MATCHING...Answers will be used more than once.

1. **E** Like a dot. Indicates a location.

2. **D** Flat, goes forever in all directions.

3. **G** Has two endpoints. A piece of a line.

4. **C** Straight, goes forever in two directions.

5. **F** Starts at one point and goes forever in one direction.

6. **C** Two points determine a _____.

7. **D** Three non-collinear points determine a ___.

8. **A** Points on the same **line** are ___.

9. **B** Points on the same **plane** are ___.

10. **E** Two **lines** intersect in a ___.

11. **C** Two **planes** intersect in a ___.

12. **F** Two lines that never intersect are _____.

13. **H** Segments with the same length are ___.

14. **J** Two little **segments** add up to the big **segment**.

15. **K** Two little **angles** add up to the big **angle**.

16. **P** Angle that measures exactly 90°

17. **L** Angle that measures less than 90°

18. **N** Angle that is more than 90° but less than 180°

19. **Q** Angle that measures exactly 180°

20. **M** Unit of measure to measure angles

21. **O** Instrument used to measure angles

22. **F** The sides of an angle are called _____.

A. Collinear
B. Coplanar
C. Line
D. Plane
E. Point
F. Ray(s)
G. Segment
H. Congruent
I. Parallel
J. Segment Addition Postulate
K. Angle Addition Postulate
L. Acute
M. Degree
N. Obtuse
O. Protractor
P. Right
Q. Straight

Fill in the blank with the correct word.

23. How many **endpoints** are on a **line**? **zero** on a **segment**? **2** on a **ray**? **1** on a **plane**? **zero**

24. Do we ever use **three** letters to name a segment, line or ray? **No** ✓Careful...this is a common error on the test!

25. When naming a **ray**, which letter **always** goes first? **endpoint**

26. How many **lines** can you draw through **one** point? **infinite** picture: 27. What about **two** points? **1** picture:

Use the diagram to name the following. Use proper notation!

28. In the diagram, name two different **rays** that go through point A __ $\overrightarrow{BA}$ $\overrightarrow{CA}$ $\overrightarrow{CB}$ ___

29. Now, state two different ways to name the **ray** having endpoint A __ $\overrightarrow{AB}$ $\overrightarrow{AC}$ ___ ⟵————→ A B C

30. List three **points** __ A, B, C __ 31. How many **points** are on this line? __ 3 __

32. List three **different** segments __ $\overline{AB}$ $\overline{BC}$ $\overline{AC}$ 33. Name the **longest segment** __ $\overline{AC}$

34. List three **different** ways to name this line __ $\overleftrightarrow{AB}$ $\overleftrightarrow{AC}$ $\overleftrightarrow{BC}$

35. Use the next picture to name the **plane** two different ways __ Plane P, Plane ABC

36. List **three points** on this plane __ A, B, C __ 37. **How many points** are on this plane? __ 3 given (infinite pts on a plane)

Use the diagram to determine if these are the same. Answer yes or no.

38. $\overrightarrow{MA}$ and $\overrightarrow{AN}$ **No** 39. $\overrightarrow{AN}$ and $\overrightarrow{MA}$ **No** 40. $\overrightarrow{MA}$ and $\overrightarrow{AM}$ **Yes** 41. $\overleftrightarrow{NA}$ and $\overleftrightarrow{NM}$ **Yes** ⟵—M A———N—→

Use the diagram to name the intersection of each pair of lines.

42. $\overleftrightarrow{DB}$ and $\overleftrightarrow{EF}$ **C** 43. $\overleftrightarrow{FG}$ and $\overleftrightarrow{CD}$ **B** 44. $\overleftrightarrow{ED}$ and $\overleftrightarrow{CF}$ **E** 45. $\overleftrightarrow{BF}$ and $\overleftrightarrow{ED}$ **None**

46. The name for two coplanar lines that do not intersect is **Parallel** Are B, C and D collinear? **Yes** C, F, D? **No**

Use the diagrams to name the intersection of each pair of planes.

47. R and S **line a** 48. U and T **line d** 49. R and T **line b** 50. R and U **None**

51. Since R and U don't intersect, they are called **parallel**

52. In the next picture, the plane that contains lines a and b is __

53. The intersection of planes P and S **line a a $\overleftrightarrow{QW}$**

54. How many points are in the intersection of these planes? **3** Are K, F, Q, and D coplanar? **No**
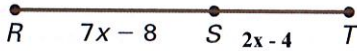Are B, F, Q and D coplanar? **No**
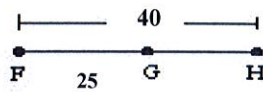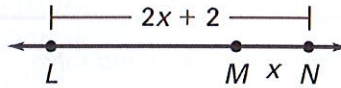
Use the Segment Addition Postulate to find each length.

