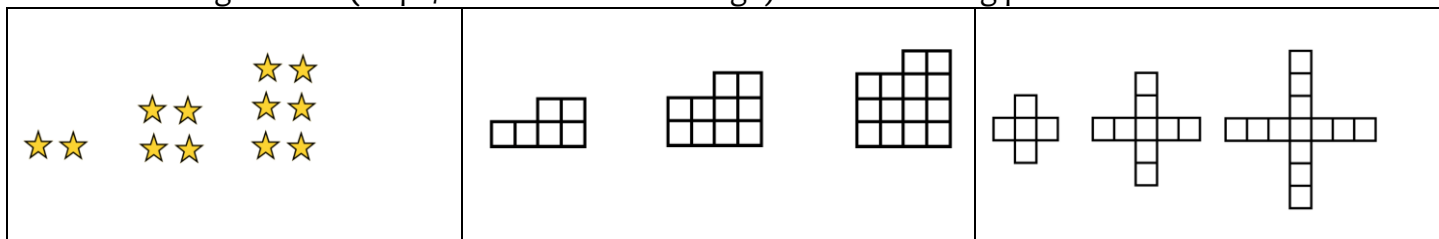


Review - MYP Math 9 Extended Level**UNIT 1: LINEAR EQUATIONS**

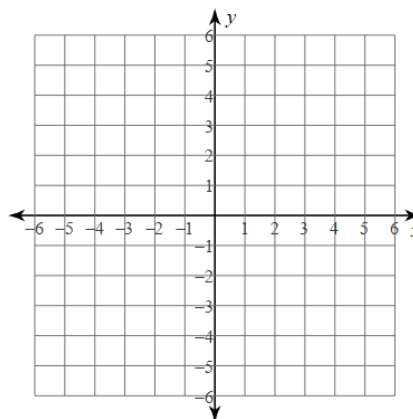
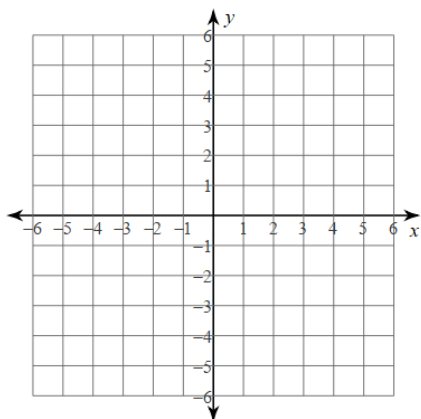
1. What are the gradients (slope/constant rate of change) of the following patterns?



2. Graph the system of equations.

(a) $y = -\frac{2}{3}x + 4$
 $y = \frac{1}{3}x + 1$

(b) $y = x + 1$
 $y = -3$



3. What is a solution to a system of linear equations?

4. Solve the system of linear equations algebraically.

(a) Solve using substitution.

$$y = -6x + 14$$

$$y = 2x + 6$$

(b) Solve using substitution.

$$y = -7x - 6$$

$$y = -6x - 5$$

(c) Solve using substitution.

$$4x + 8y = -24$$

$$y = -6$$

(d) Solve using substitution.

$$-6x + 7y = 16$$

$$y = -5x + 14$$

(e) Solve using elimination.

$$-3x + 3y = -9$$

$$3x - 6y = 0$$

(f) Solve using elimination.

$$-7x + 9y = -23$$

$$14x + 7y = 21$$

(g) Solve using elimination.

$$3x + y + 3z = 15$$

$$-2x + 2y = -8$$

$$x - 3y - 3z = 1$$

(h) Solve using elimination.

$$3x + y + 5z = -23$$

$$x - y + 2z = -9$$

$$-x + y - 3z = 13$$

(i) You are painting the white lines around the perimeter of the tennis court. You measure and find that the perimeter is 112 feet. The length is 21 feet longer than the width.

a. Write a linear system.

{

b. Identify the variables

c. Solve the linear system

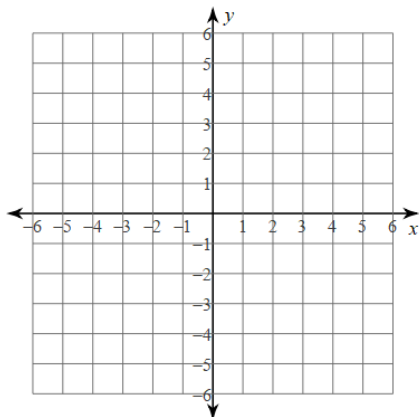
d. What are the dimensions of the tennis court?

