Semester 1 Final Exam Study Guide: Topics

Chapter 1 Exploring Algebraic & Geometric Concepts

Topics: Attributes of polygons, Area as a product and a sum, Area Model, Algebra Tiles, Describing a Graph, Angle Pair Relationships, Angles formed by Transversals, Angles and Sides of Triangles

Important Vocabulary: rhombus, parallelogram, rectangle, square, trapezoid, isosceles trapezoid, isosceles triangle, equilateral triangle, equiangular, equilateral, polygon, angle, segment, rigid transformation, translation, rotation, reflection, polynomial, binomial, area model, zeros, x-intercepts, y-intercept, minimum, maximum, slope, increasing, decreasing, constant, continuous, discrete, domain, range, complementary angles, supplementary angles, linear pair, vertical angles, congruent angles, two parallel lines cut by a transversal, corresponding angles, alternate interior angles, same-side interior angles

Chapter 2 Justification and Similarity

Topics: Triangle Congruence, Flowcharts for congruence, converse statements, dilations, similar figures, Conditions for Triangle Similarity, Determining Triangle Similarity, Similar Triangle Proofs

Important Vocabulary: Congruent Triangles, HL, AAS, SSS, SAS, ASA, Flowchart Proof, Given Information, Conditional Statement, Converse Statement, Dilation, non-rigid transformation, proportional, AA Similarity, SSS Similarity, SAS Similarity

Chapter 3 Probability and Trigonometry

Topics: probability, tree diagrams, area models, unions, intersections, expected value, slope ratio, slope angle, tangent

Important Vocabulary: probability, sample space, probability area model, outcomes, event, intersection, union, Probability Addition Rule, Probability Addition Rule when there is an Intersection, complement of an event, expected value, fair game, slope triangle of a line, slope angle, slope ratio, trigonometry, theta, tangent ratio, hypotenuse, Pythagorean Theorem

Chapter 4 Factoring and More Trigonometry

Topics: quadratic expression, factoring, area model, Casey's pattern (4-4 p. 212), factoring using algebra tiles, factoring with the area model, special cases, factoring completely, sine and cosine ratios, inverse trigonometry

Important Vocabulary: expression, terms, coefficients, constant term, polynomial, monomial, binomial, trinomial, factoring, factored form, factor, quadratic expression, standard form, algebra tiles, factored completely, prime (or not factorable), common factor, closed set, special quadratics, difference of squares, perfect square trinomial, sine ratio, cosine ratio, opposite leg to theta, adjacent leg to theta, Pythagorean theorem, hypontenuse, SOHCAHTOA, trigonometric ratios, inverse operations, inverse sine ($\sin^{-1}$), inverse cosine ($\cos^{-1}$), inverse tangent ($\tan^{-1}$)

Chapter 5, sections 5.1.1 to 5.1.5 Quadratic Functions

Topics: Graphs, tables, and equations of quadratic functions, Zero Product Property, X-intercepts of a parabola

Important Vocabulary: parabola, open upward, open downward, line of symmetry (AOS), vertex, minimum point, maximum point, zeros of the function, quadratic equation, Zero Product Property

Final Exam Study Guide **Chapter 1**

The best way to prepare for a mathematics exam is to do lots of practice problems. This study guide is designed to provide practice on various topics we have learned throughout the year.

The following questions ARE NOT exactly like the final exam. The final exam is in a multiple choice format. Go through your notes, homework assignments, and look over the topics you missed on each test.

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1) Solve the following problem for the variable. Show that your answer checks.

a) $\frac{x+5}{17}=\frac{9}{11}$ a)_____

b) $14-5(2x-1)=7x-1$ b)_____

2) Fill in the missing dimensions and areas. Then write the entire area as a product equivalent to the area as a sum.

a)

	$5X$	$4X$
-9		
$2Y$		

B)

	-7	
	$10Y^2$	
$+14$		-2

(____)(____)=_____

(____)(____)=_____

3) a) Draw the triangle with vertices $A(-4,3)$, $B(-4,8)$, and $C(5,8)$ on the grid below. LABEL ALL POINTS!!!!

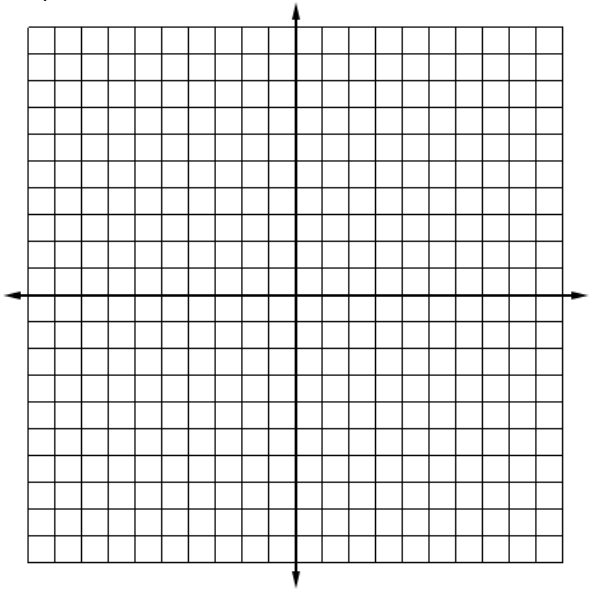
b) What kind of triangle is this? Justify your answer.

c) Reflect ΔABC over the x-axis.

d) What are the coordinates of your new vertices?

Write your answers in prime notation.

