

Topic 1 : Equation of a circleEquation with center $(0,0)$ and radius r

$$x^2 + y^2 = r^2$$

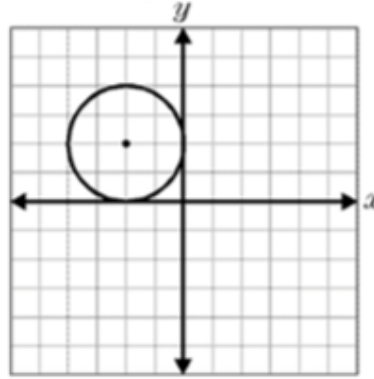
Equation with center (h,k) and radius r

$$(x - h)^2 + (y - k)^2 = r^2$$

1. The endpoints of a diameter of a circle are located at $(5, 9)$ and $(11, 17)$. Which is an equation of the circle?

- A $(x - 5)^2 + (y - 9)^2 = 100$
 B $(x - 5)^2 + (y - 9)^2 = 25$
 C $(x - 8)^2 + (y - 13)^2 = 100$
 D $(x - 8)^2 + (y - 13)^2 = 25$

2. Find the equation of the circle below



3. Which equation represents circle O with center $(2, -8)$ and radius 9?

- 1) $(x + 2)^2 + (y - 8)^2 = 9$
 2) $(x - 2)^2 + (y + 8)^2 = 9$
 3) $(x + 2)^2 + (y - 8)^2 = 81$
 4) $(x - 2)^2 + (y + 8)^2 = 81$

4. What is the equation of a circle whose center is 4 units above the origin in the coordinate plane and whose radius is 6?

- 1) $x^2 + (y - 6)^2 = 16$
 2) $(x - 6)^2 + y^2 = 16$
 3) $x^2 + (y - 4)^2 = 36$
 4) $(x - 4)^2 + y^2 = 36$

5. The coordinates of the endpoints of the diameter of a circle are $(2, 0)$ and $(2, -8)$. What is the equation of the circle?

- 1) $(x - 2)^2 + (y + 4)^2 = 16$
 2) $(x + 2)^2 + (y - 4)^2 = 16$
 3) $(x - 2)^2 + (y + 4)^2 = 8$
 4) $(x + 2)^2 + (y - 4)^2 = 8$

6. Identify the center and the radius of the following circle.

$$x^2 + y^2 + 4x - 12y = 41$$

Topic 2: Scale Drawings

1. The perimeter of the smaller of two similar trapezoids is 18 units. The ratio of the sides of the smaller to the larger trapezoid is 3:5. What is the perimeter of the larger trapezoid?

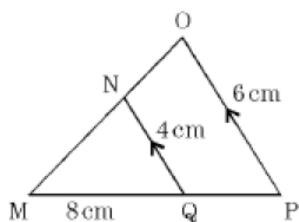
- 1) 48
- 2) 30
- 3) 10.8
- 4) 6.75

2. Which of the following transformations preserves angle measure, but not distance?

- 1) Dilation
- 2) Rotation
- 3) Reflection
- 4) Translation

3. In the figure below, \overline{NQ} is parallel to \overline{OP} and $NQ=4\text{cm}$, $OP=6\text{cm}$, and $MQ=8\text{cm}$. If $NO=2$, how long is \overline{QP} ?

- 1) 10 cm
- 2) 2 cm
- 3) 6 cm
- 4) 4 cm



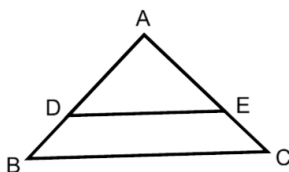
4. Triangle ABC is similar to triangle DEF. Which is the correct statement for the ratio of their corresponding sides?