5. Graph the linear inequalities.

$$y \leq -x + 3$$

$$y > \frac{3}{2}x - 2$$

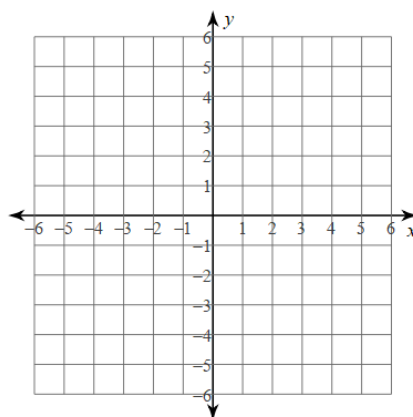
(a)



$$y \leq -\frac{1}{3}x + 2$$

$$y > -\frac{1}{3}x - 1$$

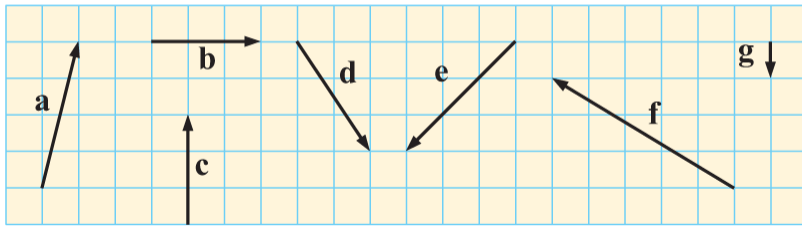
(b)



UNIT 2: VECTORS

6. Write the component form of the vector.

Write each vector in the form $\begin{pmatrix} x \\ y \end{pmatrix}$:



7. Find the approximated length of the vector

a $\begin{pmatrix} 5 \\ 2 \end{pmatrix}$

b $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$

c $\begin{pmatrix} -4 \\ -2 \end{pmatrix}$

d $\begin{pmatrix} 3 \\ 0 \end{pmatrix}$

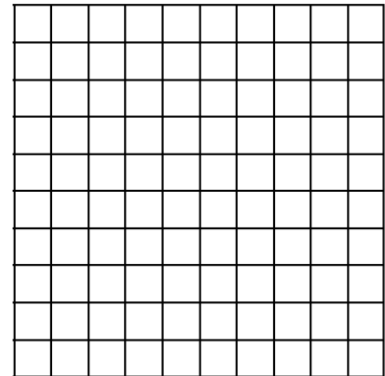
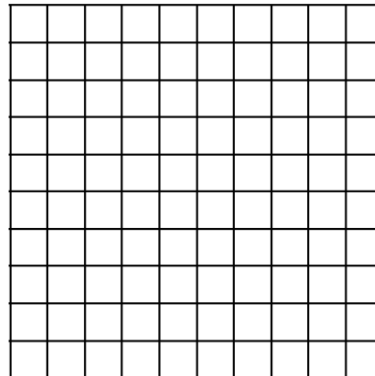
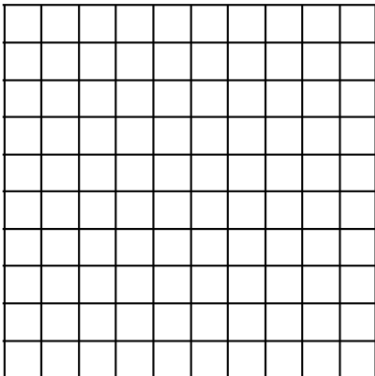
8. Do the vector addition.

If $\mathbf{a} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$, and $\mathbf{c} = \begin{pmatrix} -4 \\ 1 \end{pmatrix}$, find:

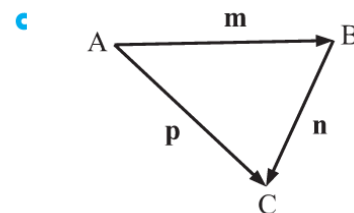
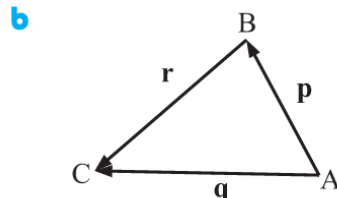
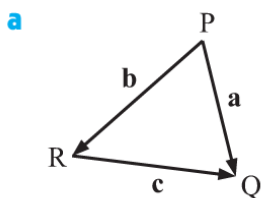
a $\mathbf{a} + \mathbf{b}$

