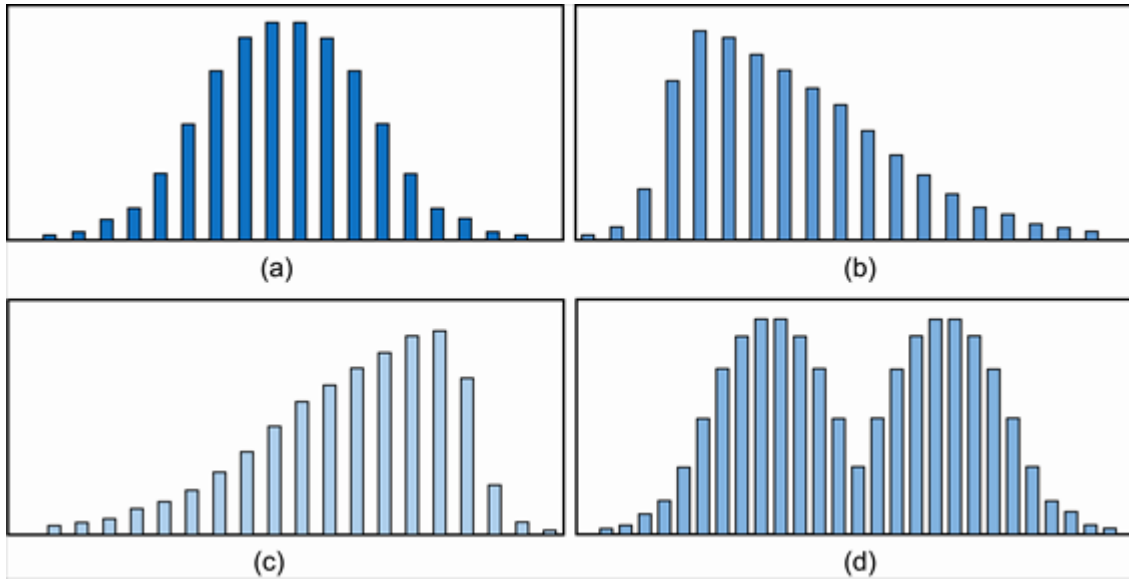
- 6) Write a problem that is an example of independence.
- 7) Write a problem that is an example of dependence.
- 8) \*\*\* Use the two-way frequency table to answer the related questions:

Gender	Preferred Program			
	Dance	Sports	Movies	Total
Women	16	6	8	30
Men	2	10	8	20
Total	18	16	16	50

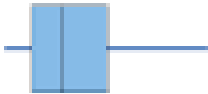
- a) The probability the individual prefers the movies.
- b) The probability the individual prefers dance and is a man.
- c) The probability the individual prefers sports, given the individual is a woman
- d) The probability the individual is a woman, given the individual prefers movies
- e) The probability the individual is a man
- f) The probability the individual is a woman who prefers dance
- g) The probability The individual prefers movies, given the individual is a man

## Statistics

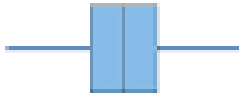
1) Match each of the following histograms and box plots with its shape description (i – iv).



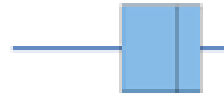
a)



b)



c)



