GEOMETRY 21: Review for Final Exam

Unit 1 Parallel Lines/Angles

True or False

1) ____ Any 2 lines always intersect at one point.

2) ____ If $\overline{AB}$ bisects $\overline{CD}$ at point E, then AE = EB.

For #3-6, use the following statement: "Linear pairs are supplementary, adjacent angles."

3) Rewrite the statement as a conditional.

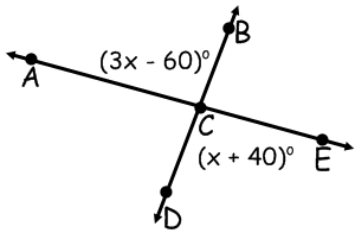
4) Write the converse of the conditional.

5) Write the statement as a biconditional.

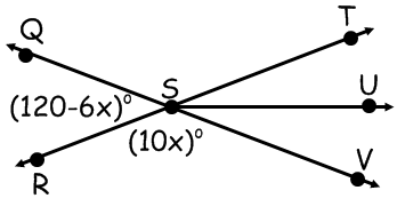
6) Is the statement a definition? Explain your reasoning.

For #7-10, determine the value of the variables in the given diagrams.

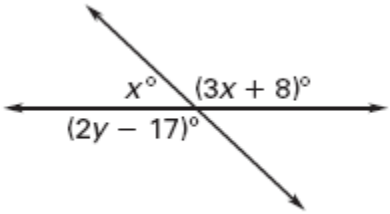
7)



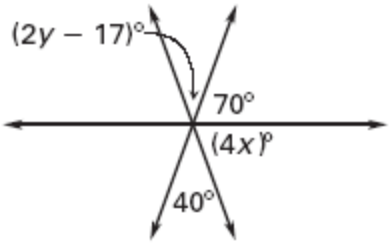
8)



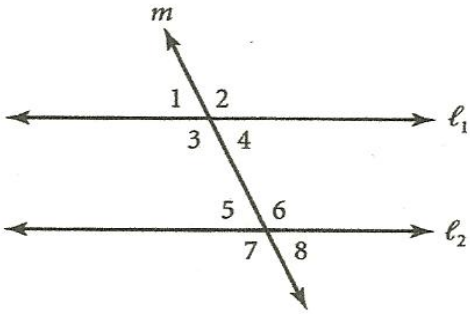
9)



10)



#11-13 are multiple choice and use the diagram to the right.



(diagram for #11 -13)

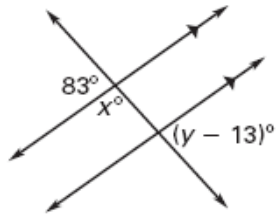
11) What type of angles are ∡3 and ∡6?
   a. alternate interior b. alternate exterior
   c. same-side interior d. corresponding

12) If $l_1 \| l_2$ and m∡1 = 110°, then determine the equation below that will find the m∡6=
   a. $m\angle 6 = 110$ b. $m\angle 6 = 2(110)$ c. $m\angle 6 + 110 = 180$ d. $m\angle 6 + 110 = 360$

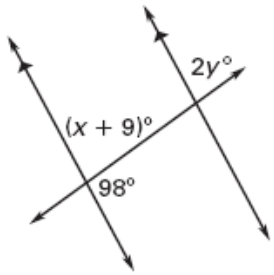
13) If $l_1 \| l_2$ and m∡5=75°, then m∡3 =
   a. 15° b. 75° c. 90° d. 105°

Find the value of *x* and *y*.

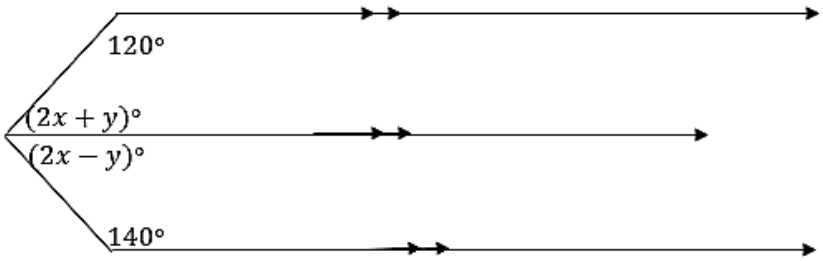
14)



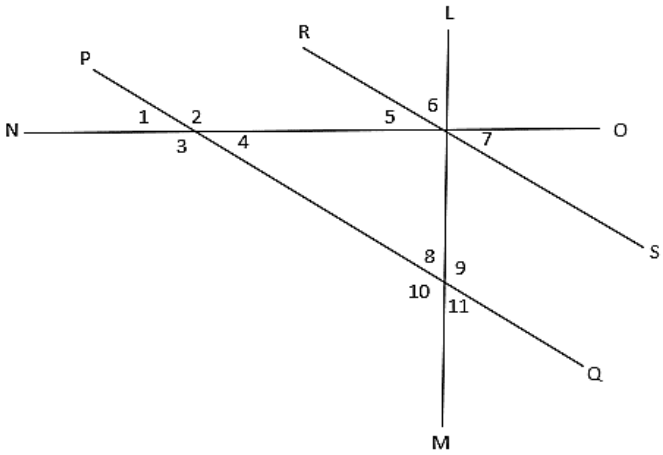
15)



16) Find the values of *x* and *y* in the diagram.

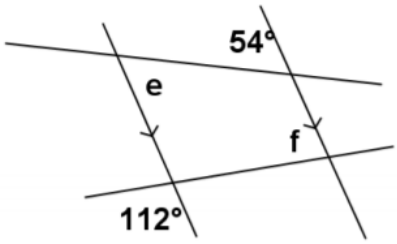


17) Given $\overline{PQ} \parallel \overline{RS}, \overline{LM} \perp \overline{NO}$, and the m∠2 is 12° more than three times the m∠1 , find the measure of each numbered angle below.

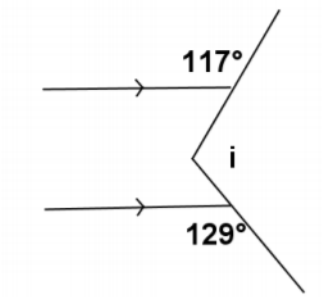


18) Find the value of the variables below.

a.



b.



19) Assume that ∠*A* is supplementary to ∠ *B* and complementary to ∠*C*. Determine *m*∠ *A*, *m*∠ *B*, and *m*∠*C* if $m\angle A = (x + 10)°, m\angle B = (12x + 1)°, m\angle C = (5x + 2)°$.

Unit 2 Triangles

1) The angles in a triangle are in the extended ratio 2:3:4. Find the measure of each angle.

2) $\overleftrightarrow{MO}$ bisects $\angle LMN$. If $m\angle LMO = (x^2 + 4x - 5)°$ and $m\angle LMN = (9x + 5)°$, solve for x and find $m\angle NMO$.

3) $\overline{YV}$ is an angle bisector of $\angle XYZ$. Determine m∡ZYV and m∡XYZ if $m\measuredangle XYV = (8x - 6)°$ $m\measuredangle ZYV = (3x + 8)°$.

4) If C is the midpoint of $\overline{AB}$ find the value(s) of x given $AB = 11x + 10\ cm$ and $BC = x^2 + 4x - 5\ cm$

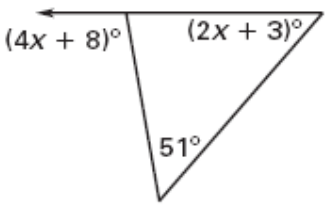
5) Can a triangles have sides with the given lengths? Explain.

a. *8 cm, 9 cm, 7 cm*

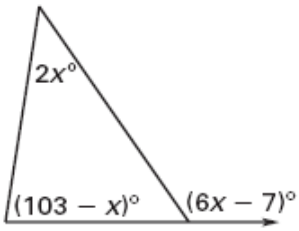
b.) 7 ft, 13 ft, 6 ft

6) Solve for the given variable(s) or numbered angles.

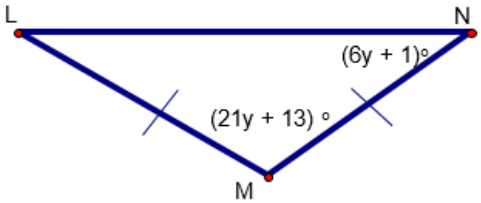
a.



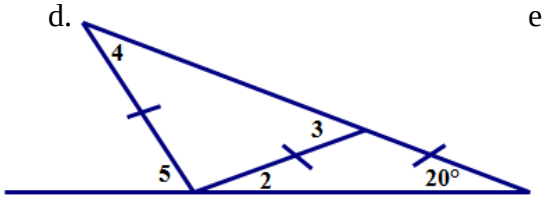
b.



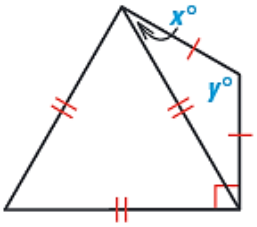
c.



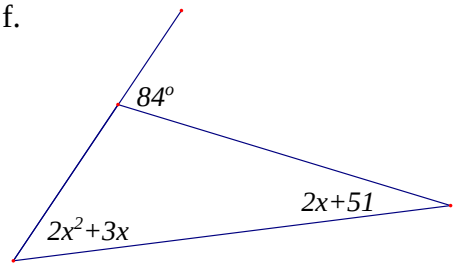
d.



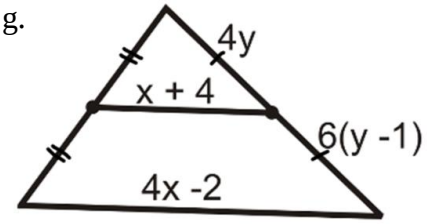
e.



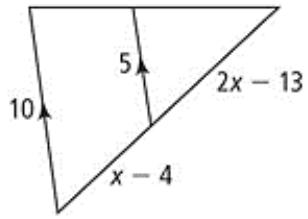
f.