b $\mathbf{b} + \mathbf{a}$

c $\mathbf{b} + \mathbf{c}$



9. Write a vector equation to connect the vectors in the following:



10. Simplify.

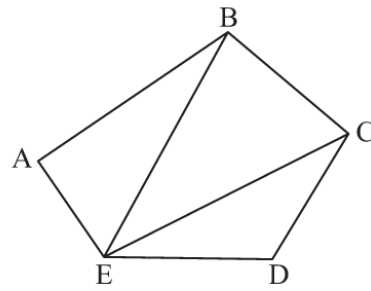
Simplify:

a $\vec{AB} + \vec{BE}$

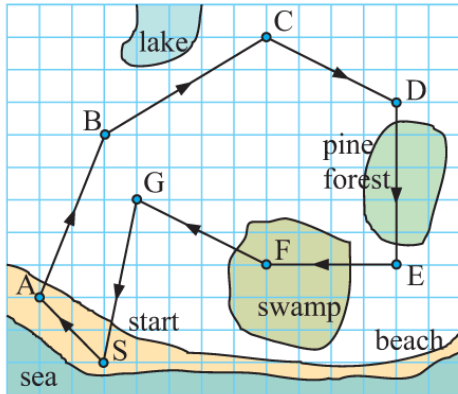
b $\vec{BC} + \vec{CE}$

c $\vec{BC} + \vec{CD} + \vec{DE}$

d $\vec{AB} + \vec{BC} + \vec{CD} + \vec{DE}$



11. Solve the vector application.



The diagram alongside shows an orienteering course run by Kahu.

- a** Write a column vector to describe each leg of the course.
- b** Find the sum of all of the vectors.
- c** What does the sum in **b** tell us?

12. Do the vector subtraction.

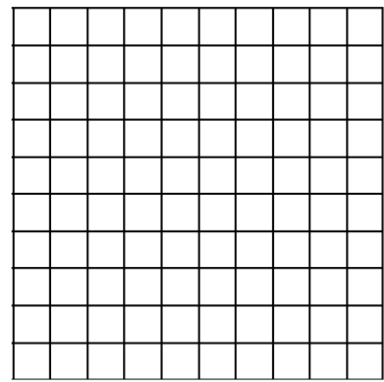
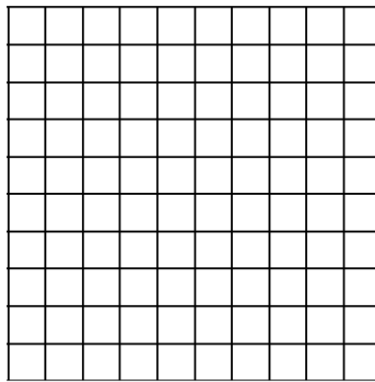
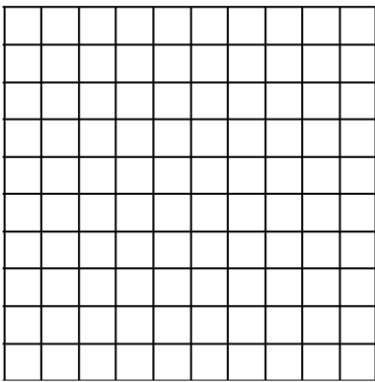
For the vectors $\mathbf{a} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$, and $\mathbf{c} = \begin{pmatrix} -5 \\ 0 \end{pmatrix}$, find:

a $\mathbf{a} - \mathbf{b}$

b $\mathbf{b} - \mathbf{c}$

e $\mathbf{a} + \mathbf{b} - \mathbf{c}$

f $\mathbf{b} + 2\mathbf{c} - \mathbf{a}$



13. Simplify.

a $\vec{AB} - \vec{CB}$

b $\vec{QP} - \vec{RP}$

c $\vec{AB} + \vec{BC} - \vec{DC}$

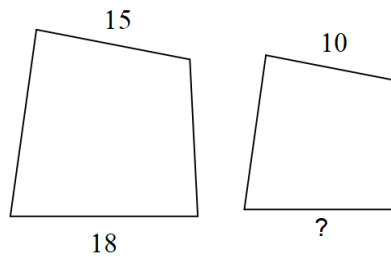
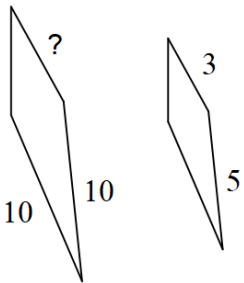
d $\vec{PQ} - \vec{RQ} + \vec{RS} - \vec{TS} + \vec{TV}$

UNIT 3: SIMILARITY AND TRIGONOMETRY

13. Solve the proportions.

$\frac{2}{10} = \frac{9}{n}$	$\frac{4x + 1}{2} = \frac{3x - 2}{5}$	$\frac{x}{6} + \frac{x + 2}{3} = -3$	$\frac{x + 4}{6} - \frac{x}{2} = \frac{3x - 2}{3}$
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14. The polygons are similar. Solve for the unknown side length.