- 1) $\frac{AB}{DE} = \frac{BC}{DF} = \frac{AC}{EF}$
- 2) $\frac{AB}{DF} = \frac{AC}{DE} = \frac{BC}{EF}$
- 3) $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$
- 4) $\frac{AB}{EF} = \frac{BC}{DF} = \frac{AC}{DE}$

5. In the following diagram, $\overline{DE} \parallel \overline{BC}$. If $EC = 3$ and

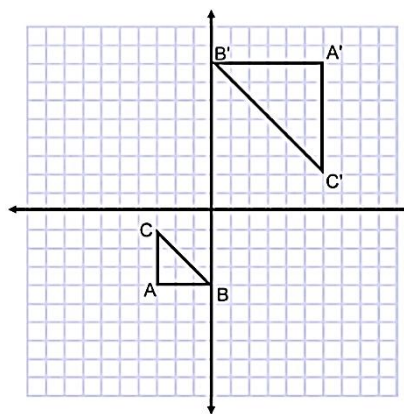
$BD = \frac{1}{2}(AD)$, what is the length of AC ?

- 1) 6
- 2) 9
- 3) 12
- 4) 15



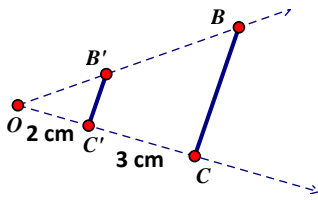
6. Which similarity transformation maps ABC onto $A'B'C'$?

- a) Dilation by factor of 2 and a Rotation about the point $(0, 1)$
- b) Reflection over the origin and a Dilation by factor of 2
- c) Rotation of 180° and a reflection over the line $y=x$
- d) Translation $(x+2, y+5)$ and a dilation of 2



7. Determine the scale factor of the given dilation from point O?

- 1) $\frac{2}{3}$ 2) $\frac{2}{5}$ 3) $\frac{3}{2}$ 4) $\frac{5}{2}$

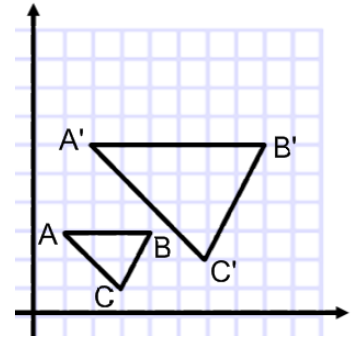


*8. Which one of the following linear functions would remain unchanged under a dilation of 3 about the point (0, 3)?

- 1) $y = 2x$
 2) $y + 2x = 3$
 3) $y - 3x + 5 = 0$
 4) $y = -x - 3$

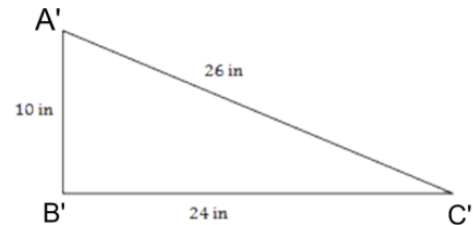
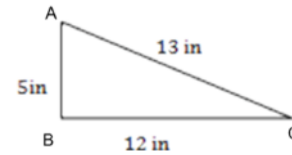
9. Given $\triangle ABC$ and its image $\triangle A'B'C'$ after a dilation with center at the origin.

- a) Determine the constant of dilation and the ratio of $A'B':AB$
 b) Are these triangles congruent, similar or neither? Explain.
 c) Find the ratio of the perimeter of $\triangle ABC$ to $\triangle A'B'C'$.
 d) Find the ratio of the area of $\triangle ABC$ to $\triangle A'B'C'$

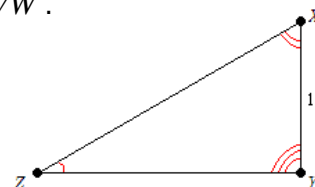
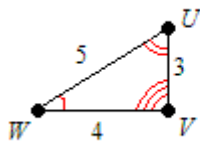


10. Using the diagram (to the right) of the two similar triangles:

- a. What is the relationship between the sides of $\triangle ABC$ to the sides of $\triangle A'B'C'$?
 b. Find the perimeters of both triangles. What is the relationship between the perimeter of $\triangle ABC$ to the perimeter of $\triangle A'B'C'$?
 c. Find the area of both triangles. What is the relationship between the area of $\triangle ABC$ to the area of $\triangle A'B'C'$?