A' _____ B' _____ C'_____



4) Refer to the diagram to fill in the information for this rectangle.

x^2	x^2	x	x	x	x
x	x				
x	x				
x	x				
x	x				

Dimensions of Rectangle:

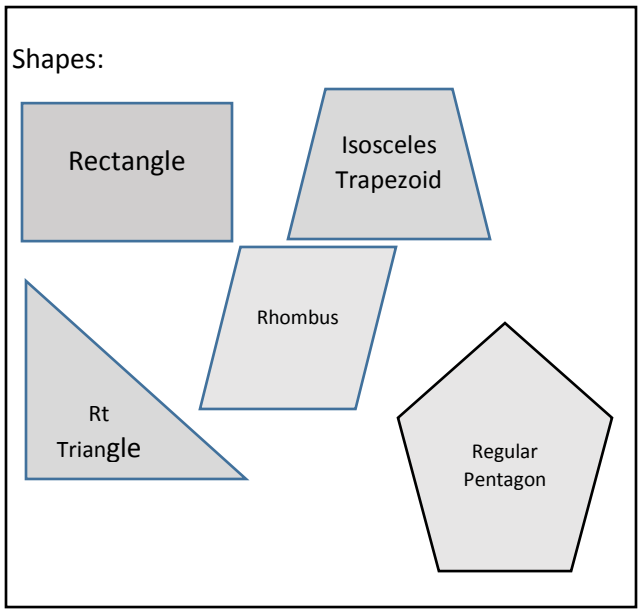
_____ by _____

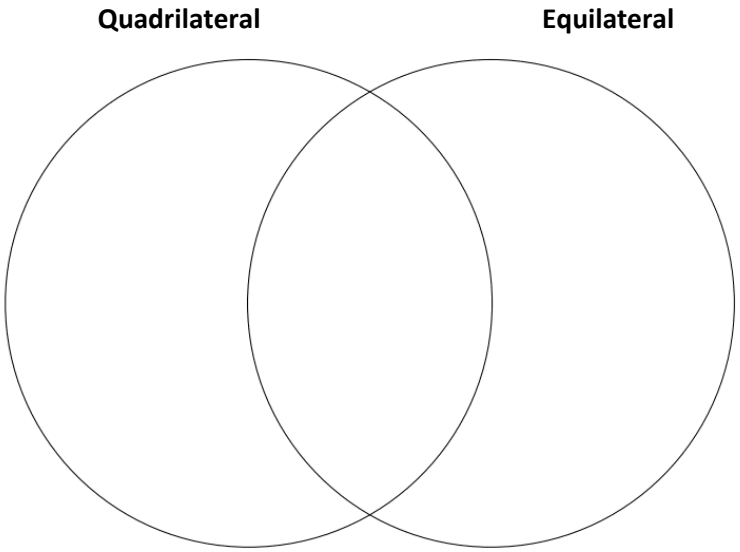
Area as a Product:_____

Area as a sum:_____

Perimeter:_____

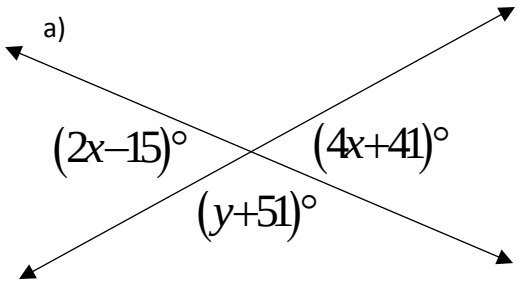
5) Fill in the Venn Diagram with the shapes for the categories.



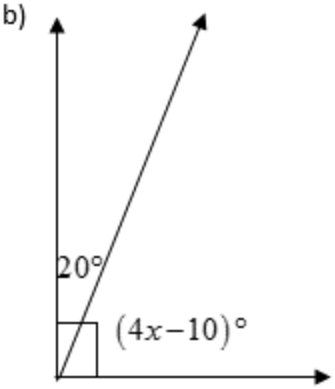


6) Identify the angle pair relationship. Solve for x (&y). After solving for x, check your solution and explain how you know that your answer is correct.

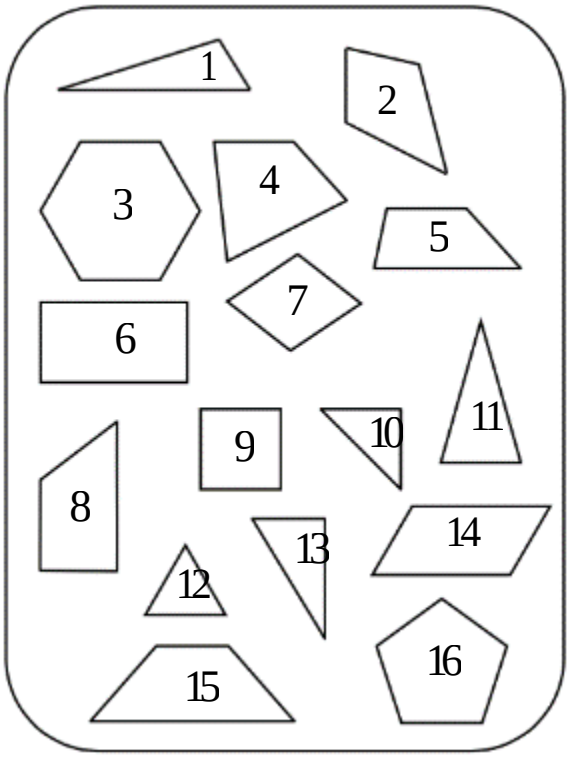
a)



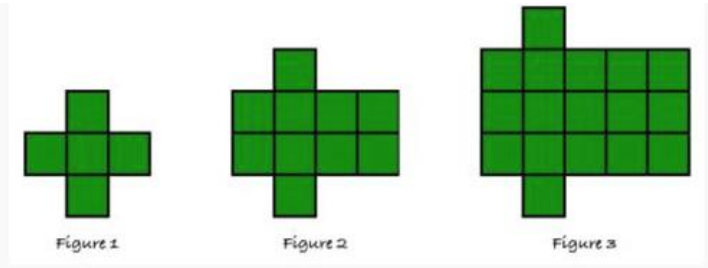
b)



7) **Early in this chapter**, we did a number of activities with these shapes. For each, identify the shape. Then classify the shape by it's sides, angles, and symmetry (reflection, rotation, or translation symmetry)



8) We also looked at patterns. (King, rug problem? Remember?) Here is a new design.



