



Put a 

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 around your answer!

# Geometry

## Summer Packet

Welcome to geometry! Geometry is a language of mathematics that describes the world around us. **Architects, artists, engineers, physicists, surveyors, and video game designers** all use geometry every day. We will learn about where these concepts come from and how to use them. This packet will help you prepare for the upcoming year by drawing on what you already know.

This packet is **entirely assembled** from materials provided by **Ms. Chall and Ms. Lee** from your 7<sup>th</sup> and 8<sup>th</sup> grade math classes. You should have **seen all of these problems before**. The skills in this packet are the ones *you will be using* this upcoming year in geometry, so you need to refresh them before you begin.

If there are any problems you don't remember, do your best to find instruction online (on Khan academy, for example), and try to do as many steps as possible. Do not leave any problems blank. You will receive your first major grade of the year for this packet.

Questions? Email Mr. Salazar ([jsalazar@latinpcs.org](mailto:jsalazar@latinpcs.org)).

### Directions:

Use pencil.

Show your work. The work is not only to show an answer, but to show the reader your sequence of thinking and operations. If I cannot see how you did something, point off.

All final expressions or other solutions must be in simplest form.

Box your answers.

## Solving Equations

Solve each equation below.

1.  $-3(-6x + 5) = 2x + 17$

2.  $12r + 6 - 10r = 6r - 18$

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Proportions and Similarity

Solve. Show your work.

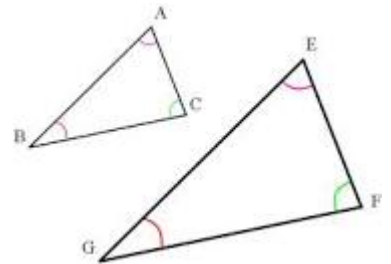
3.  $\frac{3}{x} = \frac{15}{20}$

4.  $\frac{u-2}{5} = \frac{7}{8}$

5. Triangle GHI is similar to Triangle TUV. First, draw and label these two triangles. Then fill in the five boxes below.

6.	7.	8.	9.	10.
$m\angle G = m\angle \underline{\hspace{2cm}}$	$m\angle H = m\angle \underline{\hspace{2cm}}$	$\frac{HI}{UV} = \frac{IG}{\underline{\hspace{2cm}}}$	$m\angle I = m\angle \underline{\hspace{2cm}}$	$\frac{GH}{TU} = \frac{UV}{\underline{\hspace{2cm}}}$

11. Triangle *ABC* is similar to Triangle *EFG*. If  $AB = x$ ,  $EG = 8$ ,  $AC = 4$  and  $EF = 6$ , find the value of  $x$ . (Hint: set up a proportion.)



25. 15. **All the angles of a triangle add to 180 degrees.** Triangle *ABC* is similar to Triangle *EFG*. Fill in the degree measures requested.

$m\angle A = 35$      $m\angle B = \underline{\hspace{2cm}}$      $m\angle C = 75$      $m\angle E = \underline{\hspace{2cm}}$      $m\angle F = \underline{\hspace{2cm}}$      $m\angle G = \underline{\hspace{2cm}}$

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### Transformations and Symmetry

If you don't remember these rules, search online! You should be able to find them easily.

Type of Transformation	(x, y) ----->
16. Reflection across the y-axis	(_____, _____)
17. Reflection across the x-axis	(_____, _____)
18. Reflection across the line $y = x$	(_____, _____)
19. Reflection across the line $y = -x$	(_____, _____)
20. Translation h units and k units	(_____, _____)
21. Rotation 90 degrees counter-clockwise	(_____, _____)
22. Rotation 180 degrees counter-clockwise	(_____, _____)
23. Rotation 270 degrees counter-clockwise	(_____, _____)
24. Dilation by a scale factor of k	(_____, _____)

Write a rule for the following transformations. The first one has been done for you as an example.