11. In the diagram below, $\triangle XYZ$ is the result of a dilation of $\triangle UVW$.



- a) Find the values of \overline{XZ} and \overline{ZY} .
 b) Find the ratio of the sides.
 c) Find the ratio of the perimeters.
 d) Find the ratio of the areas.

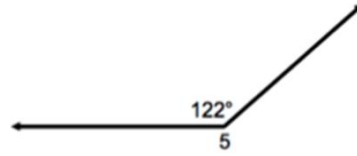
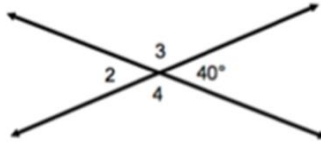
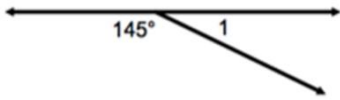
Topic 3 : Unknown Angles

Complementary Angles: Two angles that add to 90°

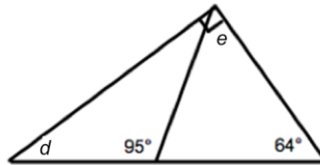
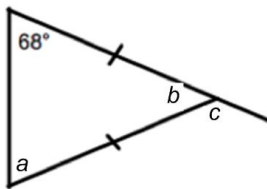
Supplementary Angles: Two angles that add to 180°

Adjacent Angles: Two angles that share a common vertex and common side.

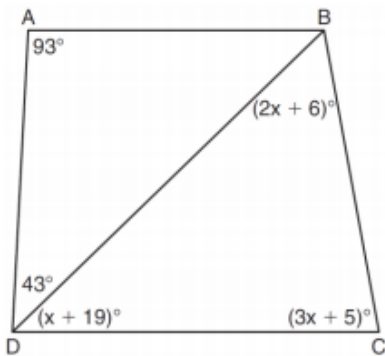
1. Find the measure of each labeled angle. Give a reason for your solution



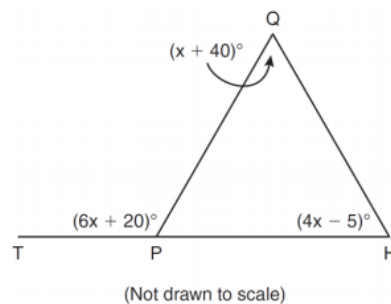
2. Find the measures of angles a , b , c , d , and e .



3. In the diagram below of quadrilateral ABCD with diagonal BD, determine if AB is parallel to DC if $m\angle A = 93$, $m\angle ADB = 43$, $m\angle C = 3x + 5$, $m\angle BDC = x + 19$, and $m\angle DBC = 2x + 6$. Explain your reasoning.



4. In the diagram below of triangle HQP, side HP is extended through P to T. a) Find $m\angle QPT$.



b) Classify triangle PQH.

Topic 4: Proofs/Congruence

Triangle Proofs Summary

List the 5 ways of proving triangles congruent:

1. *SAS @ SAS* 2. *SSS @ SSS* 3. *AAS @ AAS* 4. *ASA @ ASA* 5. *HL @ HL*

Which two sets of criteria CANNOT be used to prove triangles congruent.

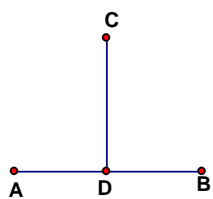
1. *AAA @ AAA* 2. *SSA @ SSA*

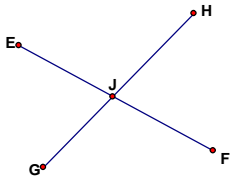
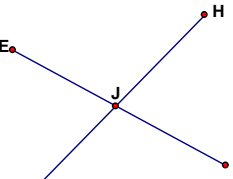
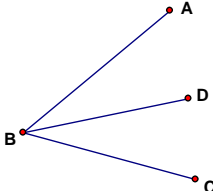
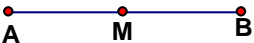
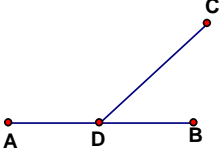
In order to prove a pair of corresponding sides or angles are congruent, what must you do first?