First analyze the rug design your team has been assigned, and draw diagrams of Figures 4 and 5 for your rug design on graph paper.

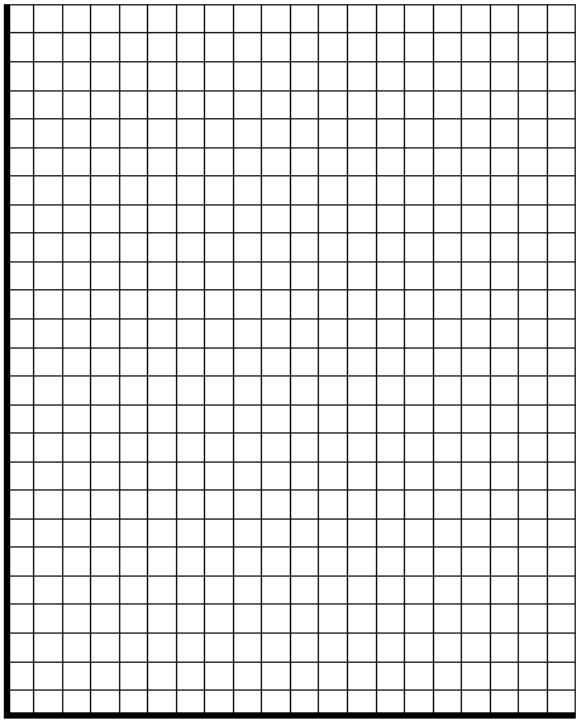
Describe Figure 20 of your design. Provide as much information as you can. What will it look like? How will the squares be arranged?

A table can help you learn more about how the area changes as the rugs get bigger.

1. Fill in the table below to organize information about the area of each rug in your design.

Figure number	1	2	3	4	5	20
Area (in square units)						

2. On a new set of axes, graph the area data for Figures 1 through 5. (You do not need to include Figure 20.) What is the shape of the graph?

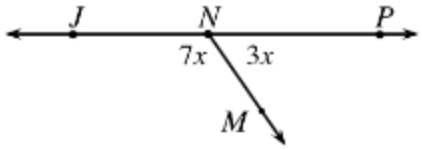


3. How does the area grow? Examine your table and graph and describe how the area changes as the rugs get bigger.

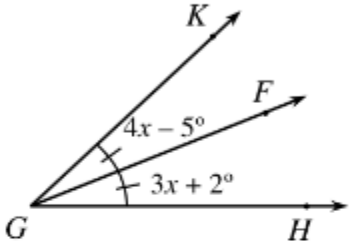
4. Write an equation that calculates the area of Figure *n*. How did you figure out your equation? Be ready to defend your strategy.

9) **Angle Pair Relationships.** Solve for x and y and find the measure of the given angle.

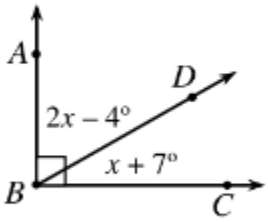
a. What is $m\angle MNP$?



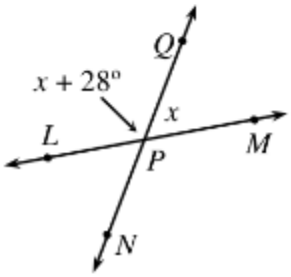
b. What is $m\angle FGH$?



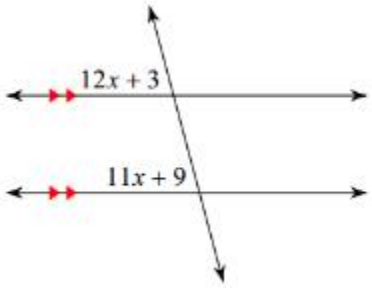
c. What is $m\angle DBC$?



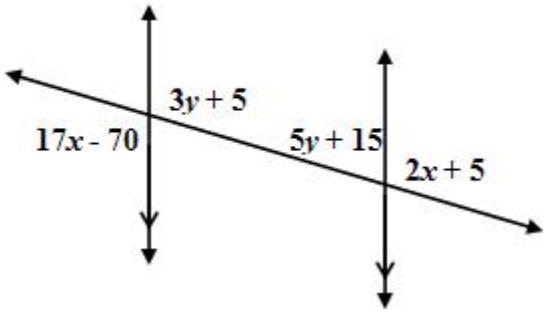
d. What is $m\angle NPM$?



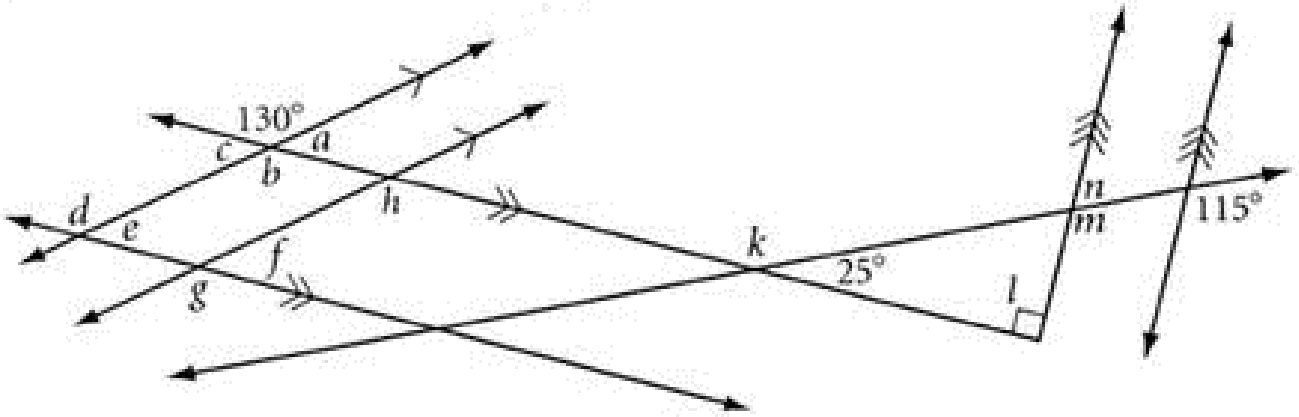
e.



f.