55.

N 4 P 22 Q

NQ = **26**

56.

40
F 25 G H

GH= **15**

57.

X 2x + 3 Y 5x - 1 Z

XZ = **7X+2**

58.

R 7x − 8 S 2x - 4 T
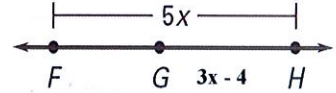
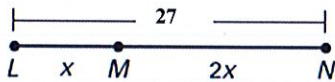RT = **9X−12**

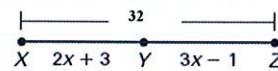59.

2x + 2
L M X N

LM = **X+2**

60.

5x
F G 3x - 4 H

FG = **2X+4**

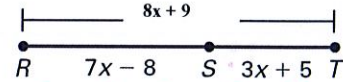**Use the Segment Addition Postulate to write an ALGEBRAIC EQUATION. Then, solve the equation for x.**

61.

27
L x M 2x N

Equation **X+2X=27**

x = **9**

62.

32
X 2x + 3 Y 3x − 1 Z

Equation **2X+3 + 3X−1=32**

x = **6**

63.

8x + 9
R 7x − 8 S 3x + 5 T

Equation **7X−8 + 3X+5=8X+9**

x = **6**

Use the pictures to match two PAIRS of congruent segments. Use the correct notation to write a congruence statement.

64. Congruence statement pairs:

$\overline{AB} \cong \overline{EF}$

$\overline{XY} \cong \overline{JK}$

A ||| B

Y
X

E ||| F

J | K

Given the picture, state the measure of each angle or write the measure in the proper location on the diagram.

65.

P T
81° 42°
R S

m∠ PRT = **81°** m∠ TRS = **42°**

66.

R
24°
E 30° U
23°
V
Z
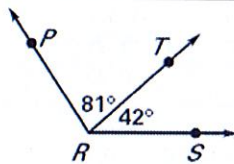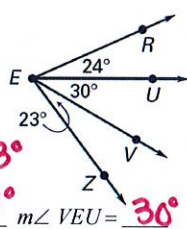
m∠ VEZ = **23°**
m∠ REU = **24°** m∠ VEU = **30°**

67.

W
50° 60°
X
10°
Z
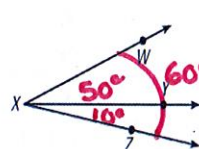
m∠ YXZ = 10° m∠ WXY = 50°
m∠ WXZ = 60°

68.

110°
70° 2 1
3 4
110° 70°
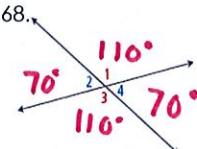
m∠1 = 110° m∠2 = 70°
m∠3 = 110° m∠4 = 70°

Find the measure of each angle using addition or subtraction.

69. m∠ RSP = 20°
m∠ PST = 30°

R
S 20° P
30°
T

m∠ RST = **50°**

70. m∠ ABD = 120°
m∠ABC = 35°

120°
C D
35°
A B

m∠ CBD = **85**

71. m∠ TOS = 150°

180°
150°
T O R
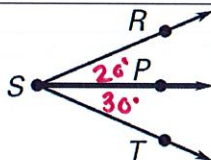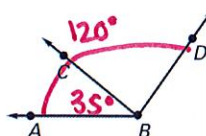
m∠ TOR = **180°**
m∠ SOR = **30°**

72. m∠ EFH =15°

H
E 15° F G
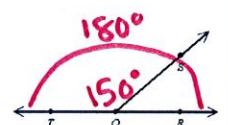
m∠ EFG = **180°**
m∠ HFG = **165°**

73. m∠ PQR = 23°

P R
Q S
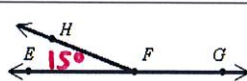
m∠ PQS = **90°**
m∠ RQS= **67°**

74. m∠ RQS = 57°

P R
Q S
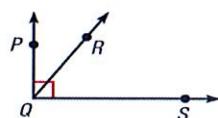
m∠ PQS = **90°**
m∠ PQR = **33°**
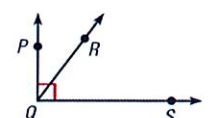
Now write an ALGEBRAIC EXPRESSION for the given angle.