25. Translate five units left and two units up.  $(x, y) \rightarrow \underline{(x - 5, y + 2)}$

26. Dilate by a scale factor of 7.  $(x, y) \rightarrow$  (\_\_\_\_\_, \_\_\_\_\_)

27. Rotate 90 degrees clockwise.  $(x, y) \rightarrow$  (\_\_\_\_\_, \_\_\_\_\_)

28. Translate six units up and two units right.  $(x, y) \rightarrow$  (\_\_\_\_\_, \_\_\_\_\_)

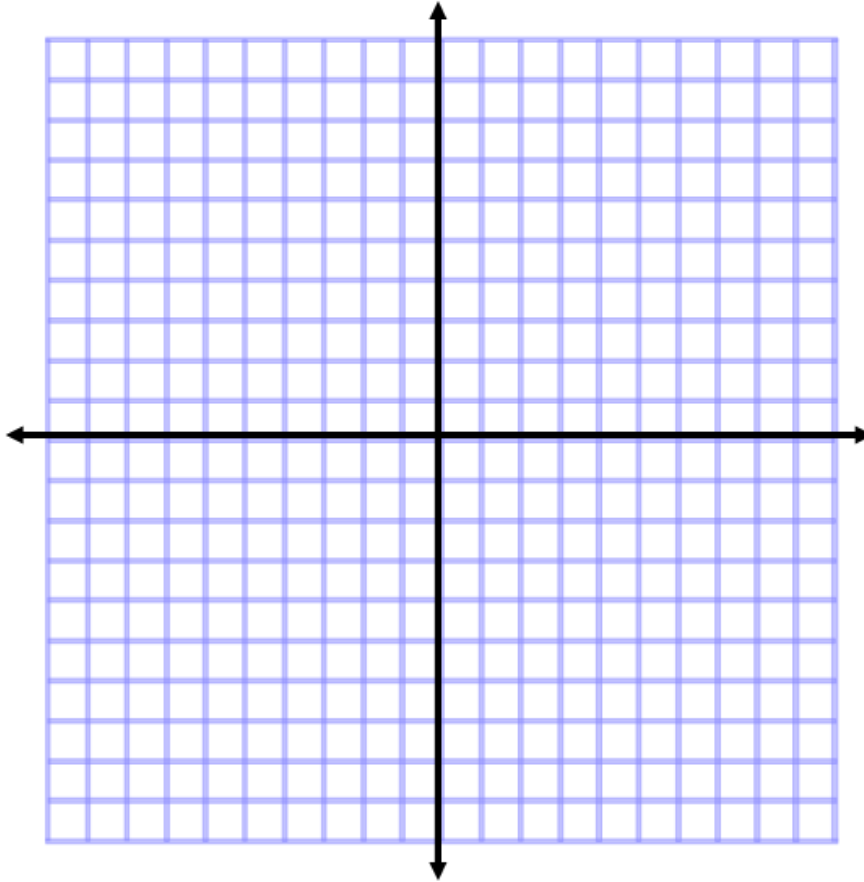
29. Reflect over the y-axis.  $(x, y) \rightarrow$  (\_\_\_\_\_, \_\_\_\_\_)

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30. On the coordinate plane below, graph triangle  $CAT$  with coordinates:  $C(0, 2)$ ,  $A(3, 2)$ , and  $T(1, -2)$ .
31. Rotate triangle  $CAT$  90 degrees clockwise.  $(x, y) \rightarrow (y, -x)$ . Label the coordinates  $C'A'T'$ .



32. Write the new coordinates of the point  $(4, 6)$  after the point is rotated 180 degrees, then dilated by a scale factor of two. How did you find this coordinate?

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33. Graph the triangle  $S(3, 4)$ ,  $U(-3,4)$ ,  $N(0,-2)$ . Now, graph its translation if it is rotated 90 degrees counterclockwise.

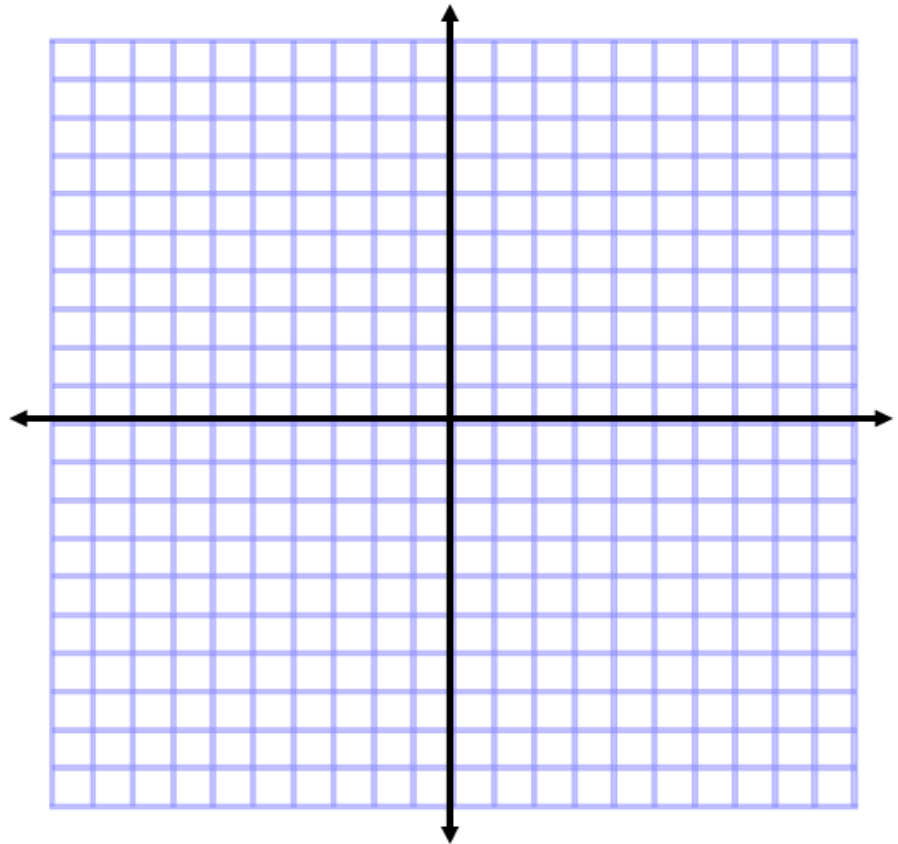
Remember, for 90 degrees counterclockwise:  $(x, y) \rightarrow (-y, x)$ .