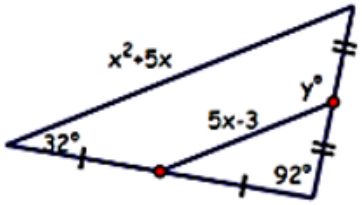
g.



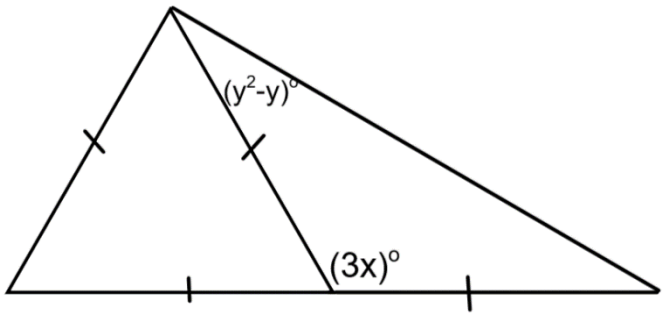
h.



i.

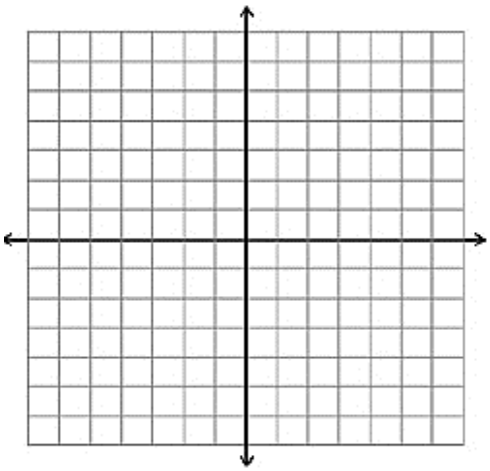


7) Find all possible values of *x* and *y* in the problem below.



8) $\overline{RS}$ has endpoints $R(2,4)$ and $S(-1,7)$. What is the coordinate of its midpoint *M*?

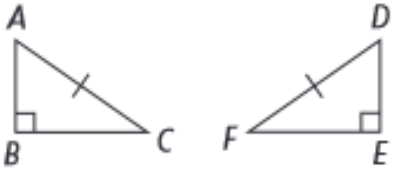
9) The midpoint of $\overline{BC}$ is $(5,-2)$. One endpoint is $B(3,4)$. What are the coordinates of C, the other endpoint?



<u>Unit 3 Congruent and Similar Triangles</u>

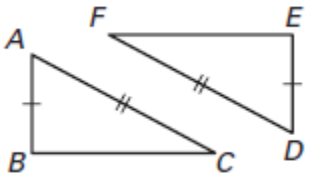
1) **<u>LABEL AND STATE</u>** the third congruence that is needed to prove the two triangles congruent using the given theorem.

a. HL≅



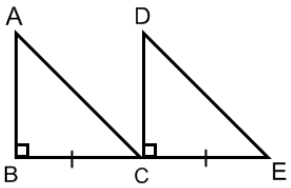
_____ ≅ _____

b. SAS ≅



_____ ≅ _____

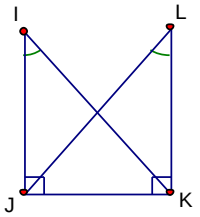
c. ASA ≅



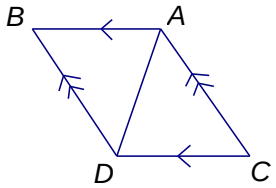
_____ ≅ _____

2) Decide whether there is enough information to prove the triangles are congruent. State the postulate or theorem that you would use to prove the triangles congruent.

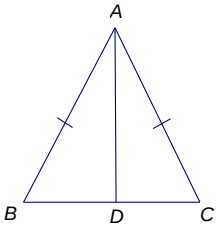
a. $\Delta IKJ \cong \Delta LJK$



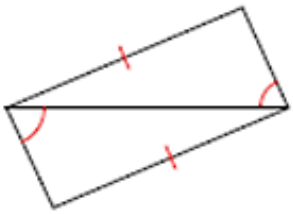
b. $\Delta ABD \cong \Delta DCA$



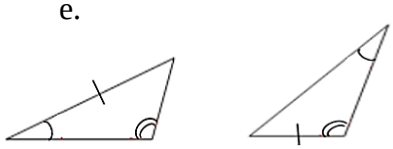
c. $\Delta ABD \cong \Delta ACD$



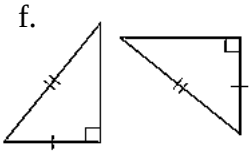
d.



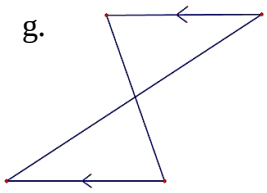
e.



f.



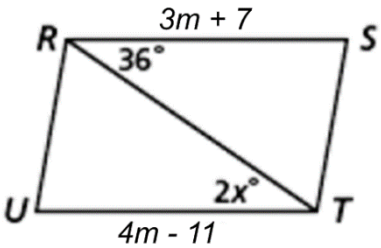
g.



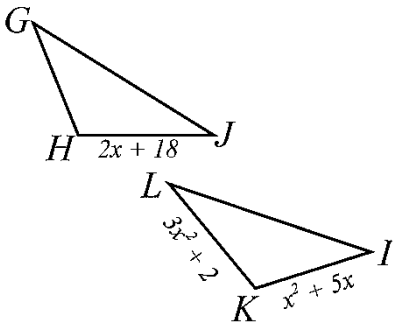
3) $\Delta MAT \cong \Delta WIL$. Determine WI, if $AT = 4x^2 + 6x - 10\ cm$, $WI = 9x - 6\ cm$, and $IL = 2x^2 + 15x + 25\ cm$.

4) Determine the values of the missing variables, given the following triangle congruence statements. State **why** you can write your equations.

a. $\triangle RST \cong \triangle TUR$



b. $\Delta GHJ \cong \Delta IKL$

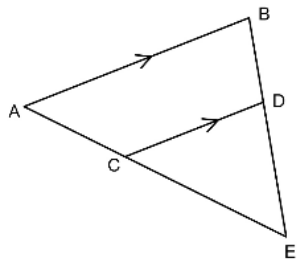


5) Which of the following theorems/postulates is NOT a way to determine if triangles are similar?

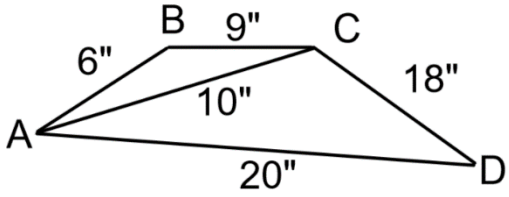
a. SAS b. SSS c. *AA* d. SAA

6) Determine whether or not the triangles below are similar by AA~, SSS~, or SAS~, or none of them. Show all work necessary! If they are similar, complete the similarity statement.

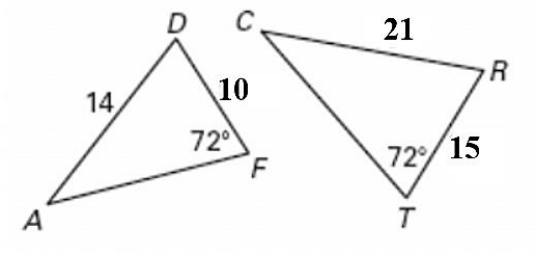
a.



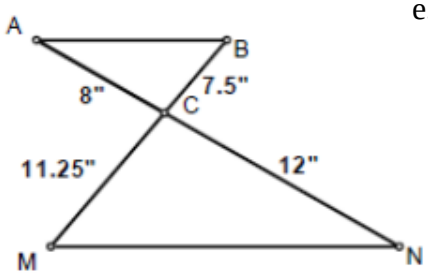
b.



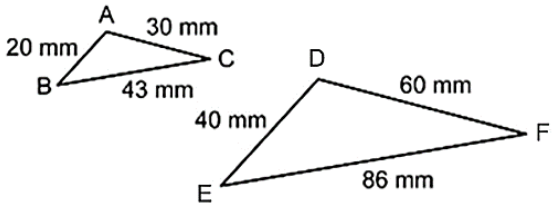
c.



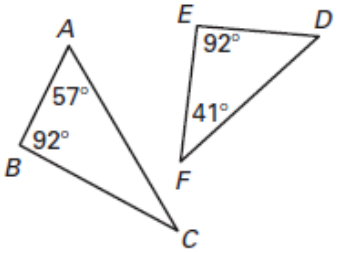
d.



e.



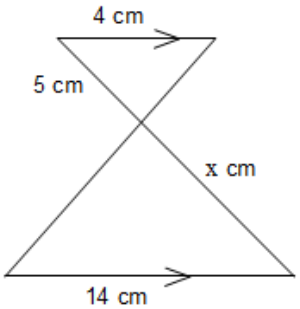
f.



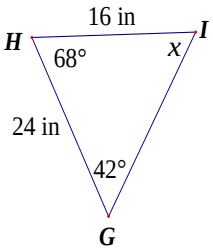
7) Tyler used similar triangles to find the height of a pole. When he stood 6.5 feet from a small puddle, he could see the reflection of the top of the pole in the puddle. The puddle was 26 feet from the pole and Tyler's eye level was 5 feet 6 inches above the ground. What is the height of the pole?

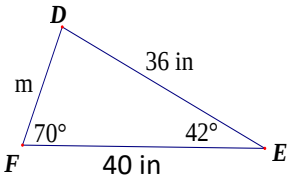
8) Given that the triangles <u>are</u> similar, solve for the missing variables/side lengths and find the scale factor from the smaller figure to the larger.

a.