75. m∠ ADC= **18x+9**

B
(11x + 9)° C
7x°
A D

76. m∠ NRQ= **12x+6**

N
(8x + 7)° P
R
(4x − 1)°
Q
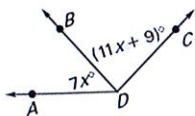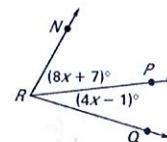
Now write an ALGEBRAIC EQUATION for the given angle and solve.

77. m∠KLM = **180°**

Equation: **10x−5 + 4x+3 = 180°**

N
(10x − 5)° (4x + 3)°
K L M

x = **13**
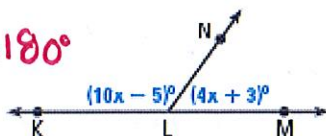
m∠ KLN = **125°**   m∠ NLM= **55°**

78. m∠ VRS= **90°**

Equation: **x−4 + 3x+2 = 90**

(x − 4)°
V T
(3x + 2)°
R S

x = **23**

m∠ VRT = **19°**   m∠ TRS = **71°**

---

79. Which statement about the figure is true?

A E D x
C B
y

(A) Lines x and y intersect at point A.
(B) Points A, B, and C are collinear.
(C) EC and ED are opposite rays. ⟵ circled
(D) Another name for AE is AB.

80. Name three points that are collinear.

b F
J I
H G a

(A) G, H, and I ⟵ circled   (B) H, G, and J
(C) F, G, and I   (D) G, J, and I

81. What is the intersection of plane HGY and plane HFX ?

(A) HZ
(B) HZ
(C) Point H
(D) Plane EFH

E F
G H
W
Y X Z

79.
C

80.
A

81.
B

82. Name the acute angles in the given figure.

B C
A
F D
E

(A) ∠CAD and ∠DAE
(B) ∠BAC and ∠FAE
(C) ∠BAF and ∠CAE
(D) ∠BAD and ∠FAD

83. What is the length of XZ?

6   18
X Y Z

(A) 3
(B) 12
(C) 24
(D) 25
(E) 114

84.

M
(9x − 6)° Q
(5x + 7)°
P N

If m∠MPN = 85°, what is x?

(A) 5   (B) 6
(C) 7   (D) 20
(E) 21

82.
A

83.
C

84.
B

85. Which line is not drawn?

(A) AE   (B) EC
(C) BD   (D) FD
(E) AC

G
A E B
F
D C

86. Which points are collinear?

(A) A, E, C   (B) F, D, E
(C) A, E, D   (D) D, E, C
(E) G, B, E

G
A E B
F
D C

87. What is the intersection of AC and BD?

(A) AC   (B) EC
(C) D   (D) BD
(E) E

G
A E B
F
D C

85.
D

86.
A

87.
E

Fill in the blank with the missing term.

1. Two angles that add up to 180°. _supplementary angles_
2. Ray that divides an angle into two congruent angles. _angle bisector_
3. A segment, line, ray or plane that intersects a segment at its midpoint. _segment bisector_
4. The point right in the middle of a segment. _midpoint_
5. Two angles that add up to 90°. _complementary angles_
6. Two angles that make a straight line. _linear pair_
7. Angles next to each other that share a common side and vertex. _adjacent angles_
8. Angles across from each other that are always equal. _vertical angles_
9. When a conclusion is reached based on FACTS. _Deductive reasoning_
10. When a conclusion is reached based on a PATTERN. _Inductive reasoning_

Terms:
Complementary Angles
Supplementary Angles
Midpoint
Adjacent Angles
Segment Bisector
Angle Bisector
Linear Pair
Vertical Angles
Inductive Reasoning
Deductive Reasoning

---

11. Draw the midpoint of $\overline{AB}$ and label it X, then name the resulting congruent segments.

The congruent segments are: $\overline{AX}, \overline{XB}$
A segment has _1_ midpoint(s).