The first point is done for you below.

$$S(3, 4) \rightarrow S'(-4, 3)$$

34.  $U(-3,4) \rightarrow U'(\underline{\quad}, \underline{\quad})$

35.  $N(0,-2) \rightarrow N'(\underline{\quad}, \underline{\quad})$



36. A triangle has vertices:  $A(8, -2)$ ,  $B(2, -2)$  and  $C(4, -6)$ . The triangle is dilated by a scale factor of 0.5.

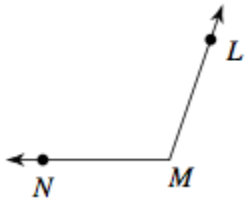
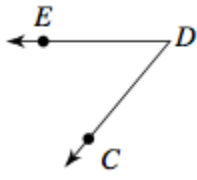
A) Write the vertices of the new triangle.

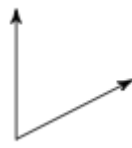


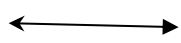
$$A'(\underline{\quad}, \underline{\quad}) \quad B'(\underline{\quad}, \underline{\quad}) \quad C'(\underline{\quad}, \underline{\quad})$$

B) Are triangles  $ABC$  and  $A'B'C'$  similar or congruent? Explain your answer. Look up these definitions online if you are not sure.

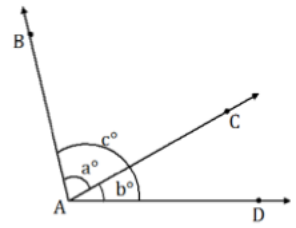
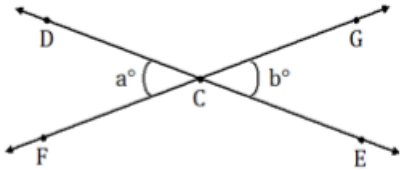
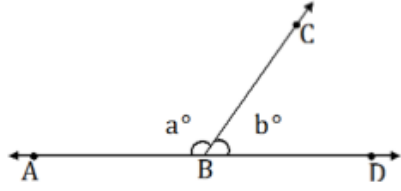
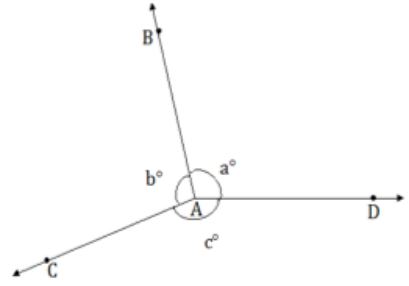
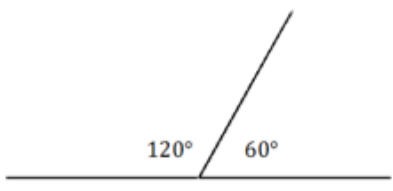
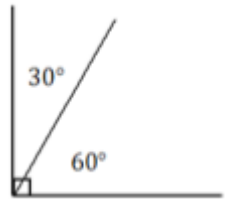
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### Angles