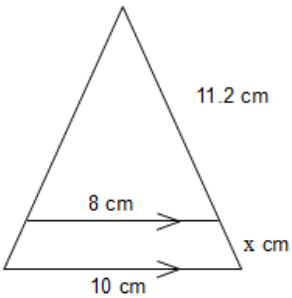


b.

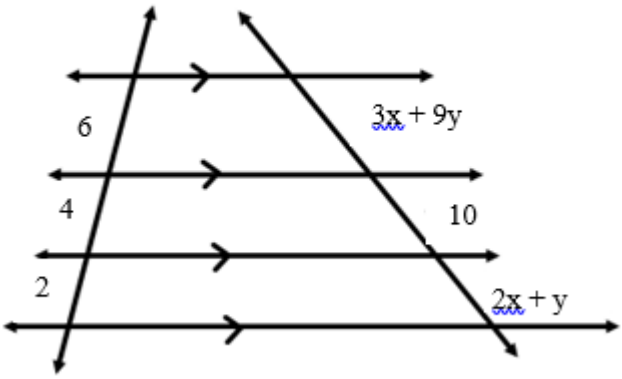




c.

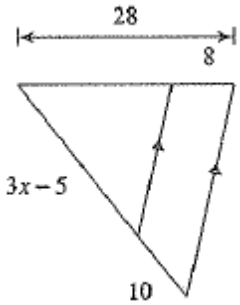


9) Solve for x and y.

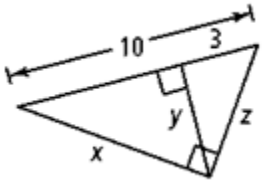


10) Solve for the missing variable(s)/?.

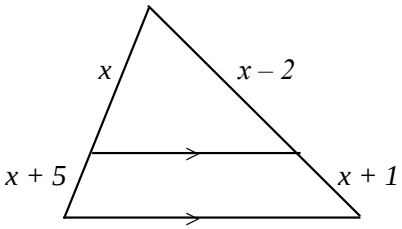
a.



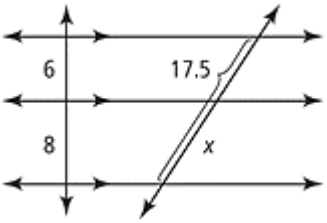
b.



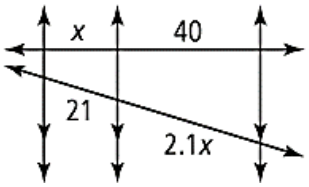
c.



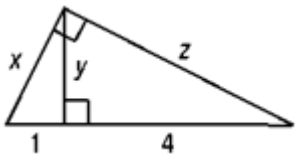
d.



e.

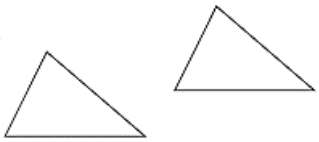


f.

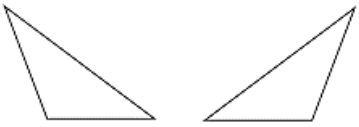


11) Tell what type of TRANSFORMATION is shown in each diagram.

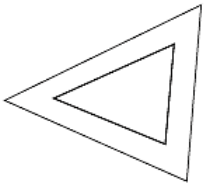
a.



b.

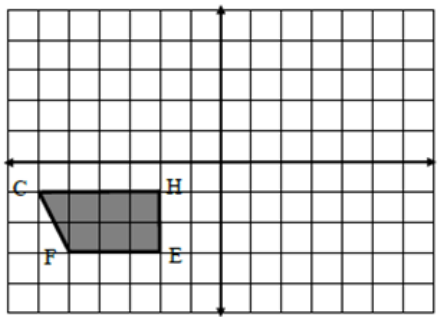


c.

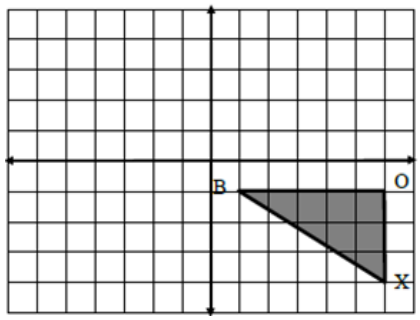


For #12 & 13, list the coordinates of the vertices. Perform each transformation. Then list the coordinates of the new vertices. Finally, write the transformation rule.

12) Rotate about the origin 90 degrees clockwise



13) Translate left 5 and up 3

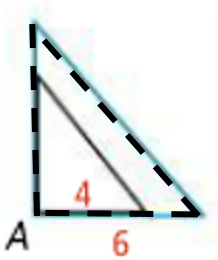


14) Given the point and its image, determine the scale factor.

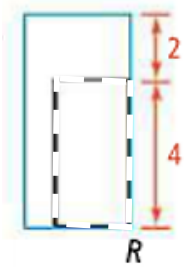
a. $A(3,6)$ $A'(4.5, 9)$ b. $G'(3,6)$ $G(1.5,3)$ c. $B(2,5)$ $B'(1,2.5)$

15) In the dilation shown, the solid-line figure is the image and the dashed-line figure is the pre-image. State whether the image is an enlargement or reduction, then determine the scale factor.

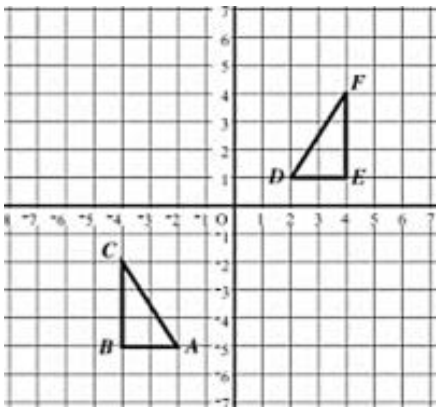
a.



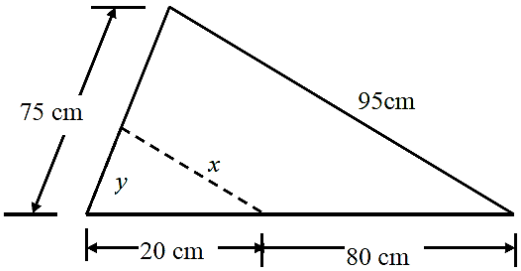
b.



16) Describe a series of transformation that would map ΔABC onto ΔDEF. Does the order your transformations take place matter?



17) The dotted figure is the image of the given preimage. Determine the scale factor then calculate the lengths of the missing sides.



18) Find the distance between points C and D. If necessary, round to the nearest tenth. $C(-3, -5)$, $D(-9, 4)$

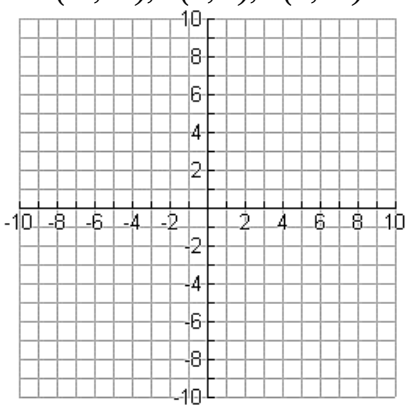
19) Determine whether $\overline{AB}$ and $\overline{CD}$ are parallel, perpendicular or neither. Explain how you know.

a) *A(-1, -3), B(4, 5)* and *C(0, -2), D(-5, 6)*

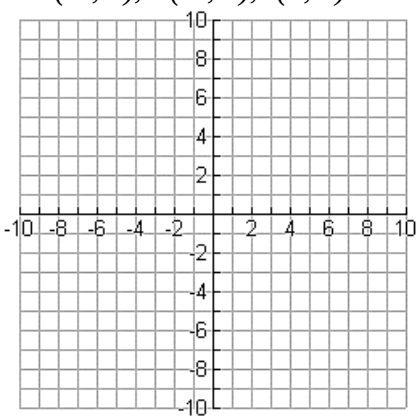
b) *A(-2, -6), B(3, 4)* and *C(-19, -5), D(-10, 10)*

20) The vertices of a triangle are given. Plot the points on a coordinate plane and determine whether the triangle is a right triangle. Then determine if it is scalene, isosceles or equilateral. Show your work to justify your answer. <u>Write a summary statement explaining your conclusion.</u>

a) *X(-2, -1), Y(0, 2), Z(3, -1)*



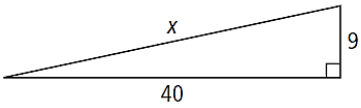
b) *T(-3, 4), R(-1, 0), I(1, 6)*



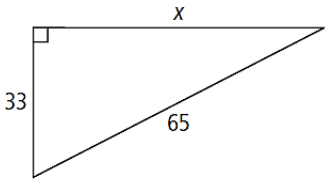
<u>Unit 4 Solving Right Triangles</u>

1) Find the value of the missing variables below. Round side lengths to the nearest hundredth and angle measures to the nearest degree. If it is a special right – leave your side lengths in simplest radical form.

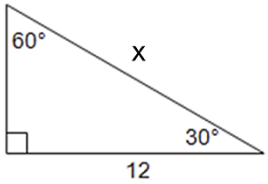
a.



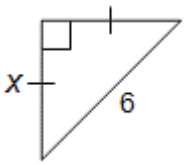
b.



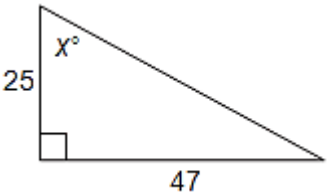
c.



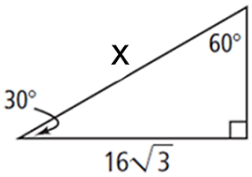
d.



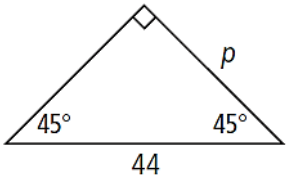
e.



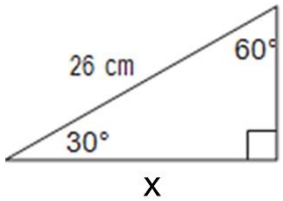
f.