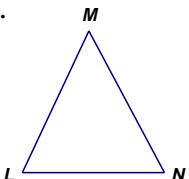
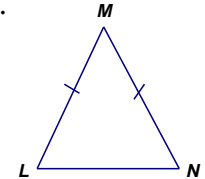
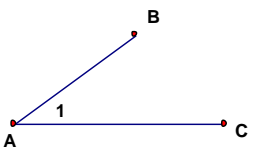
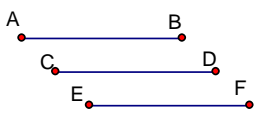
Show the triangles are congruent first!

Property	Meaning	Geometry Example
Reflexive Property	A quantity is equal to itself.	$AB = AB$
Transitive Property	If two quantities are equal to the same quantity, then they are equal to each other.	If $AB = BC$ and $BC = EF$, then $AB = EF$.
Symmetric Property	If a quantity is equal to a second quantity, then the second quantity is equal to the first.	If $OA = AB$, then $AB = OA$.
Addition Property of Equality	If equal quantities are added to equal quantities, then the sums are equal.	If $AB = DF$ and $BC = CD$, then $AB + BC = DF + CD$.
Subtraction Property of Equality	If equal quantities are subtracted from equal quantities, the differences are equal.	If $AB + BC = CD + DE$ and $BC = DE$, then $AB = CD$.
Multiplication Property of Equality	If equal quantities are multiplied by equal quantities, then the products are equal.	If $m\angle ABC = m\angle XYZ$, then $2(m\angle ABC) = 2(m\angle XYZ)$.
Division Property of Equality	If equal quantities are divided by equal quantities, then the quotients are equal.	If $AB = XY$, then $\frac{AB}{2} = \frac{XY}{2}$.
Substitution Property of Equality	A quantity may be substituted for its equal.	If $DE + CD = CE$ and $CD = AB$, then $DE + AB = CE$.
Partition Property (includes "Angle Addition Postulate," "Segments add," "Betweenness of Points," etc.)	A whole is equal to the sum of its parts.	If point C is on \overline{AB} , then $AC + CB = AB$.

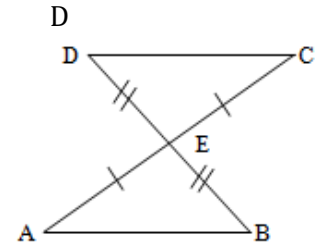
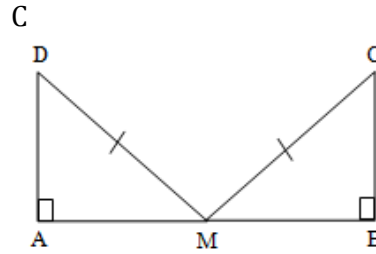
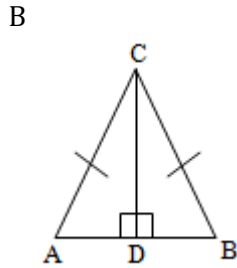
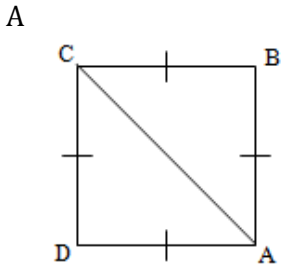
Statements of Equality

Picture	Given	Statement	Reason
1. 	$AB \perp CD$	$\angle ADB$ and $\angle BDC$ are right angles $\angle ADB \cong \angle BDC$	Perpendicular Lines form right Angles All right \angle 's are \cong