Key Definitions	Examples
<p>When two rays meet at a point called the vertex, they form an angle.</p> <p>37. In the angle on the right, _____ is the vertex.</p>	
<p>38. There are three different ways to name an angle. The vertex must always go in the _____.</p> <p>39. Name the angle at right three ways:</p> <p style="margin-left: 40px;">1. <math>\angle</math> _____</p> <p style="margin-left: 40px;">2. <math>\angle</math> _____</p> <p style="margin-left: 40px;">3. <math>\angle</math> _____</p>	

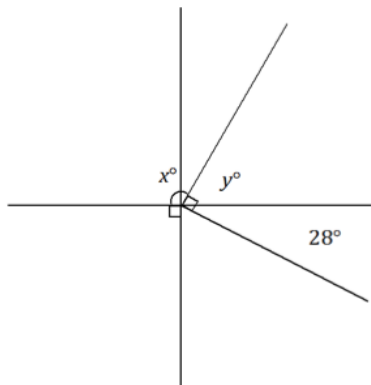
<u>Angle Classifications</u>	Examples
<p>40. _____ Angle - Angle with a measure of less than <math>90^\circ</math></p>	
<p>41. _____ Angle - Angle with a measure of <math>90^\circ</math>. Two lines that intersect to form a <math>90^\circ</math> are said to be _____.</p>	
<p>42. _____ Angle - Angle with a measure of more than <math>90^\circ</math> but less than <math>180^\circ</math></p>	
<p>43. _____ Angle - Angle with a measure of <math>180^\circ</math></p>	

Put a BOX around your answer!

<u>Angle Pairs - Relationships of two or more angles</u>	Examples
<p>Adjacent Angles - Share a side and a vertex</p> <p><math>\angle BAC</math> and <math>\angle CAD</math> are adjacent</p>	
<p>Vertical Angles - Opposite Angles</p> <p><math>\angle DCF</math> and <math>\angle GCE</math> are vertical angles</p>	
<p>Angles on a Line - If two or more angles make a straight angle, then the angles add to be <math>180^\circ</math></p>	
<p>Angles at a point - If three or more angles separate a plane into angles, then the angles add to be <math>360^\circ</math></p> <p><b>44. Which angles at right add up to <math>360^\circ</math>?</b></p>	
<p>Supplementary Angles - Angles who measures have a sum of <math>180^\circ</math>. Also can be called a LINEAR PAIR</p>	
<p>Complementary Angles - Angles who measures have a sum of <math>90^\circ</math></p>	

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45. Solve for  $x$  and  $y$ .

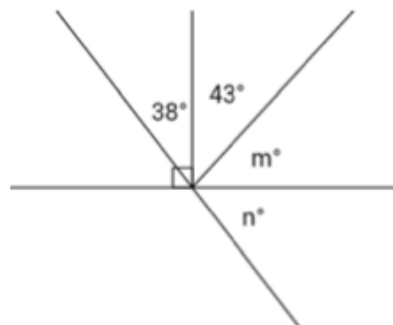


46. The supplement of the measurement of an angle is  $16^\circ$  less than three times the angle. Find each angle.

47. The ratio of the measurement of an angle to its supplement is 3: 5. Find each angle.

48. The measure of a complement of an angle is  $32^\circ$  more than three times the angle. Find the measurement of the two angles.

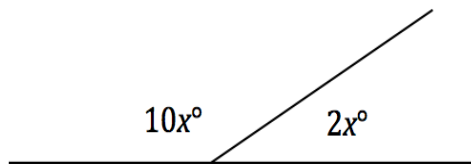
49. Solve for  $m$  and  $n$ .



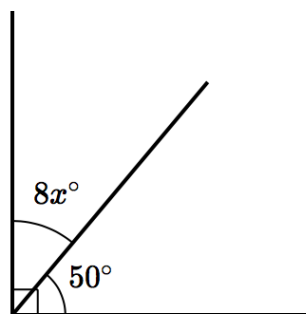


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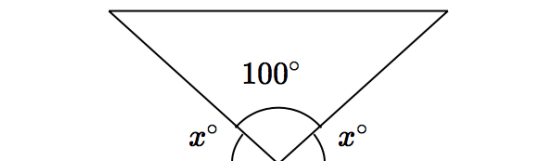
50. Find the measure of each angle.



51. Find the measure of  $x$ , **and then** find the measure of the missing angle.



52. Find the measure of angle  $x$ .



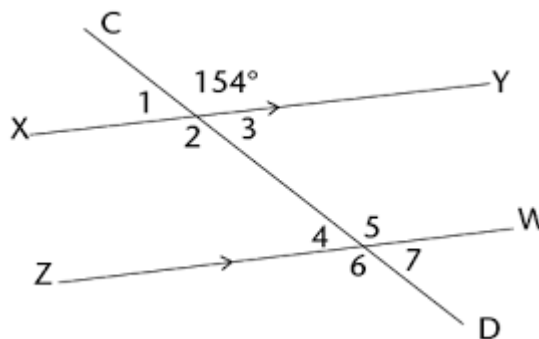
53. What is the measure of  $\angle 4$ ?