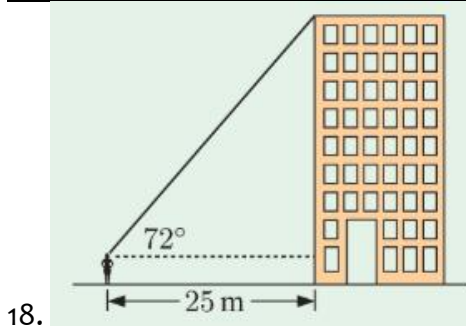
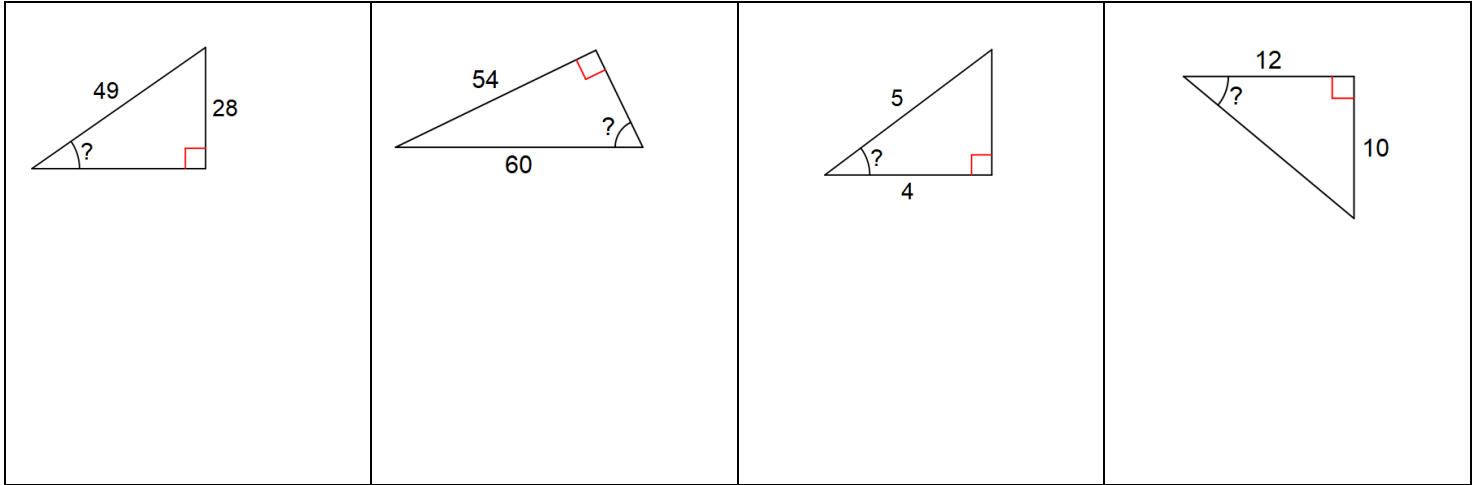
15. Find the exact trigonometric ratios.

<p>$\cos A$</p>	<p>$\sin Z$</p>	<p>$\tan X$</p>	<p>$\sin A$</p> <p>$\cos A$</p> <p>$\tan A$</p>
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16. Solve for the unknown side length.

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17. Solve for the unknown angle measure.



A young girl's eyes are one metre above ground level. She stands 25 m from the base of a tall building. She looks up to the top of the building at an angle of 72° . Find the height of the building.

19.

A swimmer swims for 68 m on the bearing 036° .

How far is the swimmer **a** north **b** east of her starting point?

20.

A helicopter pilot flies in the direction 147° and lands when he is 12 km south of his starting point. How far did he fly?

21.

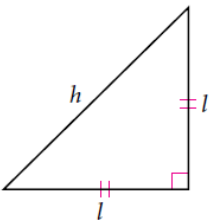
A cyclist rides 21.3 km due west and then 13.8 km due north. Find, to the nearest degree, the bearing of the finishing point from the starting point.

UNIT 4: CIRCLE TRIG & PERIODIC/TRIGONOMETRIC FUNCTIONS

22. **Investigation Special Right Triangles:** Use the Pythagorean Theorem to discover or affirm the Special Right Triangle side length patterns.