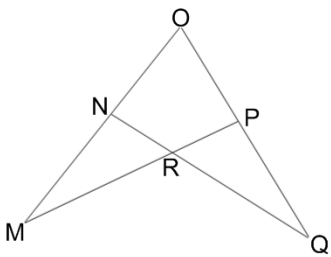
2.		EF intersects GH at J	$\angle EJH \cong \angle GJF$	Intersecting lines form \cong vertical \angle 's
3		EF bisects GH	$GJ \cong JH$	Bisector cuts segment in 1/2
4.		BD bisects $\angle ABC$	$\angle ABD \cong \angle DBC$	Bisector cuts angle in 1/2
5.		M is the midpoint of AB	$AM \cong MB$	midpoint cuts segment in 1/2
6.		AB is a straight line	$\angle ADB$ & $\angle CDB$ are supplementary	Linear Pairs are supplementary

Picture	Given	Statement	Reason
7. 	$\triangle LMN$ is isosceles LN is the base	$ML \cong MN$ $\angle MLN \cong \angle MNL$	Isosceles \triangle 2 sides are congruent and base angles are congruent
8. 	$LM \cong MN$	$\angle MLN \cong \angle MNL$	When 2 sides are congruent the angles opposite those sides are also congruent Converse also true if two angles are \cong the sides opposite them are congruent
9. 		$\angle 1 \cong \angle 1$	Reflexive
10. 	$AB \cong CD$ $EF \cong CD$	$AB \cong EF$	Transitive

1. For each pair of triangles, tell which triangles can be proven congruent (if at all) and by what method.



2. In the diagram of $\triangle OMP$ and $\triangle OQN$, $\angle M \cong \angle Q$ and $\overline{MO} \cong \overline{QO}$. Prove: $\overline{MN} \cong \overline{QP}$.



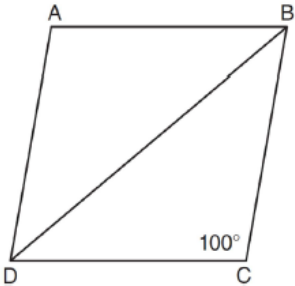
Ways to prove triangles are similar - Symbol \sim

3. Fill in the missing blanks with the correct reason for the proof.

<p>Given: $\overline{GH} \parallel \overline{DE}$</p> <p>Prove: $\triangle FGH \sim \triangle FDE$ $\frac{FG}{FD} = \frac{FH}{FE}$ $(FG)(FE) = (FD)(FH)$</p>	
STATEMENTS	REASONS
1) $\overline{GH} \parallel \overline{DE}$	1) Given
2) $\angle FGH \cong \angle FDE$	2)
3) $\angle DFE \cong \angle DFE$	3)
4) $\triangle FGH \sim \triangle FDE$	4)
5) $\frac{FG}{FD} = \frac{FH}{FE}$	5)
6) $(FG)(FE) = (FD)(FH)$	6)

Topic 5: Proving Properties of Geometric Figures

	Parallelogram	Rectangle	Rhombus	Square
Opposite angles \cong				
Consecutive angles supplementary				
Opposite sides \cong				
Opposite sides parallel				
Diagonals bisect each other				
Diagonals bisect angles				
Diagonals \perp to each other				
Diagonals \cong				
Equiangular				
Equilateral				

<p>1. All of the following must have congruent diagonals except</p> <ol style="list-style-type: none"> A rectangle A square A parallelogram Isosceles trapezoid 	<p>2. A parallelogram must be a rhombus if the</p> <ol style="list-style-type: none"> Diagonals are perpendicular Opposite angles are congruent Diagonals are congruent Opposite sides are congruent
<p>3. If the measures of two opposite angles of a parallelogram are represented by $3x + 40$ and $x + 50$, what is the measure of each angle of the parallelogram?</p>	<p>4. In parallelogram ABCD angle A can be represented by $3x + 20$ and angle B can be represented by $7x - 40$. Find the measure of each angle of the parallelogram.</p>
<p>5. In rhombus ABCD below, what is the measure of angle BDA?</p> 	<p>6. Which statement is <i>false</i>?</p> <ol style="list-style-type: none"> All parallelograms are quadrilaterals. All rectangles are parallelograms. All squares are rhombuses. All rectangles are squares.
<p>7. The following represents a cyclic quadrilateral. Find the values of all variables shown.</p>	