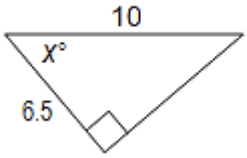
g.



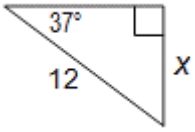
h.



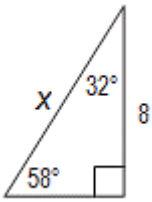
i.



j.



k.

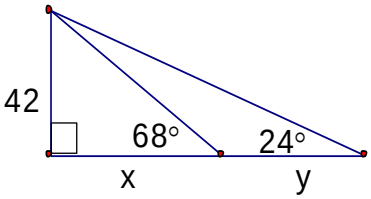


2) The lengths of the sides of a triangle are given. Classify each triangle as *acute*, *right*, or *obtuse*.

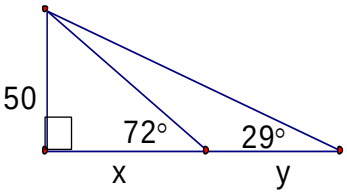
a. 50, 14, 48 b. 4, 9, 8 c. $2\sqrt{3}$, 4, 6

3) Find the value of the missing variables.

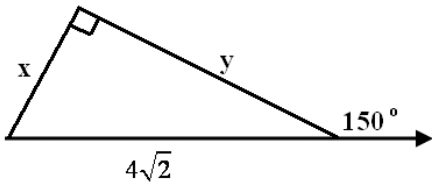
a.



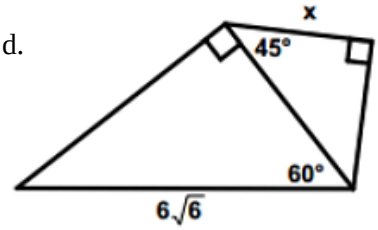
b.



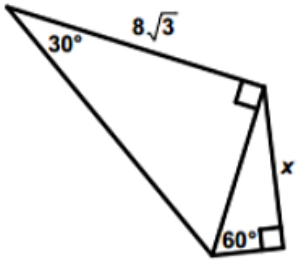
c.



d.



e.



4) The hypotenuse of a *30-60-90* triangle is $12\sqrt{2}$ ft. Find the area of the triangle.

5) Find the perimeter and area of an equilateral triangle with height *30 yards*.

6) A lighthouse is 32 feet tall and someone at the top of the lighthouse sees a boat that needs help. The angle of depression from the top of the lighthouse is 19°. Assuming the lighthouse is directly on the water, how far will the person have to row to get to the boat to help them?

7) An engineer stands 50 feet away from a building and sights the top of the building with a surveying device mounted on a tripod that is 5 feet tall. If the angle of elevation is 50°, how tall is the building?

8) A ladder is leaning up against the side of a house. The angle between the ground and the ladder is four times as big as the angle between the house and the ladder.

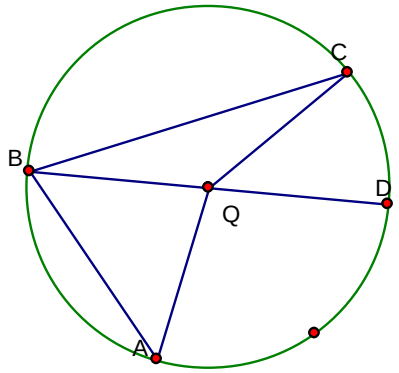
   1) What are the angles?

   2) How long is the ladder if it is 5 feet from the house at ground level?

9) A wire attached to the top of a pole reaches a stake in the ground 20 feet from the foot of the pole and makes an angle of 58° with the ground. Find the length of the wire.

<u>Unit 5 Circles</u>

1) Given ⊙Q, m∡ABC=72° and m$\widehat{CD} = 46°$. $\overline{BD}$ is a diameter. Find the indicated measures.

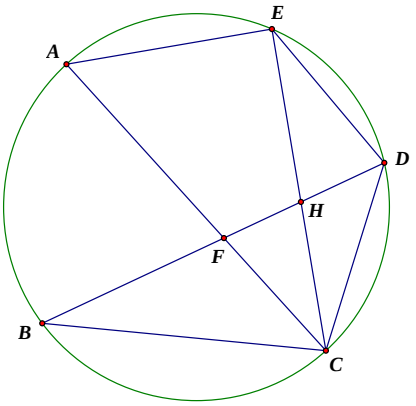


a. $m\widehat{CA} =$ _____ b. $m\widehat{BC} =$ _____

c. $m\widehat{AD} =$ _____ d. $m\angle C =$ _____

e. $m\angle ABD =$ _____ f. $m\angle A =$ _____

2) In the circle to the right, $m\angle CAE = 60°, m\widehat{BC} = (10x - 36)°, m\widehat{BA} = (8x)°, m\widehat{AE} = (4x + 12)°$, and $\overline{DE} \cong \overline{DC}$. Find each of the following.



a. $x =$ _____

b. $m\angle BDE =$ _____

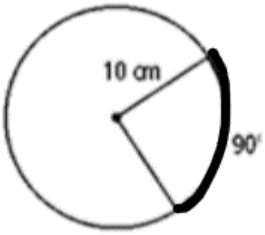
c. $m\widehat{ECA} =$ _____

d. $m\widehat{CD} =$ _____

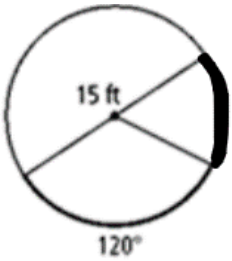
3) If the radius of a circle is 22 mm and the degree measure of one of the arcs on the circle is 160°, find the length of the arc. Write your answer in exact, simplified terms.

4) Find the length of each darkened arc. Leave answers in terms of π

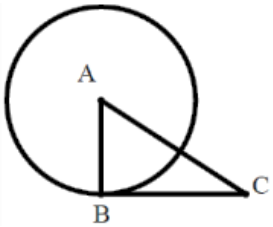
a.



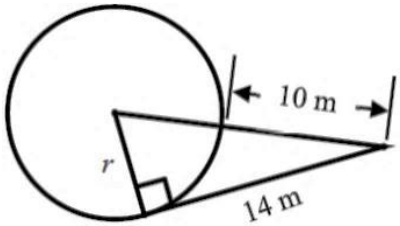
b.



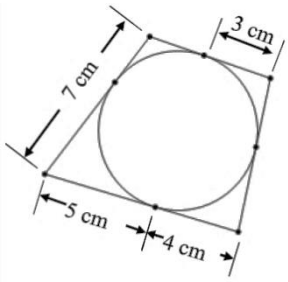
5) B is a point of tangency. If $m\angle C = 30°$ and $AC = 40\ cm$, then what is the length of the radius?



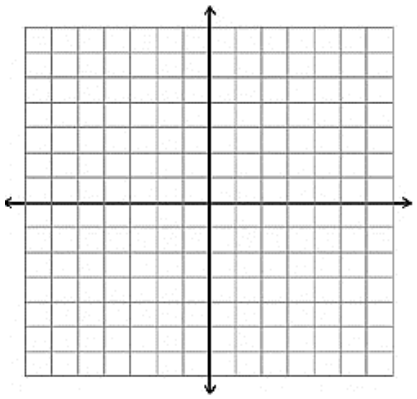
6) Find the length of the radius.



7) Find the perimeter of the quadrilateral below. The circle is inscribed in the quadrilateral.

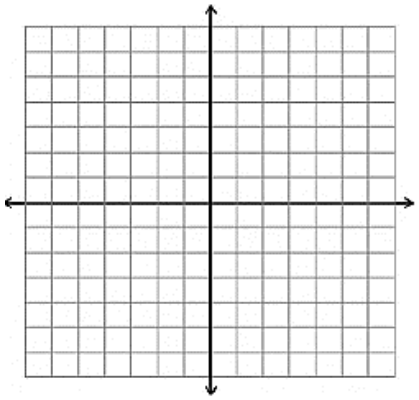


8) Write an equation in standard form for each circle. Then, give its center and radius. Then graph the circle. $x^2 - 8x + y^2 + 2y = 8$



9) Write an equation in standard form for each circle. Then, give its center and radius. Then graph the circle.

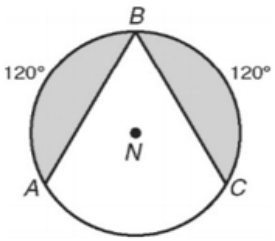
$$x^2 - 24x + y^2 + 140 = -6y + 3$$



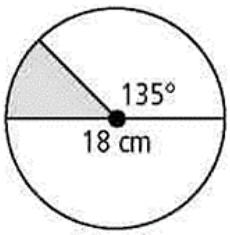
10) Find the area of the shaded region. A-C: Round your answer to the nearest hundredth and leave in terms of π

Circumference = 16π

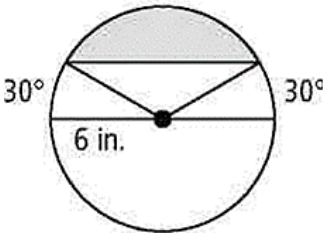
a.



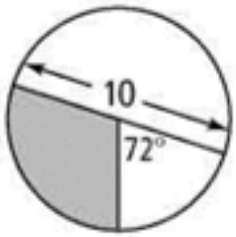
b.



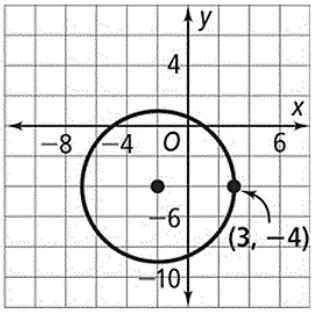
c.



d.