10) Find all the missing angles.



Final Exam Study Guide **Chapter 2**

In Chapter 2, you reviewed the criteria for Triangle Congruence that you learned in Integrated Math 1.

These include: _____, _____, _____, _____, and _____.

You can also use rigid motions to prove that two triangles are congruent. The transformations that are rigid motions are

_____, _____, and _____.

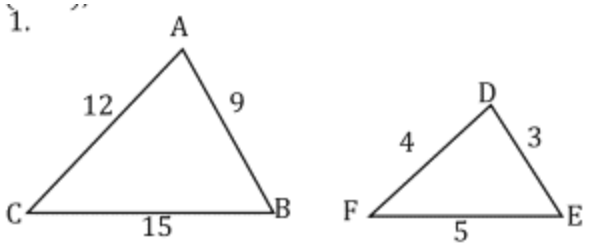
In this chapter you were introduced to a new transformation, the Dilation. When you perform a dilation, you create a new figure, with congruent _____ and _____ sides. The two figures are called **similar** figures.

The long way to show that two figures are similar is the show that all corresponding angles are _____ and that all corresponding sides are _____. Using technology, we discovered a few shortcuts to this process.

These are _____ Similarity, _____ Similarity, and _____ Similarity.

Decide if each pair of triangles is similar. If they are, write a similarity statement. Justify your answer and show evidence of your thinking.

1.



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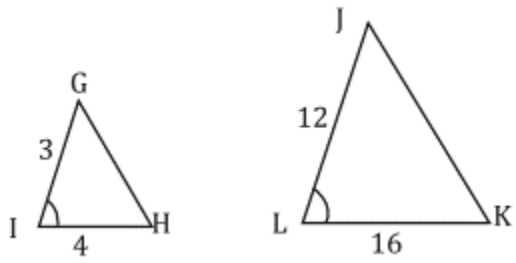

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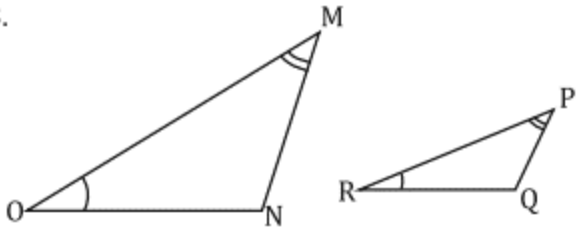

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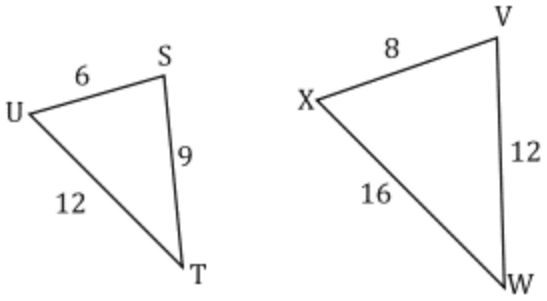

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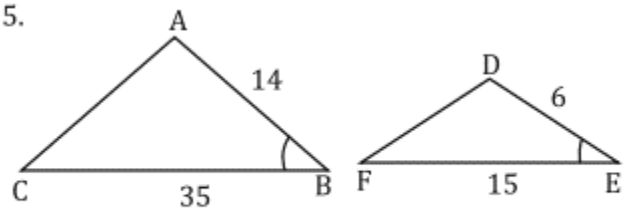

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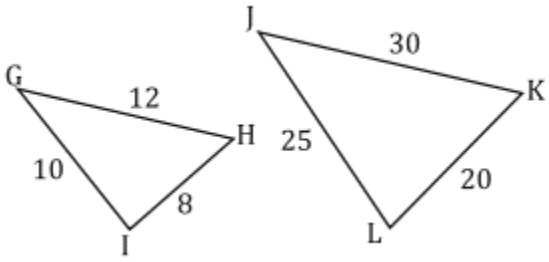

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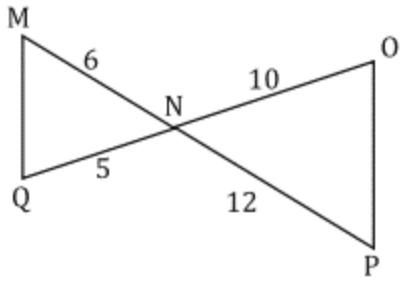

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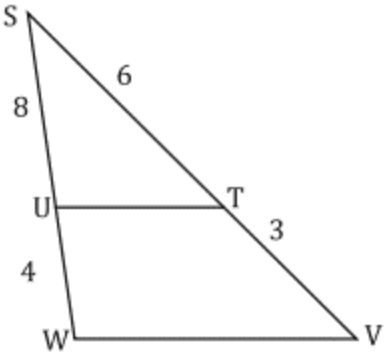
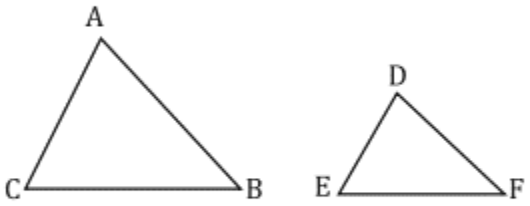


9. $\frac{AB}{DF} = \frac{BC}{EF}$ What additional information is necessary to show $\Delta ABC \sim \Delta DEF$ by SSS?