54. What is the measure of  $\angle 5$ ?

55. Name two corresponding angles.

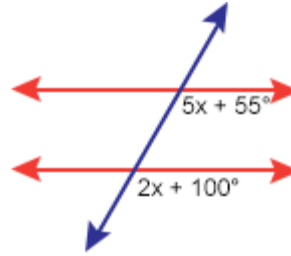
56. Name two vertical angles.

57. Name two alternate interior angles.

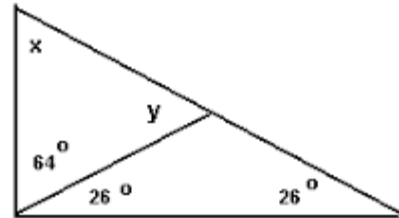


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58. Find the value of  $x$ .

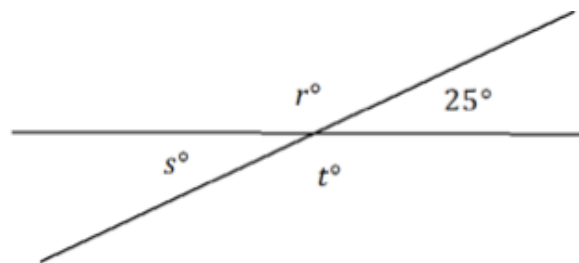


59. Find the values of  $x$  and  $y$ .

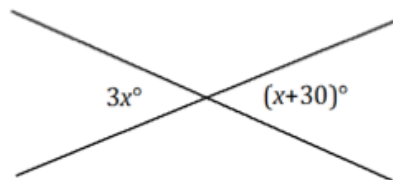


[www.analyze-math.com](http://www.analyze-math.com)