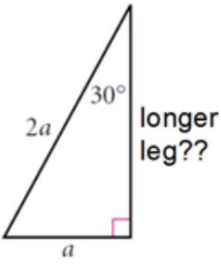
45° - 45° - 90° Triangle (Isosceles Right Triangle)

Given Leg Length	2	3	4	5
Solve for Hypotenuse				



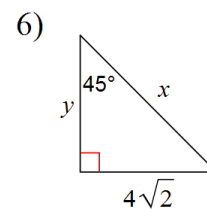
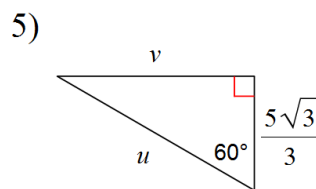
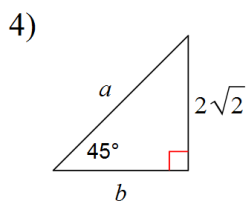
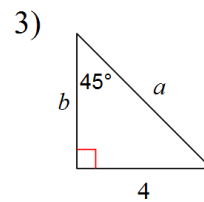
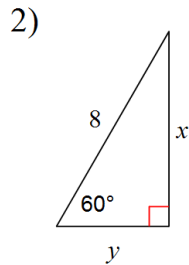
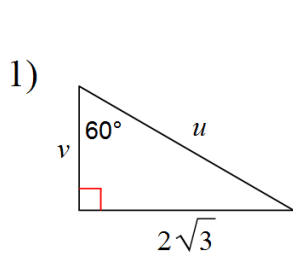
30° - 60° - 90° Triangle (Half an Equilateral Triangle)

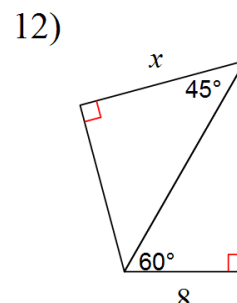
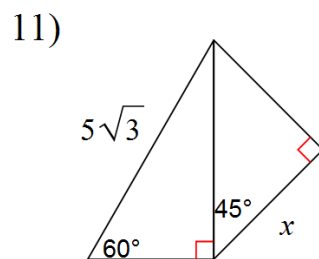
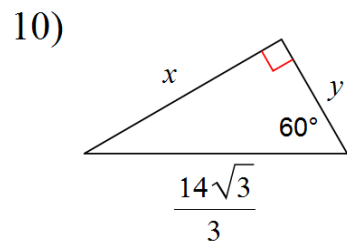
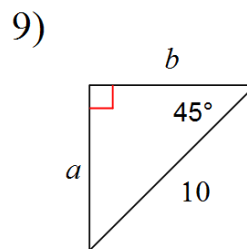
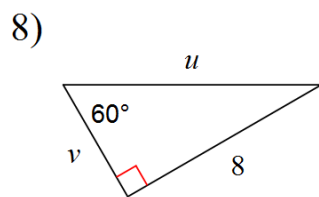
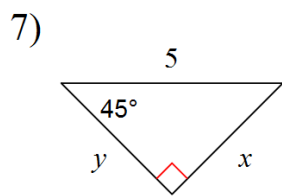
Short Leg	1	2		6
Solve for the Longer Leg				
Hypotenuse			10	



Record side length patterns:

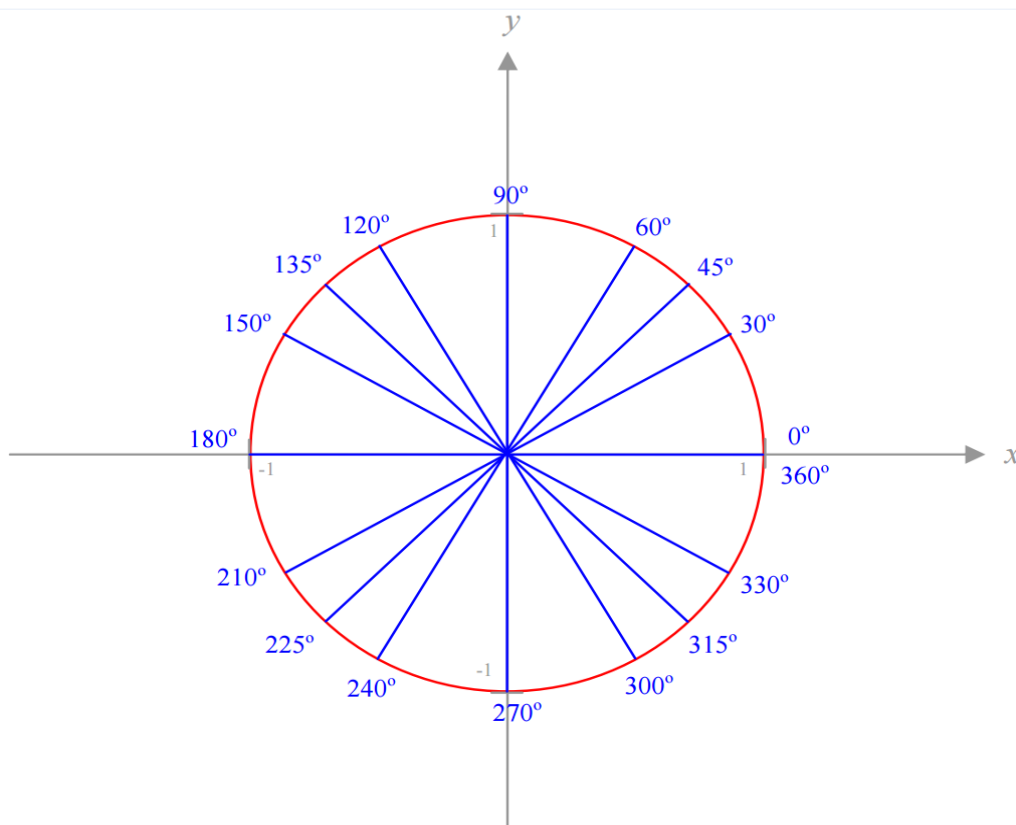
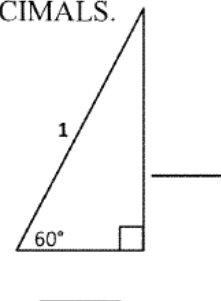
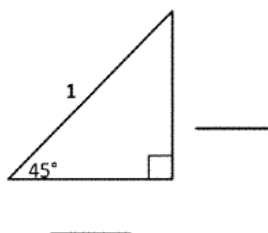
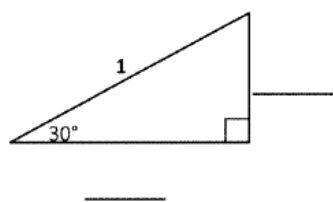
23. Apply the properties of special right triangles. Solve for all missing side lengths.





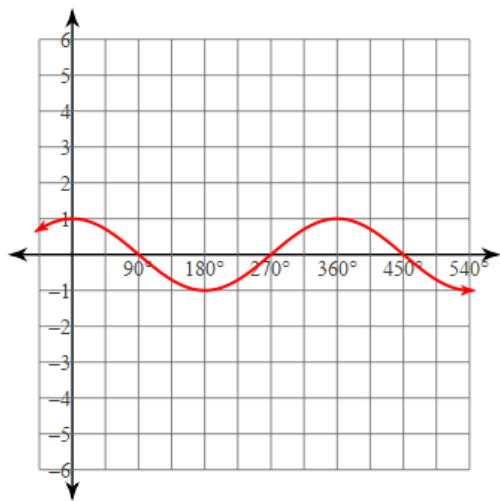
24. Build the Unit Circle

Use special right triangles to fill in the lengths of the missing sides. NO DECIMALS.