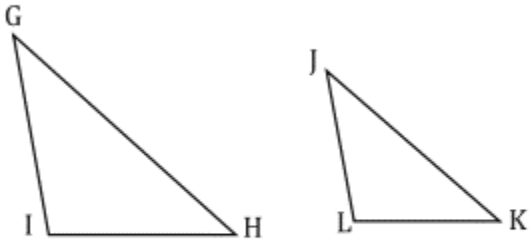
A. $\frac{AB}{AC} = \frac{BC}{EF}$

B. $\frac{AC}{DE} = \frac{BC}{EF}$

C. $\frac{AC}{DF} = \frac{AC}{EF}$

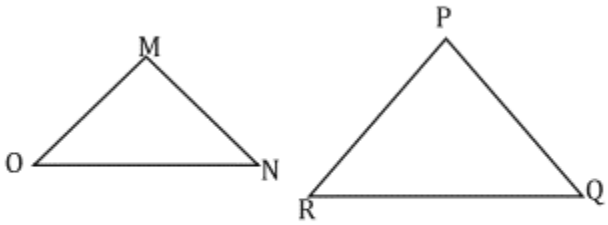
D. $\frac{CB}{AB} = \frac{EF}{DF}$

10. $\frac{GI}{JL} = \frac{IH}{LK}$ What additional information is necessary to show $\Delta GHI \sim \Delta JKL$ by SAS?



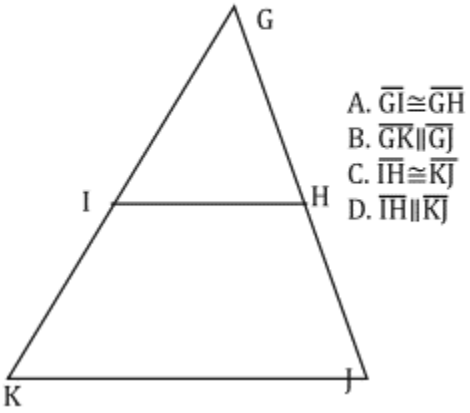
A. $\angle G \cong \angle J$
B. $\angle H \cong \angle K$
C. $\angle I \cong \angle L$
D. $\angle G \cong \angle H$

11. $\angle M \cong \angle P$. What additional information is necessary to show that $\Delta MNO \sim \Delta PQR$ by AA?



A. $\angle M \cong \angle O$
B. $\angle P \cong \angle R$
C. $\angle N \cong \angle P$
D. $\angle N \cong \angle Q$

12. What additional information is necessary to show $\Delta GHI \sim \Delta GJK$ by AA?



A. $\overline{GI} \cong \overline{GH}$
B. $\overline{GK} \| \overline{GJ}$
C. $\overline{IH} \cong \overline{KJ}$
D. $\overline{IH} \| \overline{KJ}$

13. One right triangle has a 40 degree angle. A second right triangle has a 50 degree angle. Samantha says that the triangles are similar to each other. Emmanuel says they are not similar. Who is correct? Justify your answer and show evidence.

Each pair of figures is similar. Find the missing length. Show evidence of your thinking.

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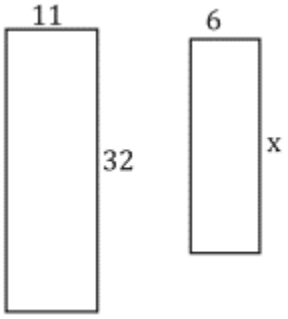

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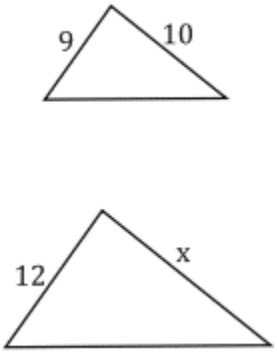

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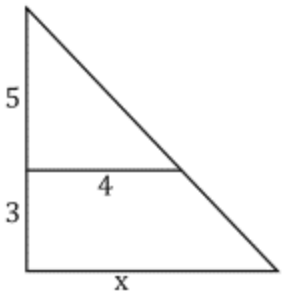

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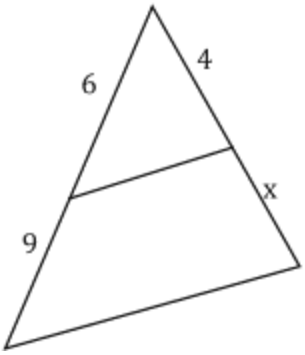

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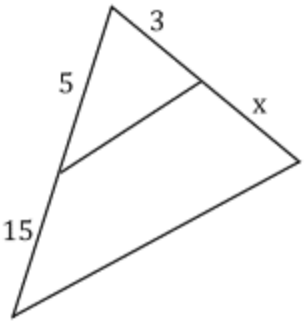

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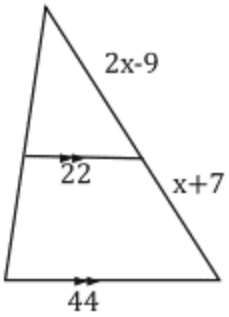


Final Exam Study Guide **Chapter 4**

I. Factoring. Factor each completely.

1. $y^2+10y+16$

2. $3x^2-18x-48$

3. m^2-25

4. $14m^3n^2+21m^2n$

5. $15j^2+3j+7$

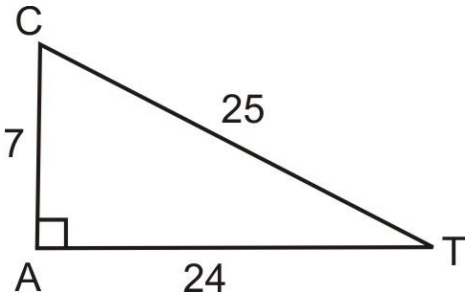
6. $6h^2+33h+27$

7. $30m^2y+34my-8y$

8. $9x^2+6x+1$

9) $8n^2-18n-35$

10. Use $\triangle CAT$ to find the given trig ratios. Write each ratio as both a fraction and a decimal (3 decimal places).



$\sin C =$ $\sin T =$

$\cos C =$ $\cos T$

$\tan C =$ $\tan T =$

11. Write the inverse statement for all 6 trig ratios above. Find angle C and angle T using the inverse trig statements. How do you know if your answers are correct?

Trigonometry practice. In this chapter, you learned the three main trigonometric ratios. Their names are _____, _____, and _____.

Write the formulas for each ratio below.