60. Find the values of  $r$ ,  $s$ , and  $t$ .

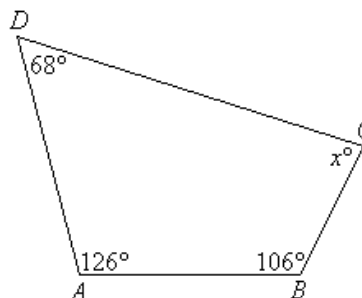


61. Find the value of  $x$ .



**The angles of a quadrilateral add to 360 degrees.**

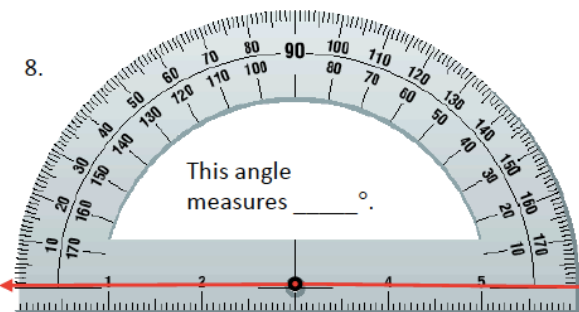
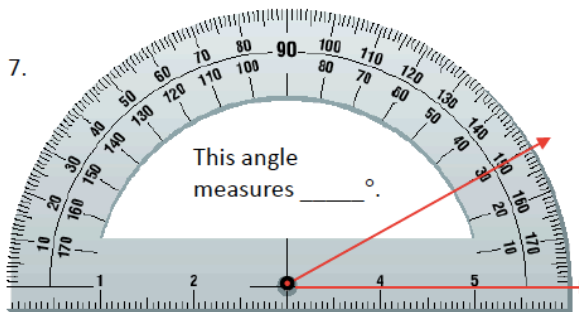
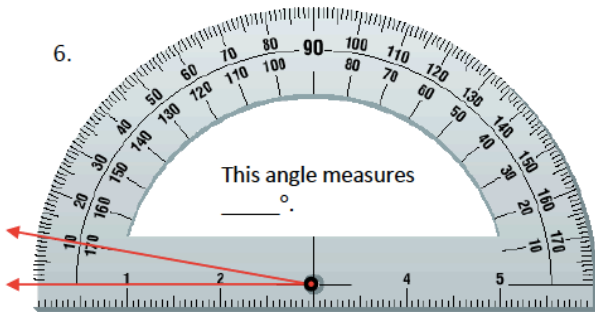
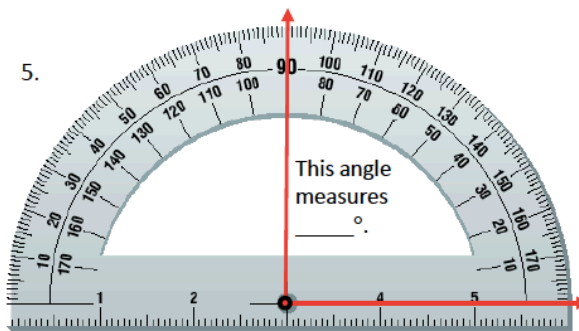
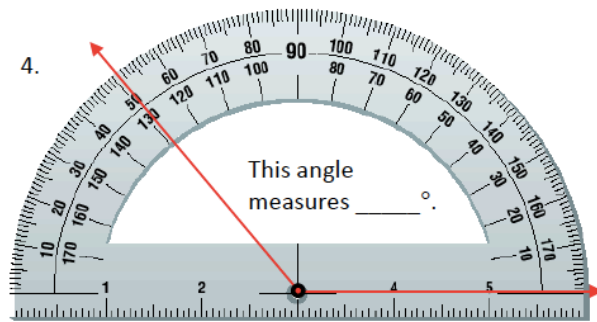
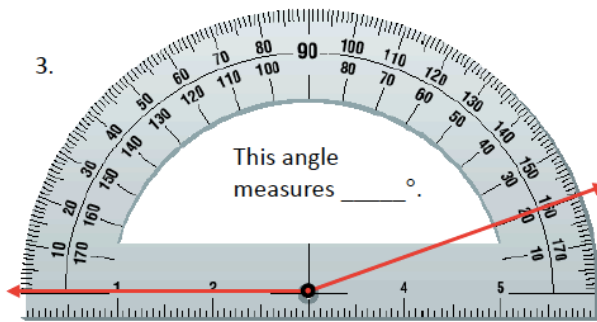
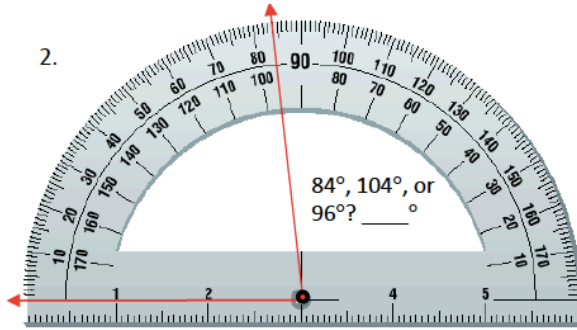
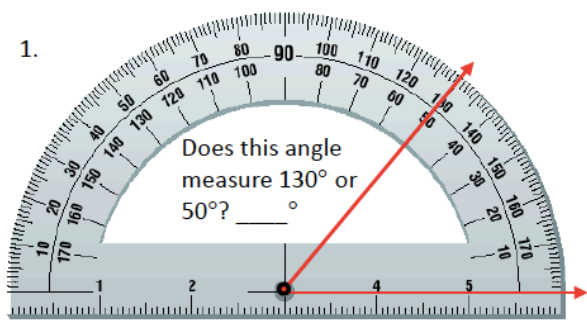
62. Find the value of  $x$ .



Put a BOX around your answer!

Problems 63-70

Protractor Practice



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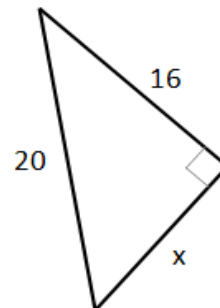
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### Pythagorean Theorem

71. Find the missing side. Use the Pythagorean theorem. Leg 1 = 10 in; Leg 2 = 5 in; hypotenuse = ?

72. Find the missing side. Use the Pythagorean theorem.



73. Dana wants to make a rectangular table with exact right angles. The length of her table is thirty-six inches and the width of his table is eighteen inches. She measures the diagonal at forty inches. Does her table have perfect right angles? Draw a diagram and show your work.

74. Konstantine wants to purchase a 17" laptop. The 17" actually represents the diagonal measurement of the screen. Konstantine wants to know the actual length and width of his new laptop. He measured the length as 10" in the store but was not able to measure the width. What is the width of his laptop? Draw a diagram and show your work.

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75. During a football play, Jay Ajayi ran forty yards up the sideline to catch a pass from Nick Foles. A defender, Trey Flowers, started twenty yards across the field from Ajayi. What is the diagonal distance Flowers will have to run to get to the spot where Ajayi caught the ball? Draw a diagram and show your work.