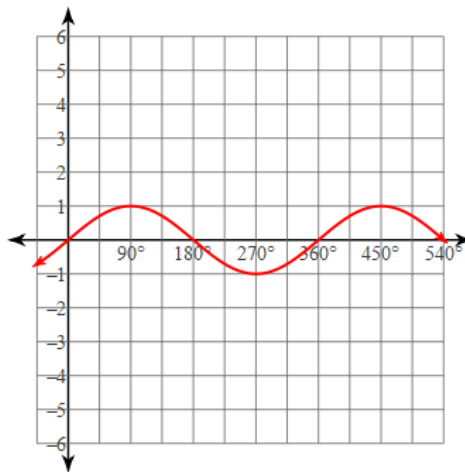


25. Determine if the graph is $y = \sin(x)$ or $y = \cos(x)$

a) _____



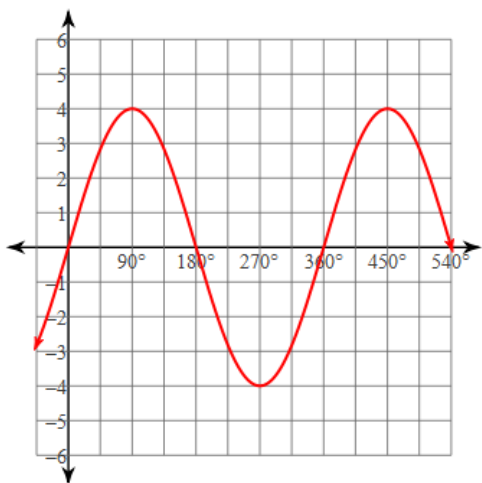
b) _____



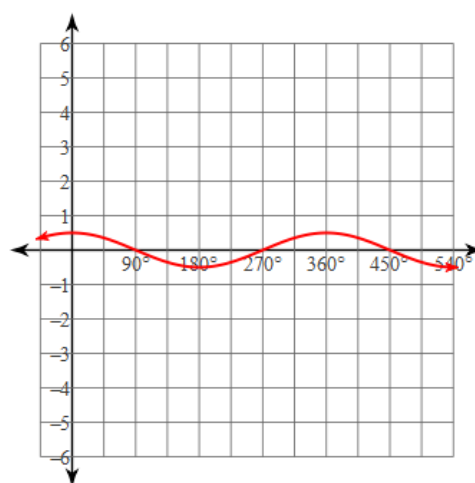
26. Determine the amplitude, period, and principle axis. Write the trigonometric equations.

$$y = a\sin(bx) + c \quad \text{or} \quad y = a\cos(bx) + c$$

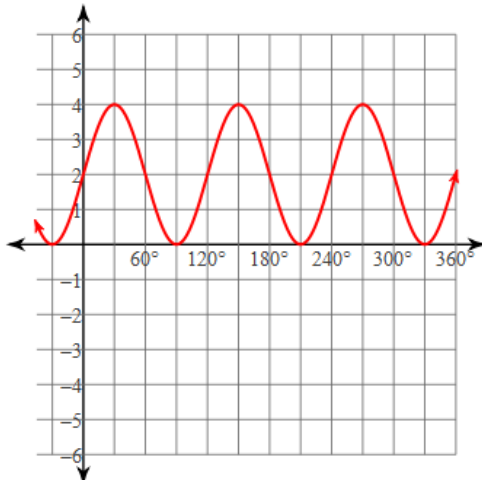
a) _____



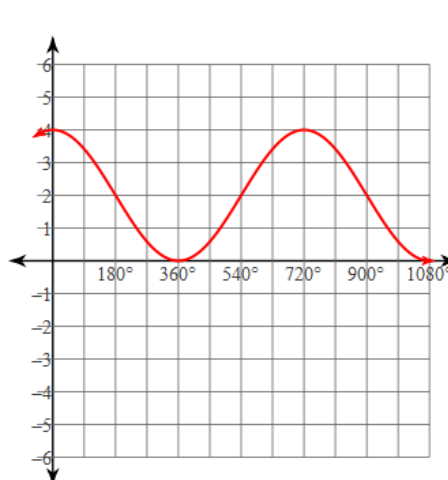
b) _____



c) _____



d) _____

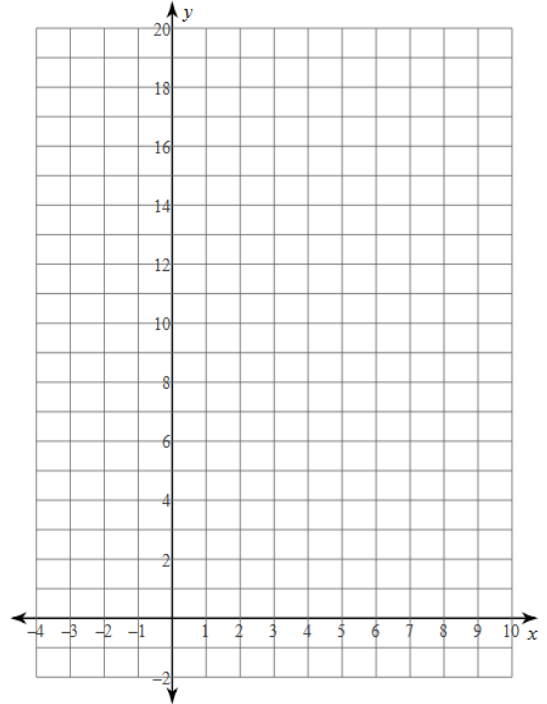


UNIT 5: EXPONENTIAL FUNCTIONS

27. Dot Pattern:



x (Stage)	y (Number of Dots)
-3	
-2	
-1	
0	
1	
2	
3	
4	
5	



28. Simplify. Your answers should have only **positive** exponents.

a) $a^3 \cdot a^5$	b) $\frac{2^9}{2^3}$
c) m^0	d) $-5x^0$
e) $x^3 \cdot x^{-7}$	f) $\frac{4^3}{4^8}$
f) $(w^3)^5$	g) $(3x^5)^2$

h)

$$\frac{2a^0 \cdot b}{ab^5 \cdot a^2b}$$

i)

$$\frac{(3x^5)^2 \cdot x^{-8} \cdot y^{-5} \cdot y}{x^3 \cdot y^2}$$

j) $\frac{x^{-\frac{1}{2}}}{x^3}$

k)

$$\left(\frac{x^{-\frac{1}{3}} y^2}{x^{\frac{3}{4}} \cdot y^{-\frac{1}{2}}} \right)^2$$