12. M is the midpoint of $\overline{JK}$. Write an equation, solve for x, and find the indicated lengths.
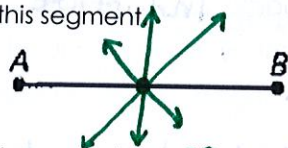
8x+4   10x-20
J ———— M ———— K

x= _12_   JM= _100_   MK= _100_

13. Use the **Midpoint Formula** to find the coordinate of the midpoint.
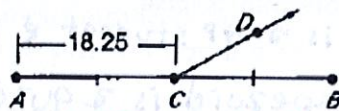(-7, 5) and (5, 3)

Midpoint: (_-1_ , _4_)

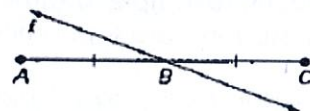
14. Draw and label three **bisectors** of this segment.

A segment has _∞_ bisectors

15. Notice the bisector and corresponding tick marks. Find the indicated lengths.

|— 18.25 —|

CB= _18.25_   AB= _36.5_

16. Notice the bisector and corresponding tick marks. Find the indicated lengths. AC = 150 yards
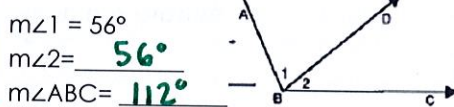
AB= _75_   BC= _75_

17.

Name the **bisector** of this angle. $\overrightarrow{WZ}$
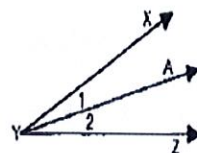Name the **congruent** angles: ∠XWZ, ∠YWZ

18. $\overrightarrow{BD}$ bisects ∠ABC

m∠1 = 56°
m∠2= _56°_
m∠ABC= _112°_

19. $\overrightarrow{YA}$ bisects ∠XYZ

m∠XYZ = 56°
m∠1= _28°_
m∠2= _28°_

---

20. Given that $\overrightarrow{BD}$ is the bisector of ∠ABC, write an ALGEBRAIC EQUATION and solve.

$8y+3=51$
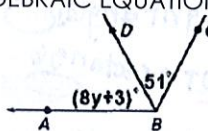
Y= _6_ m∠ABD= _51_ m∠ABC= _102_

21. Given that $\overrightarrow{WZ}$ is the bisector of ∠XWY, write an ALGEBRAIC EQUATION and solve.

(8x+3)° (5x+30)°
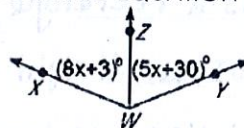
x= _9_ m∠XWZ= _75°_ m∠ZWY= _75°_
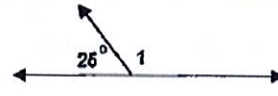
22. Name the **adjacent angles** in this picture.
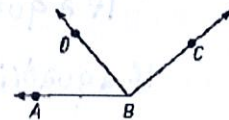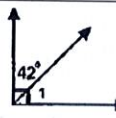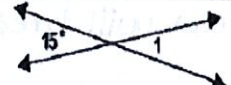
Adjacent angles: ∠ABD & ∠DBC
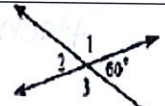
23.
15°
Complement: _75°_
Supplement: _165°_
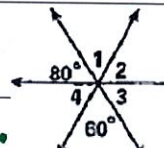
24.
172°
Complement: _None_
Supplement: _8°_

25.
26° 1

These angles add up to _180°_ m∠1= _154°_

26.
42° 1

These angles add up to _90_ m∠1= _48°_

27.
15° 1

These angles are _≅_ m∠1= _15°_

28.
2 1
60°
3

m∠1= _120°_ m∠2= _60°_ m∠3= _120°_

29.
80° 1/2
4 3
60°

m∠1= _60°_ m∠2= _40°_
m∠3= _80°_ m∠4= _40°_

30.

$m\angle 1 = $ **20°** $m\angle 2 = $ **60°**

$m\angle 3 = $ **100°** $m\angle 4 = $ **20°**

(angles in figure: 4, 60°, 3, 2, 100°, 1)

31. Determine whether the angles are vertical, complementary, supplementary, none of these.

$\angle 4$ and $\angle 5$ ___**complementary**___

$\angle 2$ and $\angle 4$ ___**vertical angles**___

$\angle 3$ and $\angle 4$ ___**supplementary**___

$\angle 1$ and $\angle 3$ ___**None**___

(figure labeled 1, 2, 5, 3, 4)

Given the picture, write an ALGEBRAIC EQUATION and solve for x.