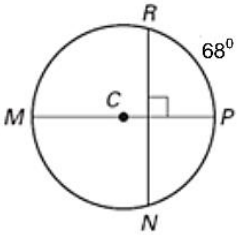
11) Write the standard equation of the circle in the diagram at the right.



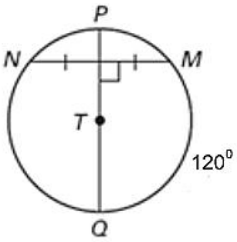
12) What is the standard equation of the circle with center (8, -2) that passes through the point (1, 4)?

13) Find the measure of $m\widehat{MN}$. $\overline{MP}$ and $\overline{QP}$ are diameters.

a. $m\widehat{MN} =$ _____

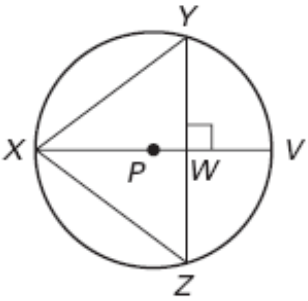


b. $m\widehat{MN} =$ _____



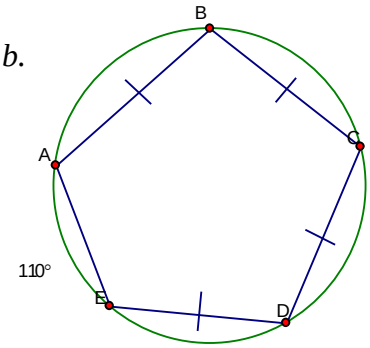
14) Find the indicated measures.

a. In ⊙P, $ZY = 12$, $XW = 10$



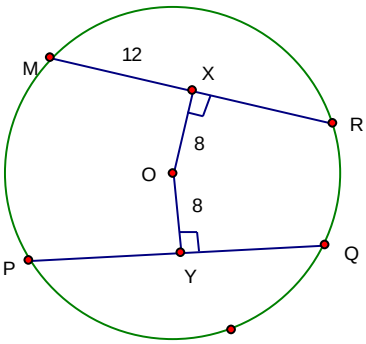
a. $XY =$ _____

b.



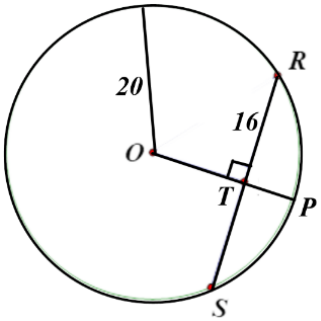
b. $m\widehat{BD} =$ _____

c.



c. $OQ =$ _____

d.



d. $PT =$ _____

$m\widehat{RS} =$ _____

Unit 6 Polygons and Quadrilaterals

1) What is the sum of the measures of the interior angles of a hexagon?

2) If the measure of an exterior angle of a regular polygon is 18°, how many sides does the polygon have?

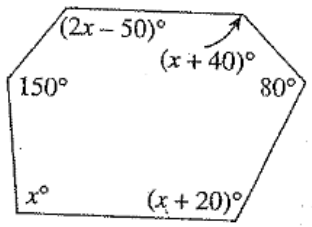
3) The measure of an interior angle of a regular polygon is 140°. How many sides does it have?

4) The measure of an interior angle of a regular polygon is four times the measure of its exterior angle. How many sides does the polygon have?

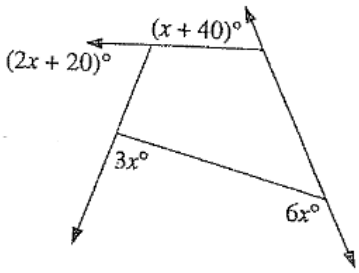
5) If each interior angle on a regular polygon has a measure of 168°, how many sides will the polygon have?

6) Find the value of the missing variables.

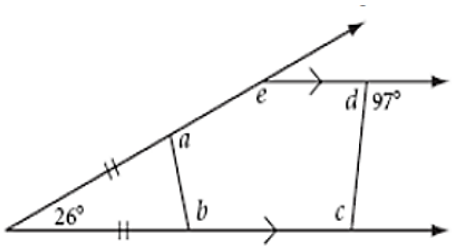
a.



b.

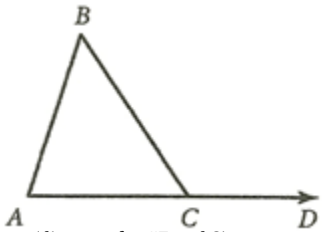


c.



7) If $m\measuredangle A = x + 5$, $m\measuredangle B = x$, and $m\measuredangle BCD = 125°$, then $m\measuredangle A =$

8) If $\overline{AC} \cong \overline{BC}$ and $m\measuredangle BCD = 108°$, then $m\measuredangle A =$

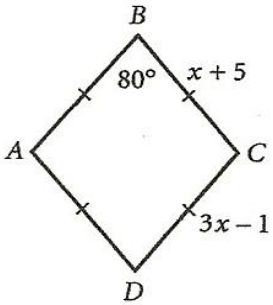


(diagram for #7 and 8)

9) What type of quadrilateral is *ABCD*? Why? Be specific

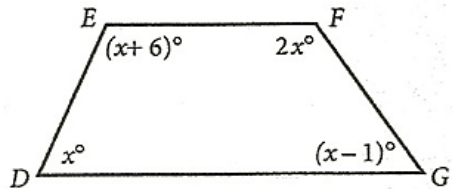
10) What is the length of side $\overline{AB}$? State a property that supports your answer.

11) What is the measure of ∡A? State a property that supports your answer.



(diagram for #9-11)

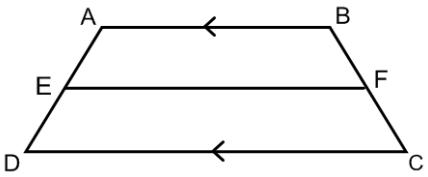
12) What is m∠G in quadrilateral DEFG?



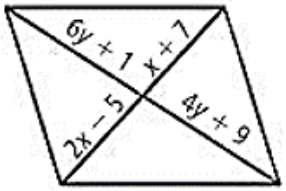
13) Determine whether each statement is Sometimes, Always, or Never true. Justify each sometimes answer.

a. If a figure is a parallelogram, then it can be a trapezoid.
b. A square is a rhombus.
c. A rectangle is a square.
d. If a figure is a quadrilateral, then it has all right angles.
e. The diagonals of a square are perpendicular.

14) $\overline{EF}$ is the midsegment of trapezoid *ABCD*. If AB= $x^2 + 3x + 7$, DC = $x^2 + 6$, and EF = $7x - 1$, determine the length of EF.



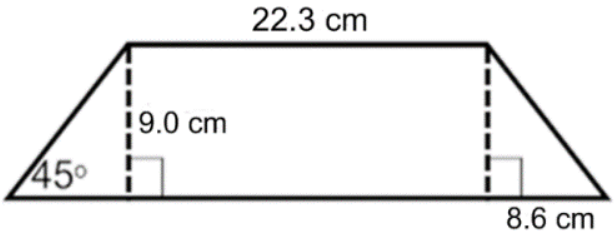
15) The quadrilateral below is a parallelogram. Find the values of *x* and *y*. State a property that supports your equations.



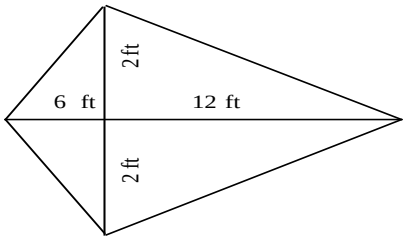
16) Quadrilateral *ABCD* is a parallelogram. If $AB = 2x^2 - 13x$, $CD = 24$, $m\angle D = (10y - 4)^\circ$, and $m\angle A = (4y + 2)^\circ$, find all possible values of *x* and *y*. State a property that supports your equations.

17) If rectangle JKLM has MK = 3x – 5, JL = 2y + 5, KL = x + 5, and JM = 4y – 5. Find JL and KL. State a property that supports your equation.

18) Find the area of the trapezoid below. Round your answer to the nearest tenth.



19) Find the area of the kite below.



20) *RHOM* is a rhombus. If $m\angle RHM = (2x^2 - 10x - 60)°$, $m\angle RMO = (x^2 + 9x - 110)°$, find $m\angle MRH$. State a property that supports your equation.

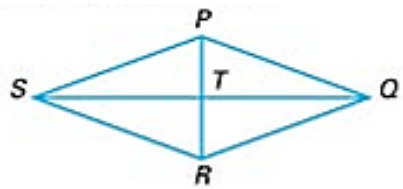
21) Given that *PQRS* is a rhombus, *PQ* = 5, *PR* = 6, *ST* = 4, $m\angle PQR = 74°$, find the following:

a. *QR* b. *TR*

c. *PT* d. *SQ*

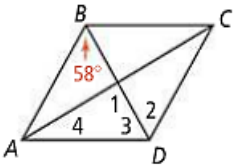
e. $m\angle QPS$ f. $m\angle PTQ$

g. $m\angle QPT$ h. $m\angle PSR$

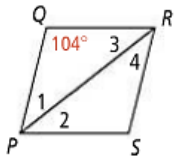


22) Find the measures of the numbered angles in each rhombus below.

a.

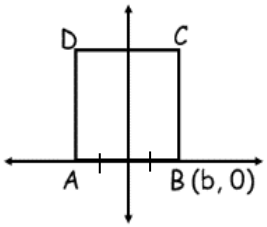


b.

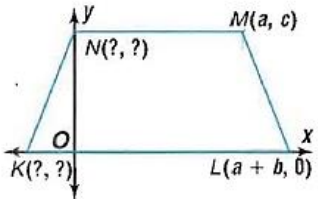


23) Determine the missing coordinates in each figure below.