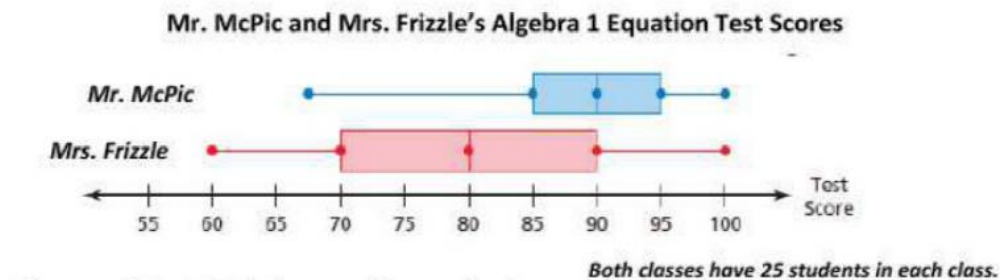
i) symmetric

ii) right skew

iii) left skew

iv) none

2) \*\*\* Use the double box and whisker below to answer the related questions



- What % of Mr. McPic's class scored between 85 and 95?
- What is the median score in Mrs. Frizzle's class?
- Would the mean be above or below the median in Mr. McPic's class?
- Which class looks like it might have an outlier? Explain.
- Can it be said Mr. McPic's class fared better than Mrs. Frizzle's? Defend your position.
- What is Q1 in Mrs. Frizzle's class? In Mr. McPic's class?

- 3) \*\*\* The mean of a set of 5 numbers is 26, with a median of 25, if all of the numbers were increased by 10
- What would the mean be?
  - What would the median be?
  - What if you changed THE ORIGINAL numbers to %s, by dividing by 100, how would this change the mean, median?
- 4) Determine the population, sample, parameter and its value, statistic and its value, margin of error and statistical range for each of the following.
- According to the world genetics foundation 36.2% of all boys age 5 – 10 carry the blue eyed gene, a study of 308 random boys age 5 – 10 found 34% of them carried the blue eyed gene.
    - Population:
    - Parameter
    - Sample
    - Statistic
    - Margin of Error
    - What happens to the margin of error when you reduce the number of your study?  
Increase the number in your study?
  - The Connecticut State Employee Human Resources data base shows 11.6% of employees live outside the state, a study of 1200 Connecticut State Employees found that 12% of them lived outside the state.
    - Population:
    - Sample
    - Parameter
    - Statistic
    - Margin of Error
    - What happens to the margin of error when you reduce the number of your study?  
Increase the number in your study?
- 5) Fairfield Woods Middle school did a survey 100 random FWMS students, to find out how many students are driven to and from school (as opposed to riding a school bus or walking). They found that 32% of students are driven to and from school.
- Can the school board use this information for planning the number of busses needed for the entire middle school district (FWMS, TMS, RLMS)? Explain why.
  - Can the school board use this information for planning the number of busses needed for Fairfield Woods Middle School? Explain why.

## Trigonometry

1) What is  $200^\circ$  in radians?

2) What is  $\frac{\pi}{18}$  in degrees?

3) Find the exact value of each:

a)  $\sin 150^\circ$

b)  $\cos 240^\circ$

c)  $\tan 135^\circ$

d)  $\sin \frac{\pi}{3}$

e)  $\cos \frac{\pi}{4}$

f)  $\sin 240^\circ$

g)  $\cos 225^\circ$

h)  $\tan 120^\circ$

i)  $\sin \frac{3\pi}{4}$

j)  $\tan \frac{\pi}{6}$

4) Use the given value and quadrant to determine the value requested:

a) Given  $\tan \theta = \frac{3}{4}$   
and  $180 < \theta < 270$ , find  
 $\sin \theta$

b) Given  $\cos \theta = \frac{1}{2}$   
and  $0 < \theta < 90$ , find  $\sin \theta$ .

c) Given  $\sin \theta = \frac{1}{2}$   
and  $90 < \theta < 180$ , find  
 $\cos \theta$ .

5) Graph 1 period of the functions below. Remember to label your scale and axes.

a)  $f(x) = \sin(x)$

b)  $f(x) = \cos(x)$

c)  $f(x) = 2\sin(x)$

d)  $f(x) = \cos(x) - 1$

e)  $f(x) = \sin(x) + 2$

f)  $f(x) = -\cos(x)$

6)  $f(x) = 3\cos(2x)$

- What is the amplitude?
- What is the period?
- What is the horizontal shift?
- What is the vertical shift?
- Identify any other transformations on the curve.