32. These angles add up to __**90**__

Equation:

$8x-10+3x+25=90$

(figure: A, B, $(8x-10)°$, $(3x+25)°$, D, C)

$x = $ **6.8** $m\angle ABD = $ **44.5°** $m\angle DBC = $ **45.5°**

33. These angles add are $\approx$ ___

Equation:

$10x-5=145$

$10x=150$

$x=15$

(figure: 145°, $(10x-5)°$)

$x = $ ___**15.**___

34. These angles add up to __**180**__

Equation:

$2x+10+5x-5=180$

(figure: $(2x+10)°$, $(5x-5)°$)

$x = $ ___**25**___

Underline the hypothesis once, and circle the conclusion.

35. If I pass my driver's test, then <u>I will get my license.</u> *(conclusion circled)*

36. If this is Homecoming Week, then <u>there will be an assembly on Friday.</u> *(conclusion circled)*

Decide whether this is an example of _inductive_ or _deductive_ reasoning.

37. The sun is a star, the sun has planets; therefore some stars have planets. **Deductive**

38. There has been a float party every night this week, therefore tonight will be a float party. **Inductive**

Give a counterexample to show that each statement is false.

39. All GP students are sophomores. ___Josh is a GP student & is a senior___

40. All quadrilaterals are rectangles. ___A trapezoid is a quadrilateral but not a rectangle.___

Write next three numbers in the pattern

41. -5, -1, 3, 7, __11__, __15__, __19__

42. 2, 3, 5, 8, 12, __17__, __23__, __30__

43. Conditional: If a quadrilateral has four right angles, then it is a rectangle.

Converse: ___If a quadrilateral is a rectangle, then it has 4 right angles___ (True)or False

Inverse: ___If a quadrilateral DOES NOT have 4 right angles, then it is NOT a rectangle___ True or False

Contrapositive: ___If a quadrilateral is NOT a rectangle, then it Does NOT have 4 right angles___ (True) or False

What can you conclude from the true Statements below?

44. If you wash your cotton t-shirt in hot water, It will shrink. You wash your cotton t-shirt in hot water.

Therefore, ___It will shrink___

Write a single if-then statement that follows from the pair of true statements below.

45. If the ball is thrown at a window, it will hit the window. If the ball hits the window, then the window will break.

___If the ball is thrown at a window, then the window will break___

46. **Multiple Choice:** What is the next figure in this pattern?

(pattern of squares with diagonals; choices A, B, C, D — B and C circled)
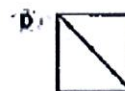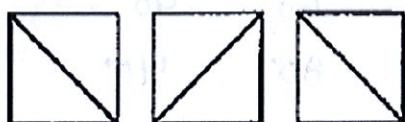
State the following using the picture. Don't forget to use angle symbols!

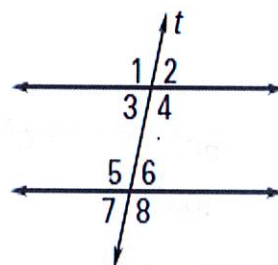1. Four **interior** angles __$\angle 3$__, __$\angle 4$__, __$\angle 5$__, __$\angle 6$__

2. Four **exterior** angles __$\angle 1$__, __$\angle 2$__, __$\angle 7$__, __$\angle 8$__

3. Two <u>pairs</u> of **alternate interior** angles __$\angle 3$__ & __$\angle 6$__ , and __$\angle 4$__ & __$\angle 5$__

4. Two <u>pairs</u> of **alternate exterior** angles __$\angle 1$__ & __$\angle 8$__ , and __$\angle 2$__ & __$\angle 7$__

5. Four <u>pairs</u> of **corresponding** angles __$\angle 1$__ & __$\angle 5$__ , __$\angle 3$__ & __$\angle 7$__ , __$\angle 2$__ & __$\angle 6$__ , and __$\angle 4$__ & __$\angle 8$__

6. Four <u>pairs</u> of **vertical** angles __$\angle 2$__ & __$\angle 3$__ , __$\angle 1$__ & __$\angle 4$__ , __$\angle 5$__ & __$\angle 8$__ , and __$\angle 6$__ & __$\angle 7$__

Choose the letter that shows the correct relationship between the angle pairs.