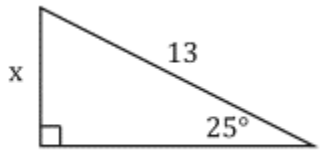
1) **2)** **3)**

You also learned the inverse trigonometric functions. These are called _____, _____, and _____. Basically, you use these when you need to solve for _____ and you use the regular trigonometric ratios when _____.

Write the 3 inverse formulas underneath the formulas above.

Solve for the missing side or angle. Round your answer to the nearest hundredth. Show all evidence of your thinking.

12.



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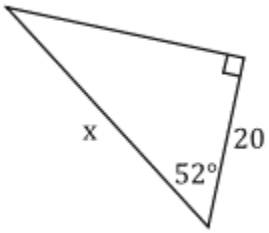

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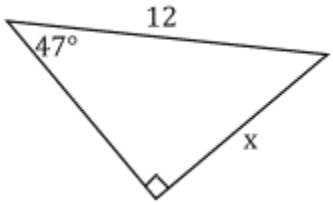

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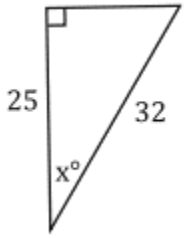

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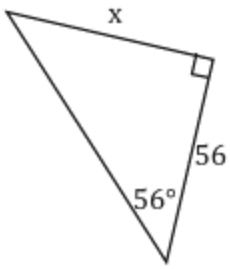

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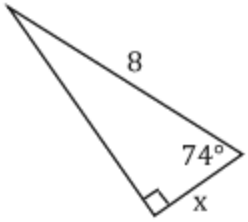

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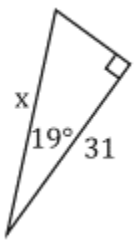

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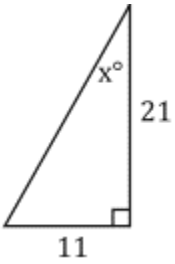

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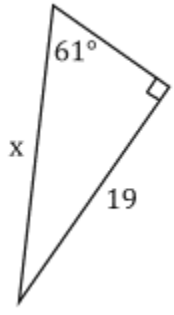
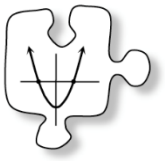




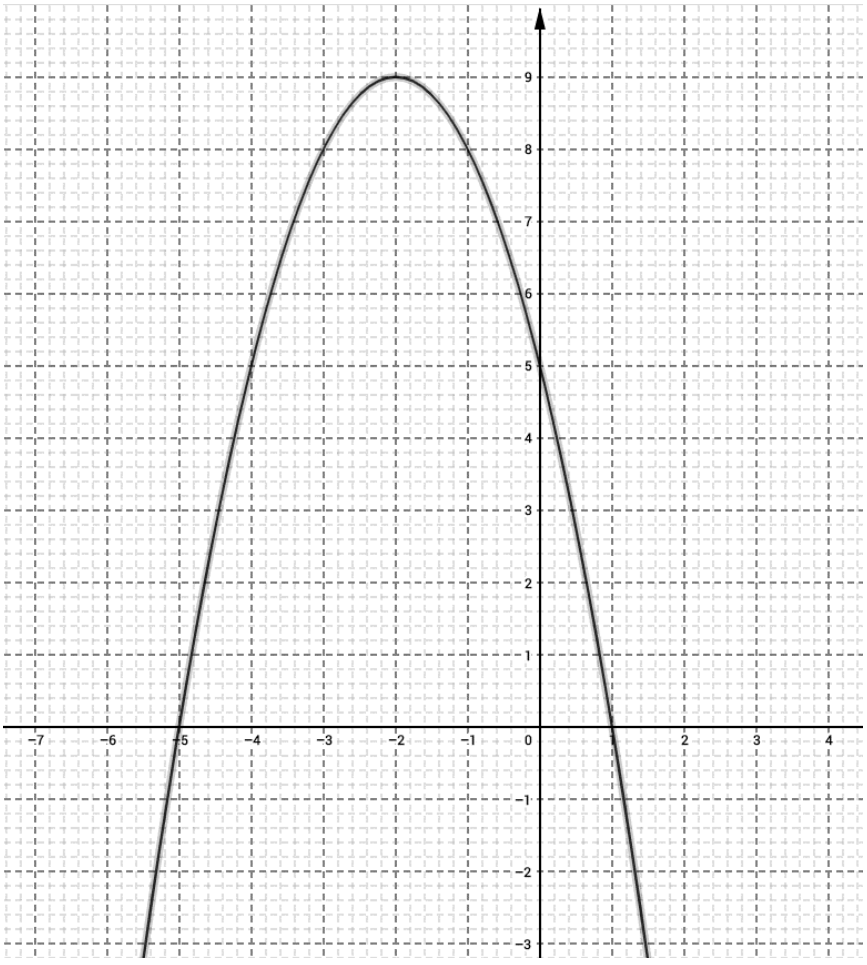
Section 5.1

You will explore graphs, tables, and equations of quadratic functions to create a quadratic functions web. You will use the Zero Product Property to determine the *x*-intercepts of a parabola. You will model and answer questions about everyday situations using quadratic functions.

1. **Your Task:** Your team will be assigned specific quadratic functions to study. Investigate your team's functions and use their tables, graphs, and equations to describe them completely. Use the list of attributes for describing graphs that your class developed in Chapter 1. However, do not limit yourselves to those attributes! Describe additional features in your own words.

