Name:_____

IB Math Studies – Summer Work

Welcome to Math Studies! I am Mrs. Murphy (previously Miss Sweeney) and I will be your math teacher for the 2017-2018 school year.

The following assignment needs to be completed and is due the FIRST DAY OF CLASS AND COUNTS AS A QUIZ GRADE. This is a review of Algebra 2 topics such as linear, quadratic and exponential functions and Geometry topics. All these topics will be review and tested on the third day of class in September. Please note that it is recommended that you purchase a TI-84+ graphing calculator, since we will be using it in class during the year, and it is necessary for the IB exam.

I will be hosting a few office/tutoring hours in late August if you are having any issues with the problems in this packet. Please email me at asweeney@rbrhs.org if I don't already have your email address, so I may let you know the dates and times of those office hours or email me if you have any questions.

Below are formulas to help with the Geometry questions.

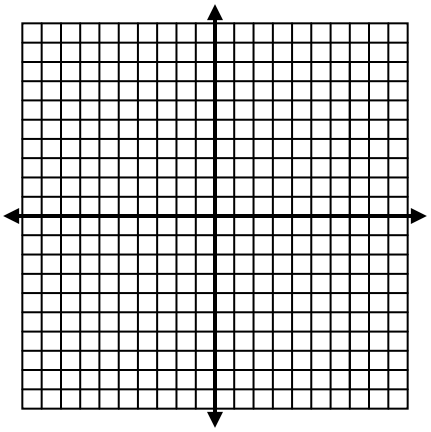
Formulas:

Area of the curved surface of a cylinder	$A = 2\pi rh$, where r is the radius, h is the height
Surface area of a sphere	$A = 4\pi r^2$, where r is the radius
Area of the curved surface of a cone	$A = \pi rl$, where r is the radius, l is the slant height
Volume of a pyramid	$V = \frac{1}{3}Ah$, where A is the area of the base, h is the vertical height
Volume of a cuboid	$V = l \times w \times h$, where l is the length, w is the width, h is the height
Volume of a cylinder	$V = \pi r^2 h$, where r is the radius, h is the height
Volume of a sphere	$V = \frac{4}{3}\pi r^3$, where r is the radius
Volume of a cone	$V = \frac{1}{3}\pi r^2 h$, where r is the radius, h is the vertical height
Volume of a prism	$V = A$h, where A is the area of cross-section, h is the height

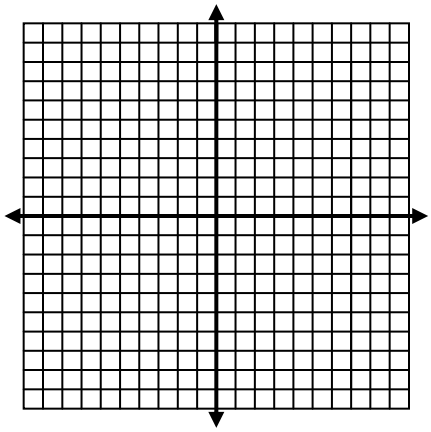
Linear Functions $y = mx + b$

Graph the following lines.