7. $\angle 3$ and $\angle 9$ __A__
8. $\angle 1$ and $\angle 12$ __C__
9. $\angle 8$ and $\angle 13$ __B__
10. $\angle 2$ and $\angle 10$ __E__
11. $\angle 5$ and $\angle 7$ __F__
12. $\angle 6$ and $\angle 16$ __C__
13. $\angle 1$ and $\angle 2$ __G__
14. $\angle 5$ and $\angle 13$ __E__
15. $\angle 10$ and $\angle 16$ __A__
16. $\angle 13$ and $\angle 15$ __F__
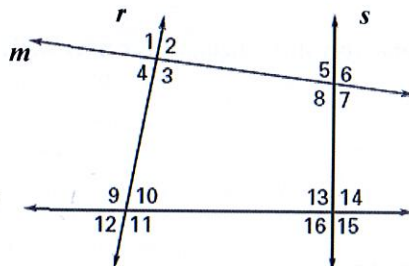
A. alternate interior
B. same-side interior
C. alternate exterior
D. same-side exterior
E. corresponding
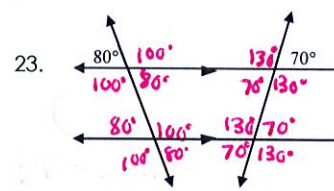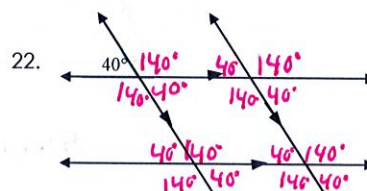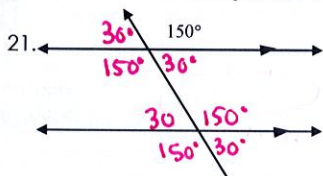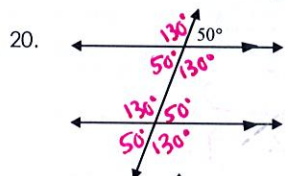F. vertical
G. linear pair

Describe the <u>relationship</u> between the pairs of angles by circling the word that makes the sentence true.

17. If lines are parallel, then ….the **alternate interior angles** are: (congruent) supplementary
the **corresponding** angles are: (congruent) supplementary
the **same side interior angles** are: congruent (supplementary)

18. **Vertical angles** are <u>always</u> (congruent) supplementary even if the lines are not parallel.

19. Angles that are a **linear pair** are <u>always</u> congruent (supplementary) even if the lines are not parallel.

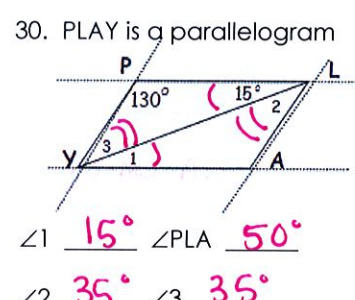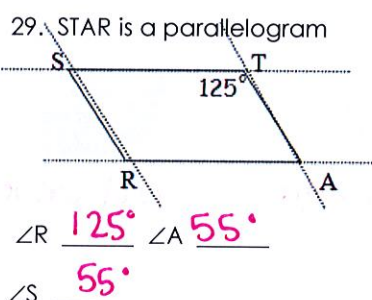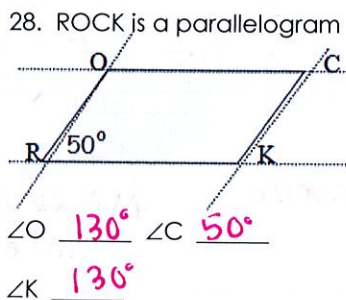**Find the measure of <u>all</u> the angles shown in the picture.**

20.

21.

22.

23.

24.

$\angle 1$ __150°__ $\angle 2$ __30°__
$\angle 3$ __120°__ $\angle 4$ __60°__

25. JKLM is a parallelogram

$\angle K$ __60°__ $\angle L$ __120°__
$\angle M$ __60°__

26. *This is a trapezoid.*

$\angle H$ __90°__ $\angle F$ __130°__

27.

$\angle 1$ __42°__ $\angle 2$ __51°__

28. ROCK is a parallelogram
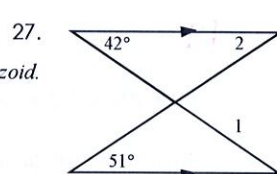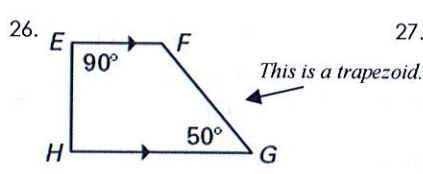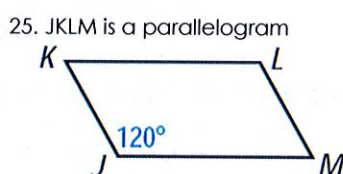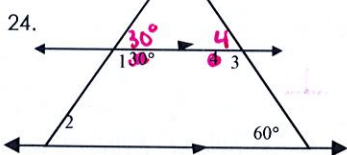
$\angle O$ __130°__ $\angle C$ __50°__
$\angle K$ __130°__