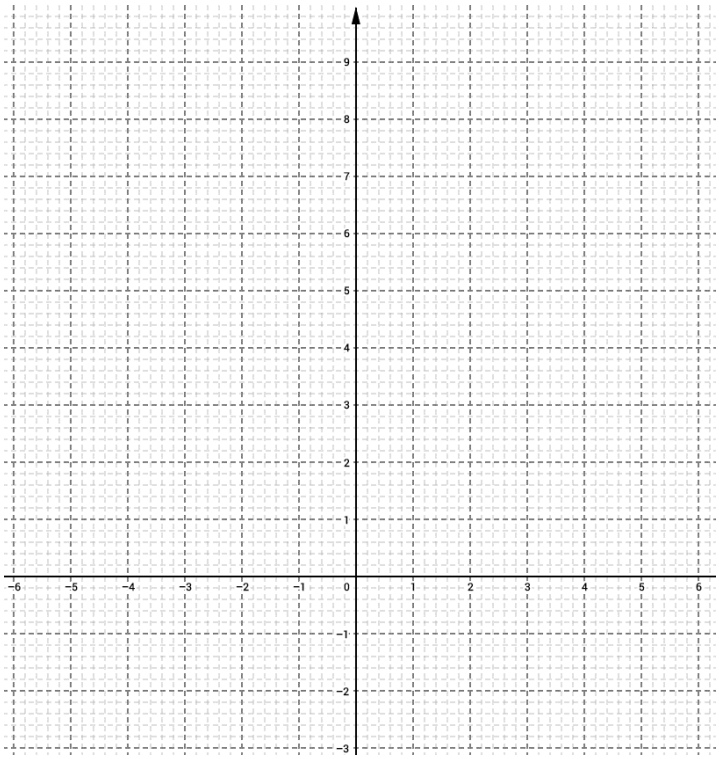
a)

x	y



b) $y=x^2-4x+3$

x	y



2. **Zero Product Property**: Explain how the zero-product property works to solve an equation. Provide an example.

3. Solve using the zero-product property.

a. $6x^2+4x=0$

b. $7y^2-4y-3=0$

c. $x^2-16=0$

d. $x^2-7x-30=0$

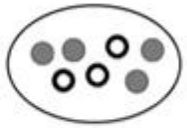
e. $x^2+10x+25=0$

f. $3x^2+13x-1=5$

practice makes perfect: probability

1) 

probability of picking a ★?

2) 

probability of picking a grey blob?

3) probability of picking an A out of APPALACHIAN?

4) smallest probability?

largest probability?

5) chance of rolling a factor of 6?

6) probability of not throwing a multiple of 3?

7) 

probability of an A?

8) 

probability of not a 1?

9) 

probability of a square ?

10) mark on the scale the probability of getting a factor of 10 when you throw a dice

11) 

12) 

what fraction would this probability be?

13) probability that Beth picks an ace is 4/52 what is the probability that Beth will not pick an ace?

14) other ways that 3 coins could land?

HHH
TTH
TTT
HTH
…
…

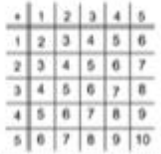
15) 

how ways you ran hese lett ?

16) chance of snow one day = 0.32

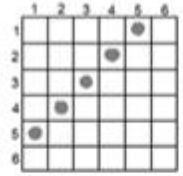
chance not snowing on that day?

17) chance of scoring a total of 5?



*	1	2	3	4	5
1	2	3	4	5	6
2	3	4	5	6	7
3	4	5	6	7	8
4	5	6	7	8	9
5	6	7	8	9	10

18) mark on the scale the probability of getting one head when you throw two coins

19) 

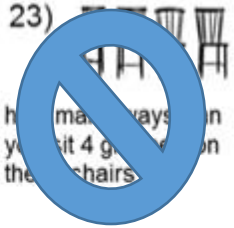
chance of scoring a total of 6 with 2 dice?

20) 

chance of getting a double with 2 dice?

21) chance of A and B?

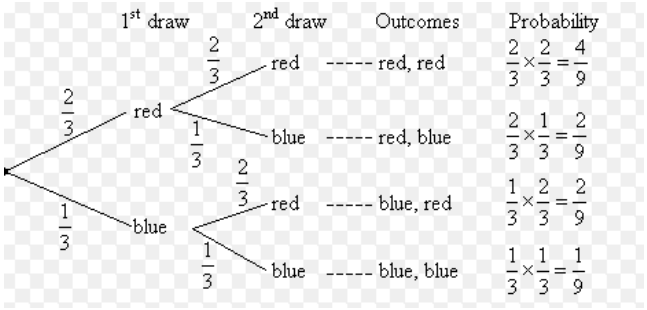
22) chance of getting a difference of 4 with 2 dice?

23) 

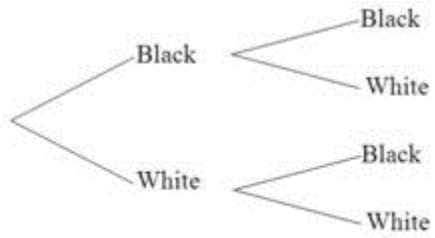
h ma ays n y it 4 g n the hairs

24) chance of B?

25) A tree diagram is used to represent and organize information for probability of 2 or more independent events. Explain all the different parts in the tree diagram below.



26) A bag contains 10 discs: 7 are black and 3 white. A disc is selected, and then put back in the bag. A second disc is selected. Complete the tree diagram showing all the probabilities and outcomes.



Find the probability that:
a) both discs are black
b) both discs are white

27) In a recent survey, 30% of children wanted to go see a movie this weekend. Meanwhile, 65% of children say that they dislike vegetables. What is the probability that a child selected at random wants to go see a movie this weekend AND dislikes vegetables? Fill out and label the area model below.