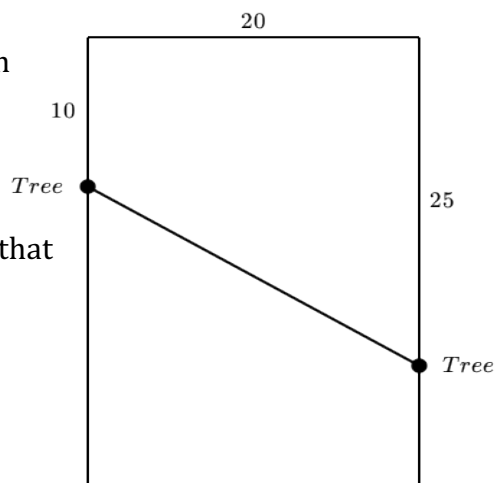
Pythagorean Statement	Type of Triangle
$c^2 = a^2 + b^2$	right
$c^2 < a^2 + b^2$	acute
$c^2 > a^2 + b^2$	obtuse

76. Three sides of a triangle are 10 ft, 24 ft and 26 ft. The triangle is:

- A. right
- B. acute
- C. obtuse
- D. cannot be determined by the information given

77. Abu is putting a clothesline in his rectangular backyard. He wants to put it between two trees on the edge of his property. He has measured his property, and made the sketch shown below, where all the lengths listed are in meters.

What's the shortest length of rope Abu could buy that would stretch from one tree to the other?



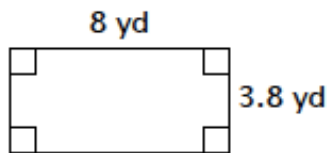
Put a **BOX** around your answer!

Area, Surface Area, and Volume

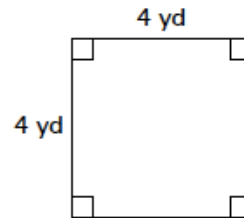
Volume of Rectangular Prism: $l \cdot w \cdot h$	Volume of Cylinder: $\pi r^2 h$
Volume of Cone: $\frac{1}{3} \pi r^2 h$	Volume of Sphere: $\frac{4}{3} \pi r^3$

Find the area of each shape. Include the unit.

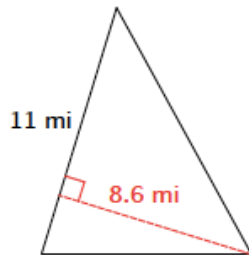
78.



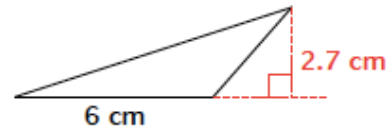
79.



80.

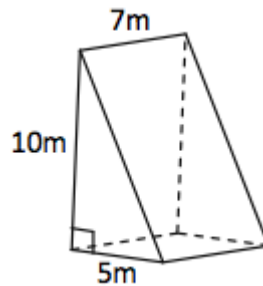


81.



82. Find the surface area of this shape.

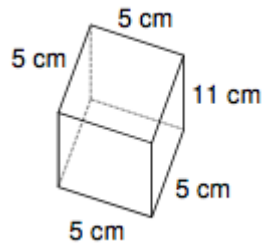
83. Find the volume of this shape.



Put a **BOX** around your answer!

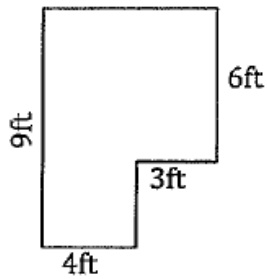
84. Find the surface area of this shape.

85. Find the volume of this shape.

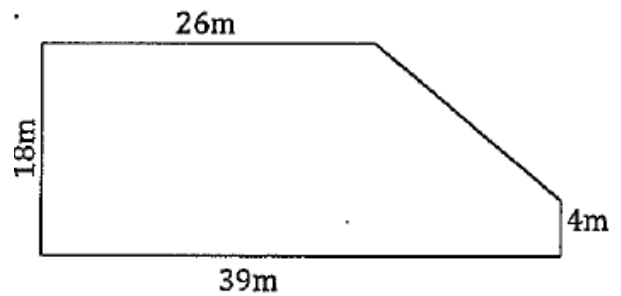


Find the area of each composite shape.

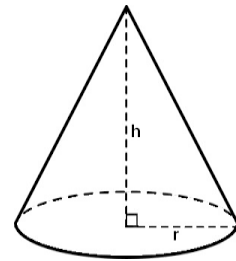
86.