29. STAR is a parallelogram

$\angle R$ __125°__ $\angle A$ __55°__
$\angle S$ __55°__

30. PLAY is a parallelogram

$\angle 1$ __15°__ $\angle PLA$ __50°__
$\angle 2$ __35°__ $\angle 3$ __35°__

31. SONG is a parallelogram

∠1 __30°__ ∠2 __50°__ ∠SGN __80°__

∠3 __100°__ ∠4 __100°__

32.

∠1 __25°__ ∠2 __50°__

∠3 __105°__ ∠4 __105°__ ∠5 __75°__

33. *Hint: There are 180° in a triangle!*

∠1 __75°__ ∠2 __35°__
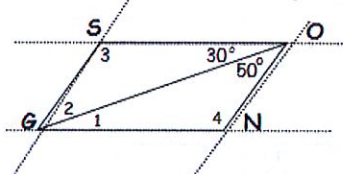
∠3 __70°__ ∠4 __130°__

State the type of angles shown and find the _measure_ of ∠1.
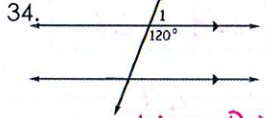
34. 120°
Type of angles __Linear Pair__
∠1 __60°__
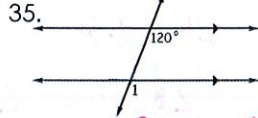
35. 120°
Type of angles __Corresponding Angles__
∠1 __120°__
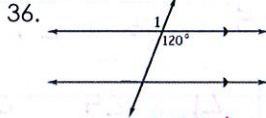
36. 120°
Type of angles __vertical angles__
∠1 __120°__
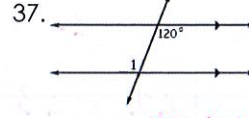
37. 120°
Type of angles __Alt. Interior Angles__
∠1 __120°__
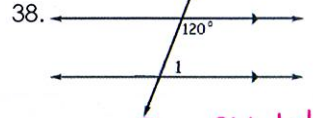
38. 120°
Type of angles __Same Side Interior Angle__
∠1 __60°__

Use the relationship between the angles given to write an equation and solve for x.
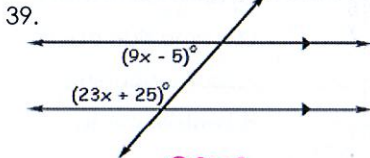
39. (9x - 5)° (23x + 25)°
Type of angles __SSI__
Relationship: congruent or (supplementary)
Equation: 9x−5+23x+25 = 180
x = __5__
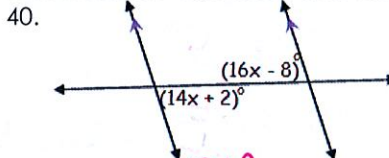
40. (16x - 8)° (14x + 2)°
Type of angles __AIA__
Relationship: (congruent) or supplementary
Equation: 14x+2=16x−8
x = __5__
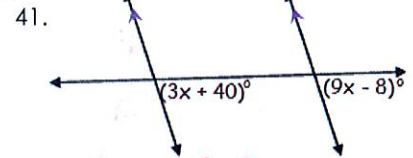
41. (3x + 40)° (9x - 8)°
Type of angles __C.A.__
Relationship: (congruent) or supplementary
Equation: 3x+40=9x−8
x = __8__
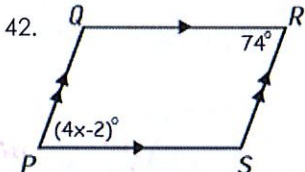
42. Q R 74° (4x-2)° P S
Relationship: (congruent) or supplementary
Equation: 4x−2=74
x = __19__
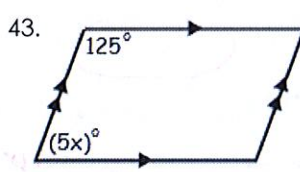
43. 125° (5x)°
Relationship: congruent or (supplementary)
Equation: 5x+125 =180
x = __11__
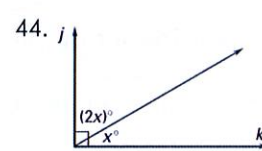
44. j (2x)° x° k
Relationship: (complementary) or supplementary
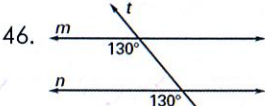Equation: 2x+x= 90
x = __30__