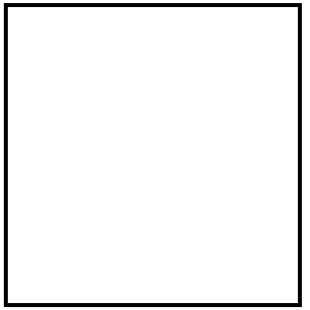
Wants to go see a movie this weekend

Yes _____ No _____

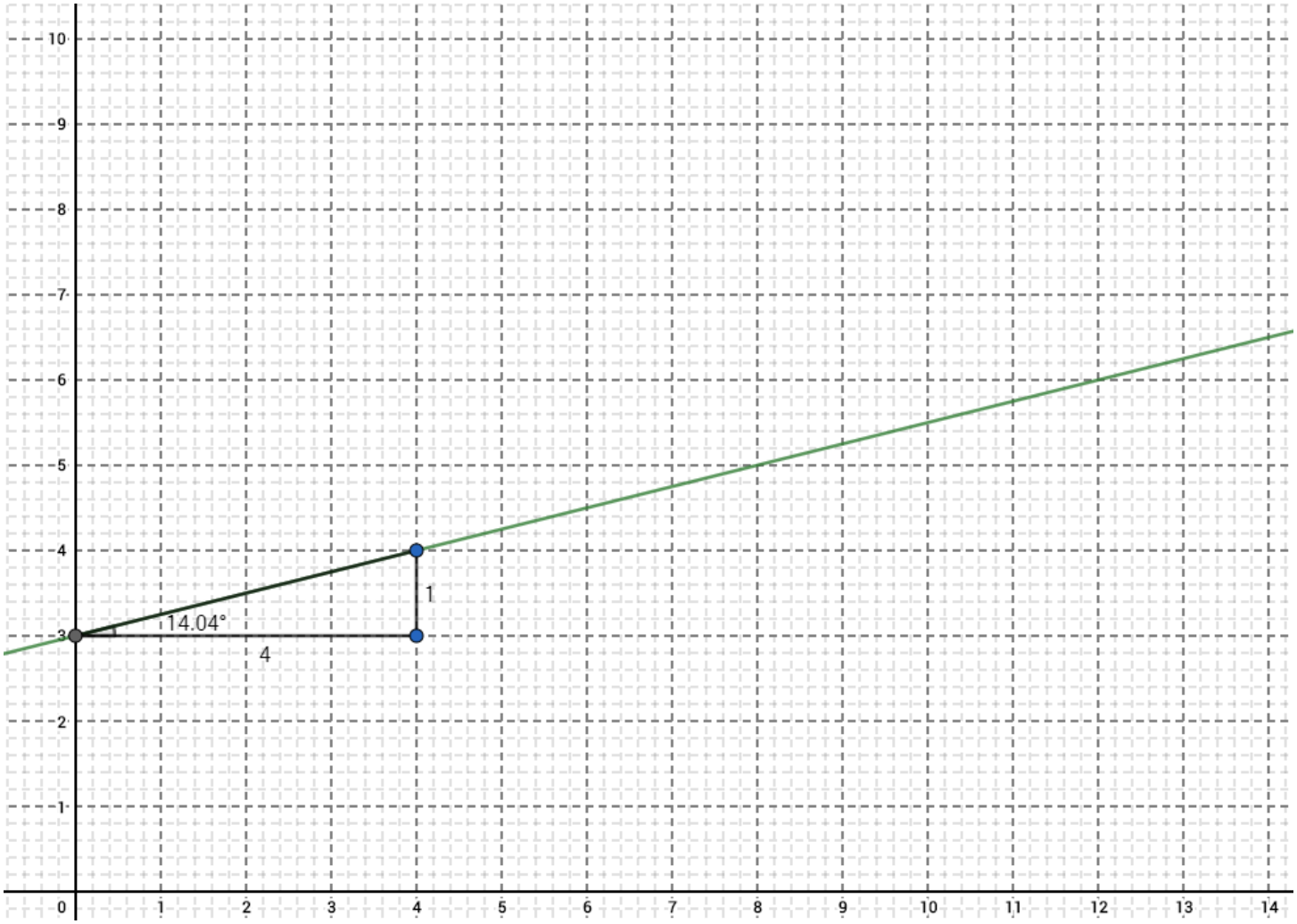
Dislikes vegetables

Yes _____ No _____

Probability that a child wants to go see a movie & dislikes veggies?



28) **In 3.2.1, in question 3-68, you did this same exploration with a different line.** In order to determine an angle, you need to investigate the relationship between the angles and the sides of a right triangle. You will start by studying slope triangles. Notice that one slope triangle has been drawn for you.



a. Draw three new slope triangles on the line. Each should be a different size. Label each triangle with as much information as you can, such as its horizontal and vertical lengths and its angle measures.

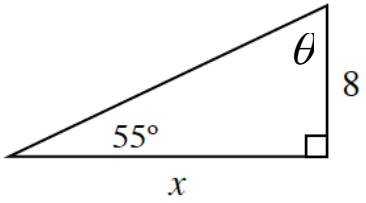
b. Explain why all of the slope triangles on this line must be similar.

c. Since the triangles are similar, what does that tell you about the slope ratios?

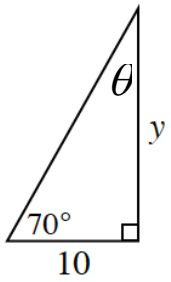
d. Confirm your conclusion by writing the slope ratio for each triangle as a fraction, such as $\frac{\Delta y}{\Delta x}$. (Note: Δy represents the vertical change or "rise", while Δx represents the horizontal change or "run".) Then change the slope ratio into decimal form and compare.

29) Solve for x and θ.

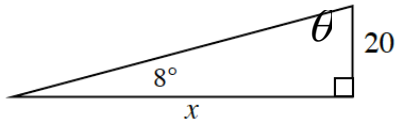
a)



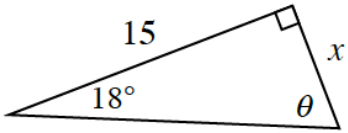
b)



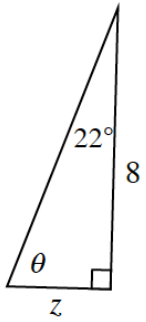
c)



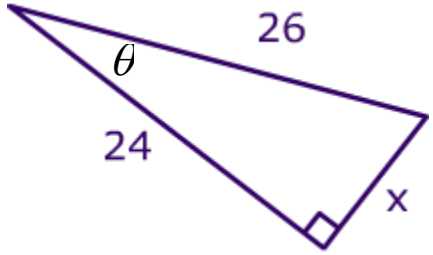
d)



e)



f)



30) How is the tangent ratio related to the slope of a line?