87.



88. A cone has a radius of 0.5 cm and a height of 2 cm. Find the volume.



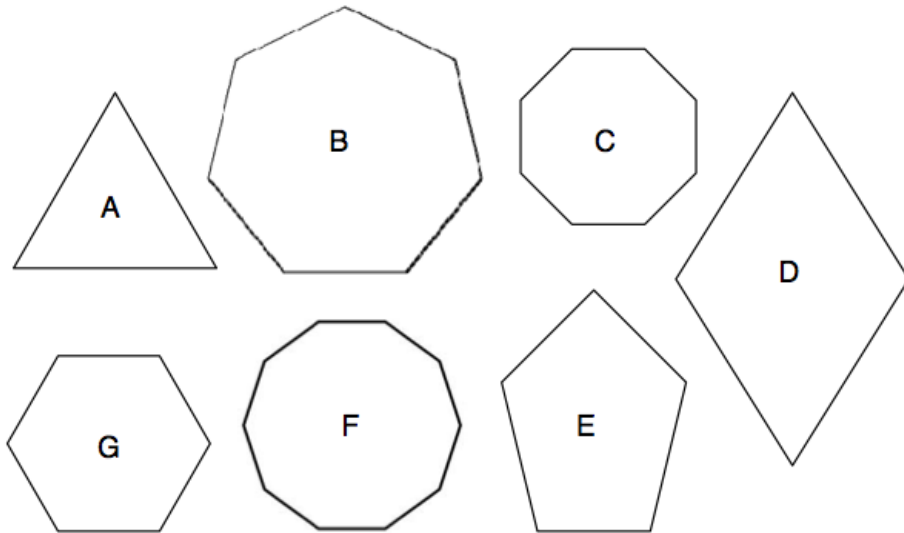
89. The diameter of Pluto is 1,477 miles. Find the volume of Pluto (imagine that it is a perfect sphere).

Put a BOX around your answer!

90-96

Match the name of the polygon with its representative figure.

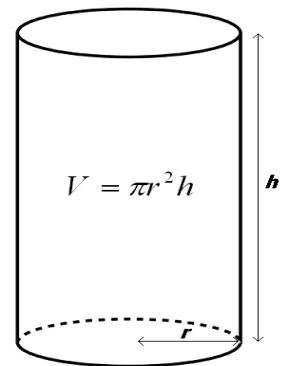
- \_\_\_\_\_ Pentagon
- \_\_\_\_\_ Decagon
- \_\_\_\_\_ Triangle
- \_\_\_\_\_ Octagon
- \_\_\_\_\_ Heptagon
- \_\_\_\_\_ Hexagon
- \_\_\_\_\_ Quadrilateral



97. Melanie is packing her Percy Jackson books into a box that is 12 inches wide, 14 inches long and 10 inches tall. Each Percy Jackson book is 5 inches wide, 9 inches long, and 2 inches tall.

- a. How many books can she fit in the box?
  
  
  
  
  
  
  
  
  
  
- b. What will the volume of the empty space in the box be? In other words, how much space is left after she has filled it with books?

98. A cylindrical dunk tank has a height of eight feet and a diameter of twelve feet. Find the volume of the tank.





Put a **BOX** around your answer!

99. The base of an ice cream cone has a circumference of 15 cm. The height of the cone is 10 cm. Chocolate chip ice cream is placed all the way into the cone, plus an additional half-sphere of ice cream.

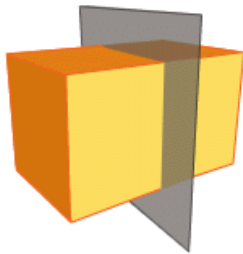


A. What is the total volume of the ice cream?

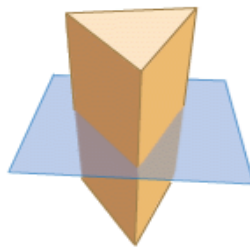
B. If there are 2 chocolate chips in every  $5 \text{ cm}^3$  of ice cream, how many chocolate chips are there?

100-102.

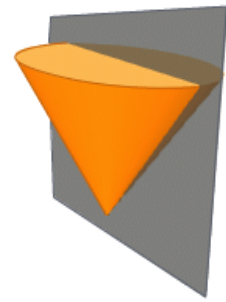
Under each 3D drawing, draw the 2D cross-section created by the cut shown.



**Cross Section:**



**Cross Section:**



**Cross Section:**

Circles

Find the area AND circumference of each circle.

103.



104.