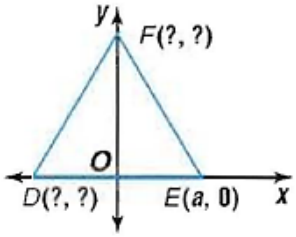
a. square *ABCD*



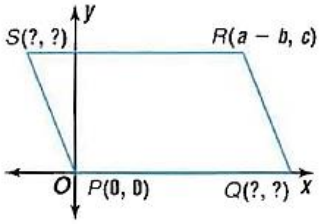
b. isosceles trapezoid *KLMN*



c. isosceles triangle *DEF*

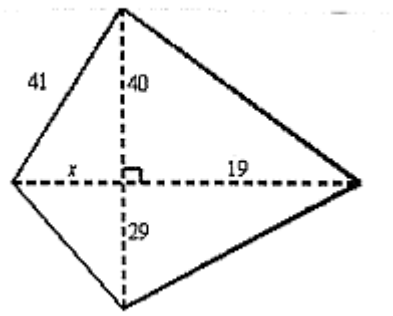


d. parallelogram *QRSO*

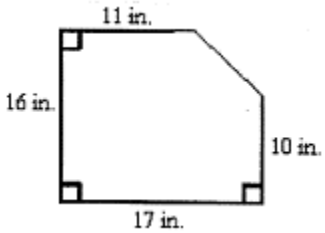


24) Find the area of the figures below.

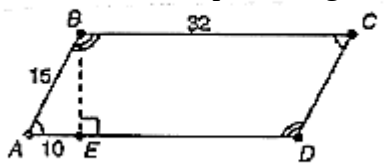
a.



b.

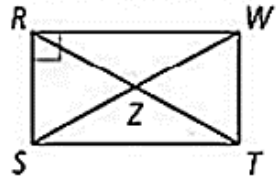


Find the area of the parallelogram ABCD. Leave answer in exact form (simplified square root).



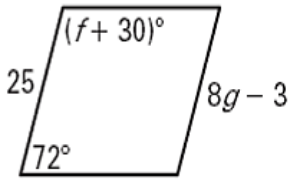
Determine the equation that will find the value for x in the parallelogram at right.

$RZ = 2x + 5$,
$SW = 5x - 20$



A. $2x + 5 = 90$
B. $2x + 5 = 5x - 20$
C. $2(2x + 5) = 5x - 20$
D. $2(2x + 5) = 2(5x - 20)$

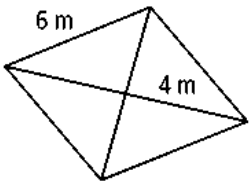
25) Determine the equation that will find the value for f in the parallelogram at right.



A. $f + 30 = 72$
B. $f + 30 = 2(72)$
C. $f + 30 + 72 = 180$
D. $f + 30 + 72 = 360$

26) In rhombus ABCD, $AB = 16$ and $AC = 28$. Find the area of the rhombus to the nearest tenth

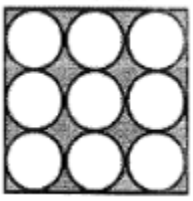
27) Find the area of the rhombus below.



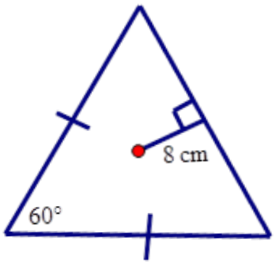
28) Find the area of an octagon whose side length is 14 in.

29) Determine the area of an equilateral triangle whose side length is 14 in. Leave answer in simplified square roots if necessary.

30) In the figure, each circle has a radius of 2 inches. What is the area of the shaded region rounded to the nearest hundredth?

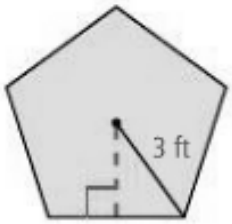


31) Find the area of the triangle if the length of the apothem is 8 cm.

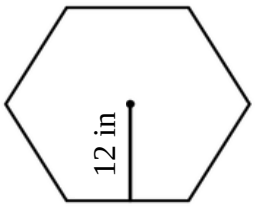


32) Find the area of the regular polygons below. Round your answer to the nearest tenth.

a.



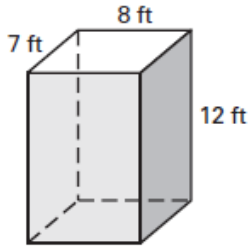
b.



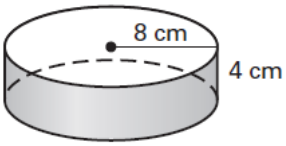
<u>Unit 7 Surface Area and Volume</u>

1) For the following find the surface area and volume of the solid. Give an exact, simplified answer.

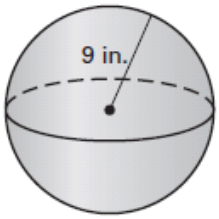
a.



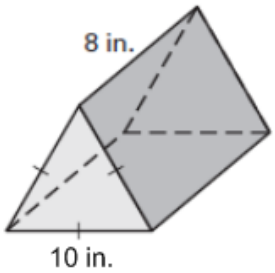
b.



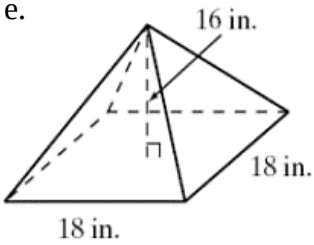
c.



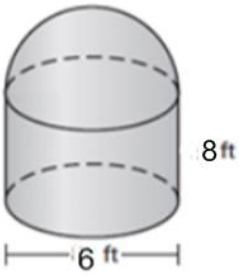
d.



e.



f.



2) For the following, determine the unknown value for a right cylinder with the given radius, r, height, h, surface area SA, and volume, V.

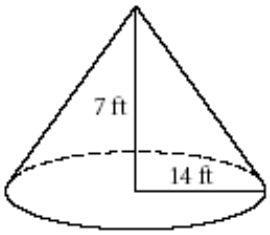
a. r = 26', h = 16' SA = _____

b. V = 144π cm^3, r = 12 cm h = _____

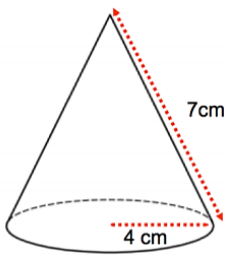
c. V = 80 in^3, h = 16 in r = _____

3) For the following, determine the surface area and volume of each right cone.

a.



b.



4) A right cone has a surface area of 152π square meters. The radius is 8 m. Determine the slant height.

5) The volume of a right cone is 27π cubic inches. The height is the same as the radius. Determine the surface area of the cone to the nearest hundredth.

6) Determine the surface area of a sphere with a diameter of 4". Leave answer in terms of π.

7) Determine the length of a radius if the surface area of a sphere is 36π cm^2.

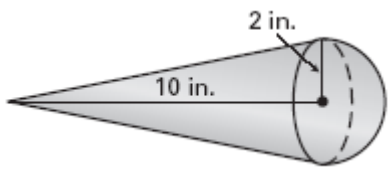
8) Determine the volume of a sphere with a radius of 14 cm.

9) The volume of a sphere is 7776π ft^3. Find the surface area in terms of π.

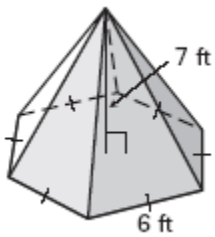
10) Determine the volume of a sphere (in terms of π) if the surface area is 100π cm^2

11) For the following, determine the surface area and volume of each figure. Write answers in exact form <u>and</u> rounded to the nearest hundredth.

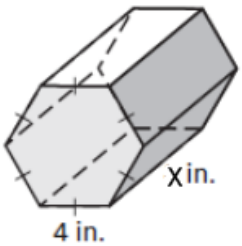
a.



b.



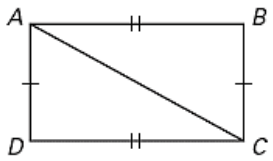
12) Find the volume of the prism below in terms of x.



Proofs

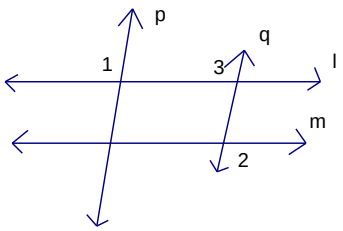
1) **Given**: $\overline{AD} \cong \overline{BC}$; $\overline{AB} \cong \overline{DC}$

   Prove: $\overline{AD} \parallel \overline{BC}$



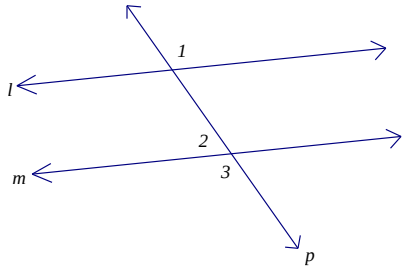
2) **Given**: p ∥ q; ∠1 ≅ ∠2

   Prove: $l \| m$



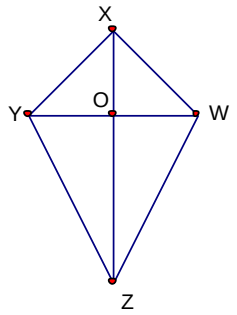
3) **Given**: $l \parallel m$

   Prove: ∠1 and ∠2 are supplementary



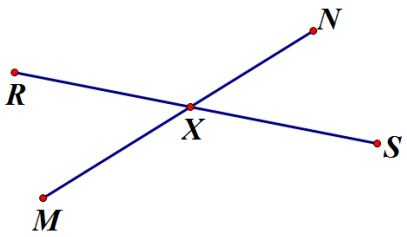
4) **Given**: $\overline{XY} \cong \overline{XW}$, $\overline{XZ}$ bisects $\angle YXW$

   Prove: $\Delta ZYX \cong \Delta ZWX$



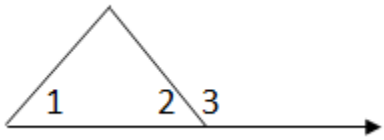
5) **Given:** X is the midpoint of $\overline{MN}$; $MX = RX$