29. Rewrite using exponents and simplify.

a) $\sqrt[3]{64}$

b) $\sqrt[6]{(27x)^2}$

c) $\sqrt[5]{32 \cdot x^{10}}$

30. Translate to Logarithm form, then solve for exponents.

a) $2^x = 128$

b) $5^x = 125$

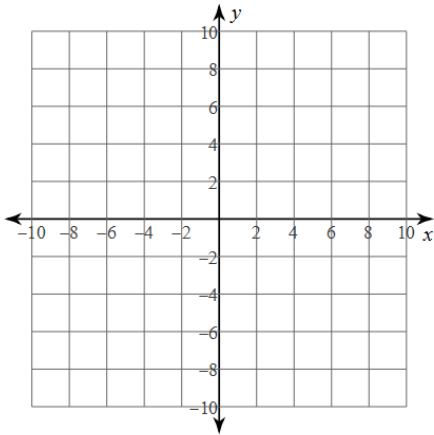
c) $2^x = 40$

d) $2^{x-3} = 32$

UNIT 6: QUADRATIC FUNCTIONS

31. Graph a quadratic given an equation and the use of a table.

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



X						
y						

32. Expand (translate from factored to general form).

a) $x(x - 3)$

b) $(x - 2)(x + 7)$

c) $(x + 3)(x + 8)$

d) $(x + 5)(x - 9)$

e) $(x + 2)^2$

f) $(2x + 5)(x^2 + 2x + 4)$

33. Factor (translate from general to factored form).

a) $x^2 + 12x + 27$

b) $x^2 - 8x + 7$

c) $x^2 - 9x + 18$

d) $x^2 - 2x - 63$

e) $x^2 + 13x + 36$

f) $2x^2 - 11x + 5$

g) $4x^2 + 2x - 12$

h) $10x^2 - 9x + 2$

34. Solve the quadratic equations (by taking square roots, Null Factor Law, and factoring).

a) $x^2 + 4 = 20$

b) $(x - 2)^2 + 3 = 67$

c) $x^2 = 49$

d) $x^2 - 5 = 11$

e) $(x - 4)(x - 5) = 0$

f) $(x - 8)(x + 3) = 0$

g) $x^2 - 16x + 60 = 0$

h) $x^2 - 9x + 14 = 0$

i) $x(x - 3)(x + 2) = 0$

j) $-2x^2 - 8x + 42 = 0$

UNIT 7: STATISTICS

35. Find the mean, median and mode of numbers of hours slept.

Hours Slept

7.25 6.5 5.75 6 8
 8.5 9 7.75 6.5 6.25
 5.75

36. Find the Minimum, 1st Quartile, Median, 3rd Quartile, and Maximum Life Expectancies.

Life Expectancy

State	Years	State	Years	State	Years	State	Years
South Dakota	74.3	New Hampshire	80.1	Minnesota	80.3	Wisconsin	79.8
Colorado	80.9	Indiana	81.3	South Carolina	78.3	Kansas	78.6
District of Columbia	77.9	Nebraska	79.8	Connecticut	82.7	Pennsylvania	81.6
Arizona	79.3	Massachusetts	83.8	Louisiana	78.2	Iowa	79.8

37. Create a Box Plot.

38. Analyze the Box Plot in the previous problem.

- i. "50% of the states have a life expectancy between _____ and _____ years."
- ii. "25% of the states have a life expectancy above _____ years."
- iii. "75% of the states have a life expectancy above _____ years."

UNIT 8: PROBABILITY

39. List all possible outcomes.

<p>You are setting the combination on a three-digit lock. You want to use the numbers 381 but don't care what order they are in.</p>	<p>A coffee shop offers small, medium, and large sizes. Customers can choose between French roast, Italian roast, and American roast.</p>
<p>A basketball player attempts two free throws. Each attempt results in a score or a miss.</p>	<p>When a button is pressed, a computer program outputs a random odd number greater than 1 and less than 9. You press the button twice.</p>