7)  $f(x) = -4\sin(x) + 2$

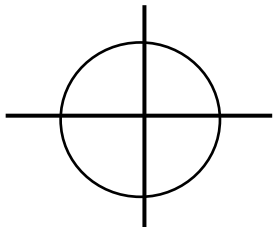
- What is the amplitude?
- What is the period?
- What is the horizontal shift?
- What is the vertical shift?
- Identify any other transformations on the curve.

8)  $f(x) = 2\cos(x - 30) - 1$

- What is the amplitude?
- What is the period?
- What is the horizontal shift?
- What is the vertical shift?
- Identify any other transformations on the curve.



9) Convert  $330^\circ$  to radians and draw it in the correct quadrant. What is the reference angle?



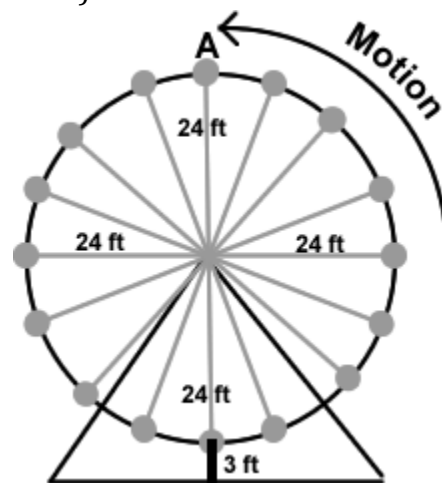
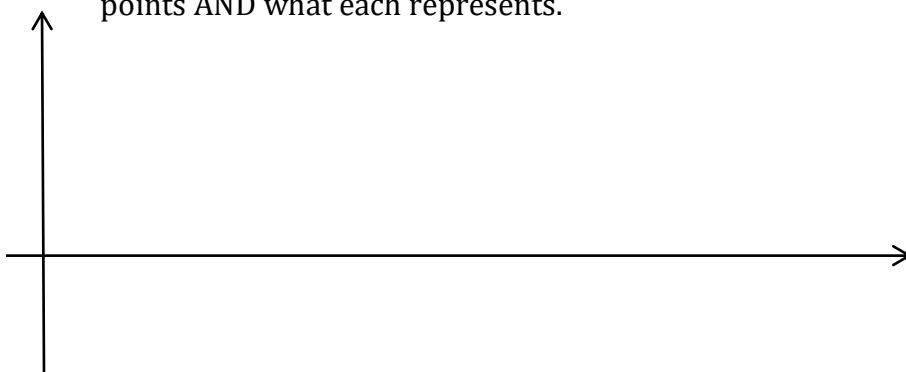
Radian measure: \_\_\_\_\_

Reference angle: \_\_\_\_\_

What quadrant is it in? \_\_\_\_\_

10) Engineers at the Big E are attempting to model the motion of the Ferris wheel. The Ferris wheel has a radius of 24 ft and the rider is 3 ft above the ground at the lowest point. When operating at full speed, the rider makes one counter-clockwise revolution every 2 minutes (120 seconds).

- a. Graph one rotations. Label x and y axes with all relevant points AND what each represents.



- b. Use sine to write a function to model the height of the rider starting with  $t = 0$  sec when the rider is at the bottom and reaches the top of the Ferris wheel after a  $\frac{1}{2}$  rotation. Find the value of A and B and explain the meaning of each parameter (A,  $\omega$ , B) of the function as it relates to the Ferris wheel model.
- Function:  $h(t) = A \sin(\pi x - \pi/6) + B$
  - Amplitude:
  - Midline:
  - Period:
- c. At what time(s) is the car A (assuming it started at the bottom at time zero) at 27 feet above the ground? (Only use first rotation)
- d. How high is car A at 30, 60, and 90 seconds?

11) State the parent function and the transformations for each graph.

a)  $g(x) = \sin(x) - 1$

b)  $j(x) = \cos(x) + 4$

c)  $p(x) = 2\cos(x) + 1$