Prove: $XN = RX$



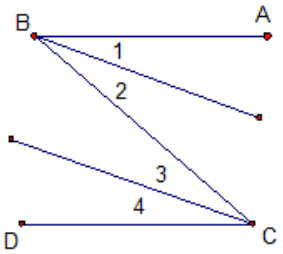
6) **Given:** $m\angle 1 + m\angle 3 = 180$

Prove: $\angle 1 \cong \angle 2$

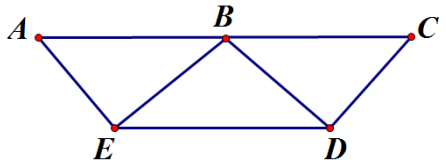


7) **Given:** $\angle 1 \cong \angle 3$, $\angle 2 \cong \angle 4$

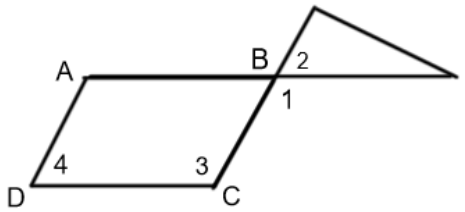
Prove: $\angle ABC \cong \angle BCD$



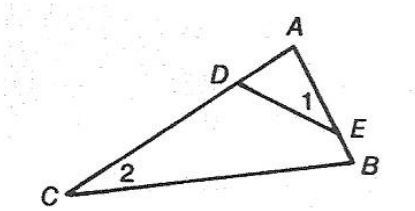
8) **Given:** $\overline{AE} \perp \overline{BE}$, $\overline{CD} \perp \overline{BD}$, $\overline{AC} \parallel \overline{ED}$, $\angle BED \cong \angle BDE$
Prove: B is the midpoint of $\overline{AC}$



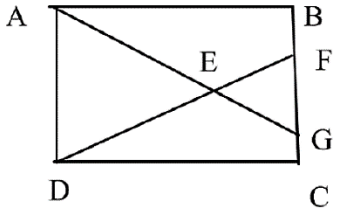
9) **Given:** $\angle 2$ *is supplementary to* $\angle 3$; $\overline{AD} \parallel \overline{BC}$
Prove: $m\angle 1 + m\angle 4 = 180$



10) **Given:** $\angle 1 \cong \angle 2$
Prove: $\frac{AD}{AB} = \frac{AE}{AC}$



11) **Given:** $\angle C$ and $\angle B$ are right angles, $\angle EFB \cong \angle EGC$
Prove: $\Delta ABG \sim \Delta DCF$



GEOMETRY 21 FINAL EXAM REVIEW ANSWERS

Unit 1 Parallel Lines/Angles

1. False- parallel or coinciding lines
2. False- $CE = DE$

3. If angles form a linear pair, then they are supplementary, adjacent angles.
4. If angles are supplementary and adjacent, then they form a linear pair.
5. Angles form a linear pair if and only if they are supplementary, adjacent angles.
6. Yes- Both conditional and converse are true.

7. $x = 50$
8. $x = 15$
9. $x = 43,\ y = 77$
10. $x = 17.5,\ y = 28.5$
11. a
12. c
13. d
14. $x = 97,\ y = 96$
15. $x = 73,\ y = 41$
16. $x = 25,\ y = 10$
17. $m\angle 1 = 42°,\ m\angle 2 = 138°,\ m\angle 3 = 138°,\ m\angle 4 = 42°,\ m\angle 5 = 42°,\ m\angle 6 = 48°,\ m\angle 7 = 42°,\ m\angle 8 = 48°,\ m\angle 9 = 132°,\ m\angle 10 = 132°,\ m\angle 11 = 48°$
18. a. $e = 54°,\ f = 68°$
    b. $i = 114°$
19. $m\angle A = 23°,\ m\angle B = 157°,\ m\angle C = 67°$

Unit 2 Triangles

1. $40°,\ 60°,\ 80°$
2. $x = 3,\ m\angle NMO = 16°$
3. $m\angle ZYV = 16.4°,\ m\angle XYZ = 32.8°$
4. $x = 4,\ x = -\frac{5}{2}$ (not a solution)
5. a. yes; $7 + 8 > 9$
   b. no; $6 + 7 = 13$, needs to be $>$
6. a. $x = 23°$
   b. $x = 22°$
   c. $y = 5°$
   d. $m\angle 2 = 20°,\ m\angle 3 = 40°,\ m\angle 4 = 40°,\ m\angle 5 = 60°$
   e. $x = 30°,\ y = 120°$
   f. $x = 3°$ or $-\frac{11}{2}$
   g. $x = 5,\ y = 3$
   h. $x = 9$
   i. $x = 3$ or $2,\ y = 124°$

7. $x = 40°,\ y = 6$ or -5

8. $\left(\frac{1}{2}, \frac{11}{2}\right)$

9. $(7, -8)$

Unit 3 Congruent & Similar Triangles

1. a. $\overline{AB} \cong \overline{DE}$ or $\overline{BC} \cong \overline{EF}$
   b. $\angle A \cong \angle D$
   c. $\angle ACB \cong \angle DEC$

2. a. yes $ASA \cong$
   b. yes $ASA \cong$
   c. not $\cong$ (SS not a valid rule)
   d. not $\cong$ (SSA not a valid rule)
   e. not $\cong$
   f. yes $HL \cong$
   g. not $\cong$ (AAA not a valid rule)

3. $x = 7,\ WI = 57$ u
4. a. $x = 18°,\ m = 18$
   b. $x = -2$ or $\frac{8}{3}$
5. d

6. a. yes $AA\sim\ \Delta ABE \sim \Delta CDE$
   b. not similar; sides not proportional
   c. not similar; SSA not a valid rule
   d. not similar; sides not proportional
   e. yes $SSS\sim\ \Delta ABC \sim \Delta DEF$
   f. not similar; angles not congruent

7. 22 ft
8. a. $x = 17.5$
   b. $m = 24,\ x = 70°$
   c. $x = 2.8$
9. $x = 2,\ y = 1$

10. a. $x = 10$
b. $x = \sqrt{70},\ y = \sqrt{21},\ z = \sqrt{30}$
c. $x = 5$
d. $x = 10$
e. $x = 2\sqrt{10}$
f. $x = \sqrt{5}$

11. a. translation
b. reflection
c. dilation

12. $C'(-1,6)\ H'(-1,2)\ E'(-3,2)\ F'(-3,5)$
13. $B'(-4,2)\ O'(1,2)\ X'(1,-1)$

14. a. enlargement $\frac{3}{2}$
b. enlargement 2
c. reduction $\frac{1}{2}$
15. a. reduction $\frac{2}{3}$
b. enlargement $\frac{3}{2}$

16. First reflect over y-axis. Then translate up vertically 6 units. The order does not matter for this set.

17. scale factor: $\frac{1}{5}$, $x = 19$ cm, $y = 15$ cm
18. 10.8 u

19. a. neither; slopes are not the same and they are not opposite reciprocals $\frac{8}{5}, -\frac{8}{5}$
b. parallel; same slopes $\frac{5}{3}$

20. a. not a right triangle- no opposite reciprocal slopes
scalene- no congruent sides
b. right triangle- $\overline{TR} \perp \overline{TI}$ because opposite reciprocal slopes -2 and $\frac{1}{2}$
isosceles- $\overline{TR} \cong \overline{TI}$ because both sides measure $\sqrt{20}$

Unit 4 Solving Right Triangles

1. a. $x = 41$
b. $x = 56$
c. $x = 8\sqrt{3}$
d. $x = 3\sqrt{2}$
e. $x = 62°$
f. $x = 32$
g. $p = 22\sqrt{2}$
h. $x = 13\sqrt{3}$
i. $x = 49°$
j. $x = 7.22$
k. $x = 9.43$

2. a. right; $2500 = 2500$
b. obtuse; $81 > 80$
c. obtuse; $36 > 28$

3. a. $x = 16.97,\ y = 77.36,\ z = 94.33$
b. $x = 16.25,\ y = 73.95,\ z = 90.20$
c. $x = 2\sqrt{2},\ y = 2\sqrt{6}$
d. $x = 3\sqrt{3}$
e. $x = 4\sqrt{3}$

4. $36\sqrt{3}$ ft^2
5. $300\sqrt{3}$ yd^2
6. 93 ft
7. 64.6 ft
8. Angle measures are 18° and 72°. Ladder is about 16.2 ft.
9. 37.7 ft

Unit 5 Circles

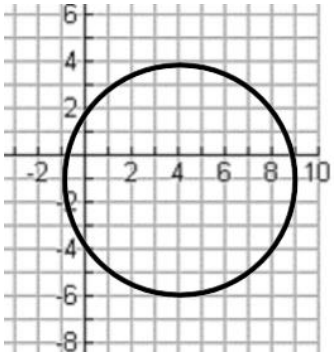
1. a. 144°
b. 134°
c. 98°
d. 23°
e. 49°
f. 49°

2. a. 12
b. 78°
c. 300°
d. 60°

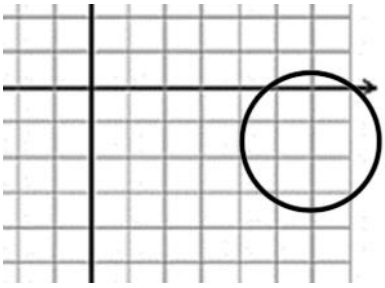
3. $\frac{176\pi}{9}$ mm

4. a. 5π cm
b. $\frac{5\pi}{2}$ ft
5. 20 u
6. 4.8 m
7. 28 cm

8. $(x-4)^2+(y+1)^2=25$
center: $(4,-1)$ $r=5$



9. $(x-12)^2+(y+3)^2=16$
center: $(12,-3)$ $r=4$



count by 2s

10. a. 78.62 u^2
b. 31.81 cm^2
c. 21.11 in^2
d. 23.56 u^2

11. $(x+2)^2+(y+4)^2=25$
12. $(x-8)^2+(y+2)^2=85$
13. a. 112°
b. 120°

14. a. $2\sqrt{34}$
b. 125°
c. $4\sqrt{13}$
d. 8, 106°

Unit 6 Polygons & Quadrilaterals

1. 720°
2. 20 sides
3. 9 sides
4. 10 sides
5. 30 sides
6. a. $x=96°$
b. $x=25°$
c. $a=b=103°$, $c=97°$, $d=83°$, $e=154°$
7. $x=60$, $m\angle A=65°$
8. $m\angle A=54°$
9. rhombus, all sides ≅
10. $AB=8$ u, all sides ≅
11. 100°, consecutive angles are supp
12. $m\angle G=70°$

13. a. never- Parallelogram has two pairs of opposite ∥ sides, while trapezoid only has one.
b. always- Square has all properties of rhombus.
c. sometimes- When all sides are congruent and it's a square.
d. sometimes- When it's a rectangle.
e. always
14. $EF=20$ or 16.5 units
15. $x=12$, $y=4$,
Diagonals bisect each other.
16. $x=8$ *or* $-\frac{3}{2}$,
Opposite sides are congruent.
$y=13$,
Consecutive angles are supplementary.