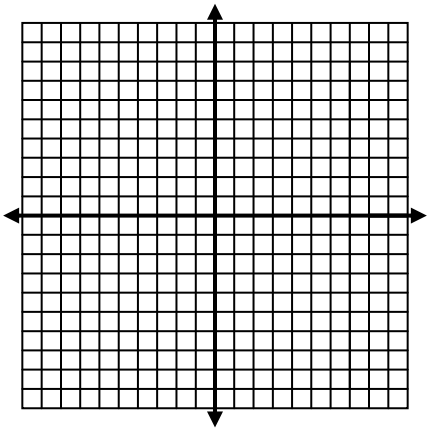
1. $f(x) = \frac{3}{4}x - 1$



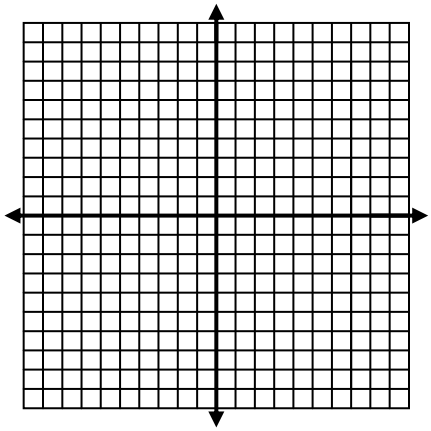
2. $f(x) = -2x - 5$



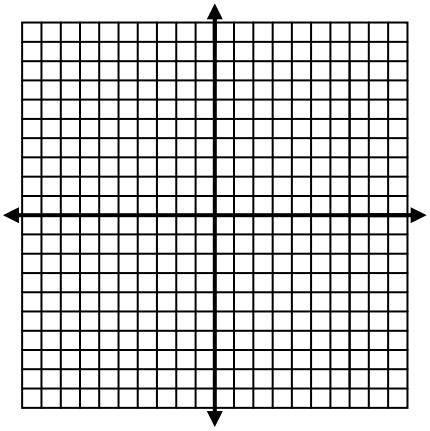
3. $-2x + 4y = 12$



4. $y = -3$



5. $-2y + 6 = x$



6. Three points are given A(0, 4), B(6, 0) and C(8, 3). Plot the points.

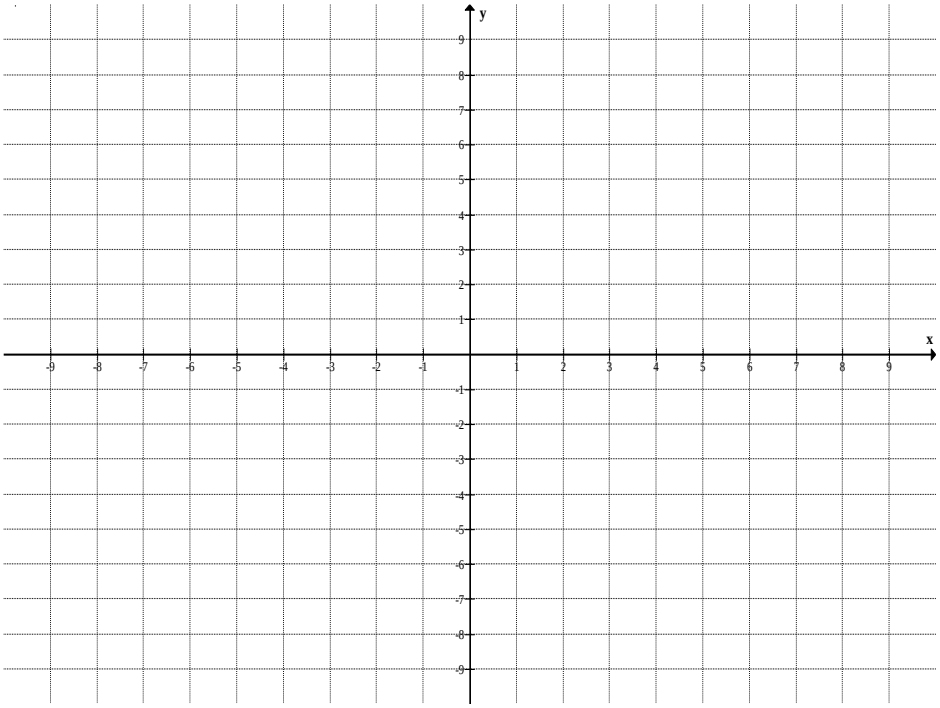
(a) Calculate the slope of line AB.

(b) Find the coordinates of the midpoint, M, of the line AC.

(c) Calculate the length of line AC.

(d) Find the slope of the line BM and then write the equation of the line BM.

(e) State whether the line AB is perpendicular to the line BC showing clearly your working and reasoning.



Quadratic Functions $y = ax^2 + bx + c$

Factor completely:

1.) $x^2 - 8x - 48$ 1.) _____

2.) $x^2 + 6x - 27$ 2.) _____

3.) $3x^2 - x - 14$ 3.) _____

4.) $2x^2 - 50$ 4.) _____

5.) $2x^2 + 15x + 7$ 5.) _____

6.) $4x^2 - 20x + 25$ 6.) _____

Solve:

7.) $x^2 + 19x + 18 = 0$ 7.)_____

8.) $x^2 - 5x = 6$ 8.)_____

For each equation, identify the vertex, fill in the chart, and graph the function:

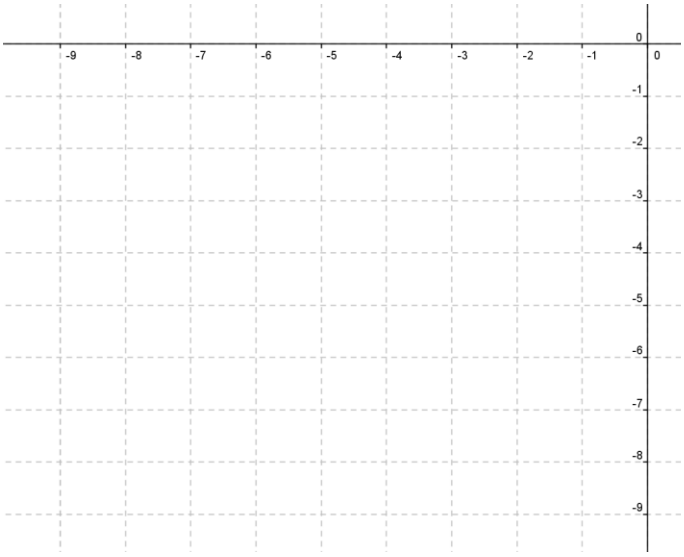
9.) $y = (x+2)(x+8)$

Vertex: _____

X-intercepts:

_____

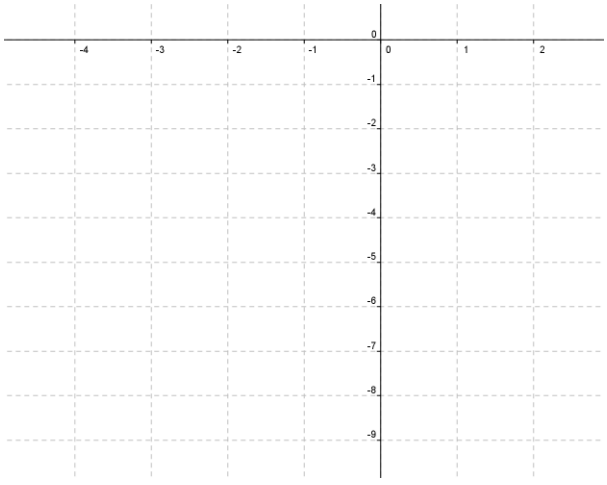
_____



10.) $y = -2x^2 - 4x - 3$

Vertex: _____

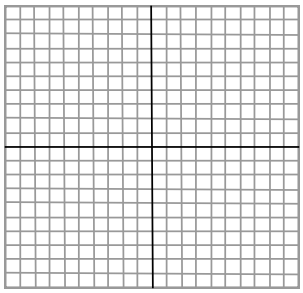
x	y



Exponential Functions $y = a \cdot b^x$

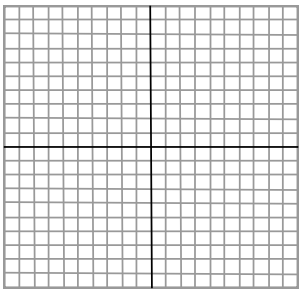
In 1 - 3, graph each function. Identify the domain, range, horizontal asymptote and y-intercept.

1. $y = 2^x$



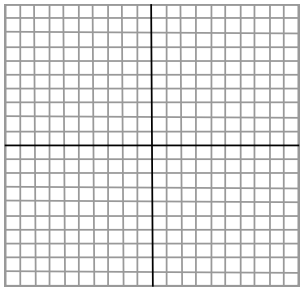
y-intercept:
domain:
range:
asymptote:

2. $y = .5^x + 1$



y-intercept:
domain:
range:
asymptote:

3. $y = 3^x - 1$



y-intercept:
domain:
range:
asymptote:

4. You bought a house in 1999 for $210,000 that has increased in value 2% each year.

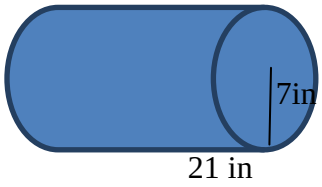
a.) Write an exponential model that describes this situation.

b.) If you decide to sell the house in 2011, how much should your asking price be, assuming the percent increase will continue?

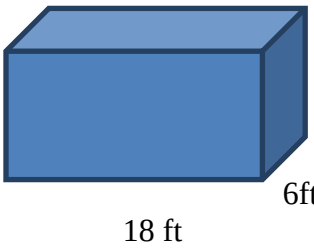
c.) When will your house be worth at least $300,000?

Surface Area and Volume

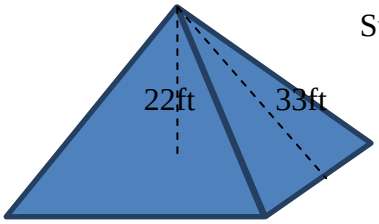
Find the Surface Area and Volume for each figure using the formula below.

1. 

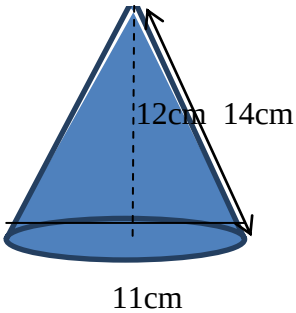
Surface Area =_____ Volume = _____

2. 

Surface Area =_____ Volume =_____

3. 

Surface Area =_____ Volume =_____

4. 

Surface Area =_____ Volume =_____

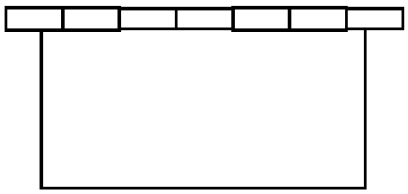
Word Problems

Use problem solving strategies to solve the following word problems.

1. When 24 is subtracted from the square of a number, the result is 5 times the original number. Find the number.

2. A triangle has base 2cm more than its altitude (height). If its area is 49.5 cm^2, find its altitude.

3. A rectangular pig pen is built against an existing brick fence. 24m of fencing was used to enclose 70m^2. Find the dimensions of the pen. (*hint:* write an equation for area and an equation for perimeter and solve the system of equations using substitution or elimination methods).



4. A rectangular swimming pool is 12m long by 6m wide. It is surrounded by pavement of uniform width, the area of the pavement being 7/8 the area of the pool.

a) If the pavement is x m wide, show that the area of the pavement is $4x^2 + 36x$ m^2.

b) Hence, show that $4x^2 + 36x - 63 = 0$.

c) How wide is the pavement?