17. $3x-5=2y+5$
Diagonals are congruent.
$x+5=4y-5$

Opposite sides are congruent.
$x = 6,\ y = 4,\ JL = 13$ u, $KL = 11$ u
18. 279.9 cm^2
19. 36 ft^2
20. $2(2x^2 - 10x - 60) = x^2 + 9x - 110$
diagonals bisect opposite angles and opposite angles are $\cong$
$x = 10$ ($x = -\frac{1}{3}$ doesn't work)
$m\angle MRH = 100°$
21. a. 5 u
b. 3 u
c. 3 u
d. 8 u
e. 106°
f. 90°
g. 53°
h. 74°

22. a. $m\angle 1 = 90°,\ m\angle 2 = 58°,\ m\angle 3 = 58°,$
$m\angle 4 = 32°$
b. $m\angle 1 = m\angle 2 = m\angle 3 = m\angle 4 = 38°$
23. a. $A(-b, 0)$ $D(-b, c)$ $C(b, c)$
b. $N(0, c)$ $K(-b, 0)$
c. $D(-a, 0)$ $F(0, b)$
d. $Q(a, 0)$ $S(-b, c)$
24. a. 966 $units^2$
b. 254 in^2
25. $160\sqrt{5}$ $units^2$
26. C
27. C
28. 216.9 $units^2$
29. 35.78 m^2
30. 946.37 in^2
31. $49\sqrt{3}$ in^2
32. 30.90 in^2
33. $192\sqrt{3} \approx 332.55$ cm^2
34. a. 21.4 ft^2
b. 498.8 in^2

<u>Unit 7 Surface Area & Volume</u>

1. a. SA = 472 ft^2 V = 672 ft^3
b. SA=192π cm^2 V=256π cm^3
c. SA = 324π in^2 V=972π in^3
d. SA = $240 + 50\sqrt{3}$ in^2 V=$200\sqrt{3}$ in^3
e. SA = $36\sqrt{337}$ in^2 V = 1728 in^3
f. SA = 75π ft^2 V= $108\ \pi$ ft^3

2. a. 2184π ft^2
b. 1 cm
c. 1.26 in

3. a. SA $\approx$ 725.32 ft^2 V $\approx$ 1436.76 ft^3
b. SA $\approx$ 138.23 cm^2 V $\approx$ 96.25 cm^2

4. 11 m
5. r $\approx$ 4.33 in, SA = 141.99 in^2
6. 16π in^2
7. 3 cm
8. 11,494.04 cm^3
9. 1296π ft^2
10. $\frac{500\pi}{3}$ cm^3
11. a. SA = $12\pi + 2\pi\sqrt{104} \approx 101.76$ in^2
V = $\frac{56\pi}{3} \approx 58.64$ in^3
b. SA = $(126 + 54\sqrt{3})$ $ft^2 \approx 250.45$ ft^2
V = $126\sqrt{3}$ $ft^3 \approx 218.24$ ft^3
12. $24\sqrt{3}x$ in^3

Proofs

1.

STATEMENTS	REASONS
$\overline{AD} \cong \overline{BC}$; $\overline{AB} \cong \overline{DC}$;	Given
$\overline{AC} \cong \overline{AC}$	Reflexive prop of ≅
$\Delta ACD \cong \Delta CAB$	SSS ≅ postulate
$\angle ACD \cong \angle CAB$	CPCTC
$\overline{AD} \parallel \overline{BC}$	Converse of Alt. Int. angles theorem

2.

STATEMENTS	REASONS
$p \parallel q$, $\angle 1 \cong \angle 2$	Given
$\angle 3 \cong \angle 1$	Corr. Angles postulate
$\angle 3 \cong \angle 2$	Substitution/ transitive prop
$l \parallel m$	Converser of alt. ext. angles theorem

3.

STATEMENTS	REASONS
$l \parallel m$	Given
$\angle 1 \cong \angle 3$	Alt. Ext. angles theorem
$m\angle 1 \cong m\angle 3$	Def. of Congruence
$\angle 2$ and $\angle 3$ are a linear pair	Def. of linear pair
$\angle 2$ and $\angle 3$ are a supplementary	Linear pair postulate
$m\angle 2 + m\angle 3 = 180°$	Def. of Supplementary
$m\angle 2 + m\angle 1 = 180°$	Substitution
$\angle 1$ and $\angle 2$ are a supplementary	Def. of Supplementary

4.

STATEMENTS	REASONS
$\overline{XY} \cong \overline{XW}$; $\overline{XZ}$ bisects$\angle$ YXW;	Given
$\angle YXZ \cong \angle WXZ$	Def. of angle bisector
$\overline{XZ} \cong \overline{XZ}$	Reflexive prop of ≅
$\Delta ZYX \cong \Delta ZWX$	SAS ≅ postulate

5.

STATEMENTS	REASONS
X is the midpoint of $\overline{MN}$; MX = RX	Given
$\overline{MX} \cong \overline{XN}$	Defn. of midpoint
MX = XN	Defn. of congruent segments
XN = RX	Substitution POE

6.

STATEMENTS	REASONS
$m\angle 1 + m\angle 3 = 180$	Given
$\angle 2$ & $\angle 3$ form a linear pair	Defn. of linear pair
$\angle 2$ & $\angle 3$ are suppl. $\angle$s	Linear Pair Postulate
$m\angle 2 + m\angle 3 = 180$	Def of Supplementary
$m\angle 1 + m\angle 3 = m\angle 2 + m\angle 3$	Substitution
$m\angle 1 = m\angle 2$	Subtraction
$\angle 1 \cong \angle 2$	Def of Congruence

7.

STATEMENTS	REASONS
$\angle 1 \cong \angle 3$; $\angle 2 \cong \angle 4$	Given
m∠1=m∠3; m∠2=m∠4	Defn. congruent angles
m∠1 + m∠2 = m∠ABC m∠3 + m∠4 = m∠BCD	Angle Addition Postulate
m∠3 + m∠4 = m∠ABC	Substitution POE
m∠ABC = m∠BCD	Substitution POE
∠ABC $\cong$ ∠BCD	Defn. congruent angles

8.

STATEMENTS	REASONS
$\overline{AE} \perp \overline{BE}$; $\overline{CD} \perp \overline{BD}$; $\overline{AC} \parallel \overline{ED}$; ∠BED ≅ ∠BDE	Given
∠AEB and ∠BEC are right angles	Def. of Perpendicular Lines
∠AEB ≅ ∠BEC	All right angles are congruent
$\overline{BE} \cong \overline{BD}$	Conv. Isosc. Δ Thm.
∠ABE ≅ ∠BED; ∠BDE ≅ ∠CBD	Alt. Int. ∠s Thm
∠ABE ≅ ∠CBD	Transitive .POC/Substitution
Δ∠ABE ≅ ΔCBD	ASA Postulate
$\overline{AB} \cong \overline{BC}$	CPCTC
B is the midpoint of $\overline{AC}$	Defn. midpoint

9.

STATEMENTS	REASONS
∠2 is supplementary to ∠3; $\overline{AD} \parallel \overline{BC}$	Given
∠1 and ∠2 form a linear pair	Def. of Linear Pair
∠1 and ∠2 are supplementary	Linear Pair Postulate
$\angle 1 \cong \angle 3$	Congruent Supplements Thm
$m\angle 1 = m\angle 3$	Def. of Congruent Angles
∠3 and ∠4 are same side interior angles	Def. of SSIA
∠3 and ∠4 are supplementary	SSIA Theorem
$m\angle 3 + m\angle 4 = 180°$	Def. of supplementary
$m\angle 1 + m\angle 4 = 180°$	Substitution POE

10.

STATEMENTS	REASONS
$\angle 1 \cong \angle 2$	Given
$\angle A \cong \angle A$	Reflexive POC
$\Delta ADE \sim \Delta ABC$	AA~
$\frac{AD}{AB} = \frac{AE}{AC}$	Def. of ~ Polygons

11.

STATEMENTS	REASONS
$\angle C$ and $\angle B$ are right angles, $\angle EFB \cong \angle EGC$	Given
$\angle C \cong \angle B$	All Right Angles ≅
$\angle EFC$ and $\angle EFB$ form a linear pair $\angle EGB$ and $\angle EGC$ form a linear pair	Def. of Linear Pair
$\angle EFC$ and $\angle EFB$ are supplementary $\angle EGB$ and $\angle EGC$ are supplementary	Linear Pair Postulate
$\angle EFC \cong \angle EGB$	Congruent Supplements Thm
$\Delta ABG \sim \Delta DCF$	AA~