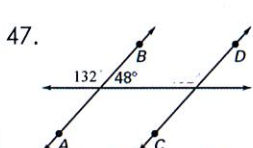**45. The SYMBOL for Parallel is:** __//__   **The SYMBOL for Perpendicular is** __⊥__

Determine whether enough information is given to conclude that the lines are parallel. If so, state the reason. Choices are:
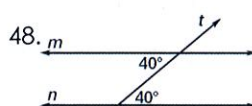- Alternate Interior Angles Converse (AIA)
- Alternate Exterior Angles Converse (AEA)
- Same-Side Interior Angles Converse (SSI)
- Corresponding Angles Converse (CA)
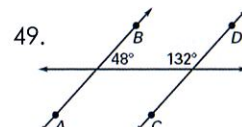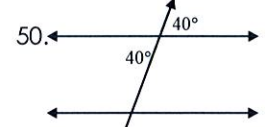- Not enough proof that the lines are parallel.
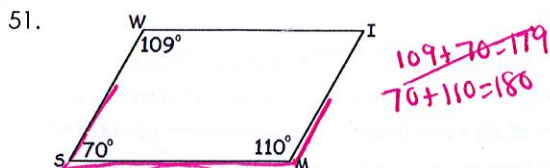
46. m t 130° n 130°
CA Converse

47. B D 132° 48° A C
Not enough info

48. m t 40° n 40°
AIA Converse

49. B D 48° 132° A C
SSI Converse

50. 40° 40°
Not enough info

Circle the segments or lines that must be parallel.

51.
109° (angle W) ... I
70° (angle S) ... 110° (angle M)

109+70=179
70+110=180

Choices: (SW ∥ MI) or SM ∥ WI

52.
29°, 30° (angle H)
30° (angle F), 30° (angle G)
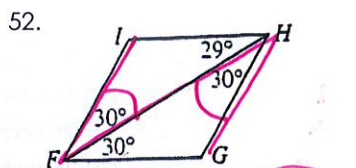
Choices: IH ∥ FG or (FI ∥ GH)
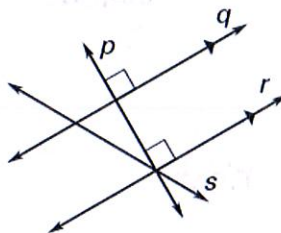
53.
m, n
88
88   87
x
y
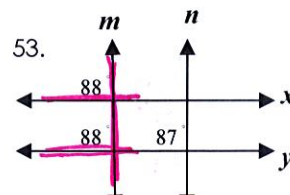
Choices: m ∥ n or (x ∥ y)

Fill in the blank with PARALLEL, PERPENDICULAR, or INTERSECTING to make each statement true.

54. Line q is __Parallel__ to line r

55. Line p is __perpendicular__ to line r

56. Line p is __perpendicular__ to line q

57. Line p is __intersecting__ to line s

Consider each segment in the diagram at the right as part of a line. Complete the statement.

58. Name three segments **parallel** to $\overline{TZ}$. __SW, VX, UY__

59. Name four segments that **intersect** $\overline{TZ}$. __YZ, UT, ST, WZ__

60. Name four segments **skew** to $\overline{TZ}$. __UV, XY, VS, XW__
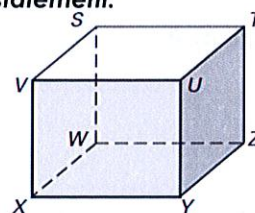
Complete the theorems about parallel, perpendicular and skew lines.

61. All **right angles** are __congruent__.

62. If two lines are **perpendicular**, then they intersect to form four __right angles__
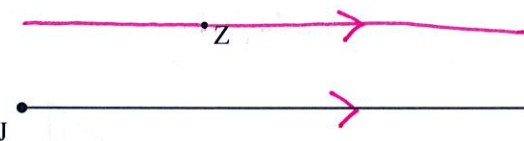
63. Two lines are parallel lines if they lie in the same plane and do not __intersect__ .

64. Two lines are **perpendicular** lines if they intersect to form a __right__ angle.
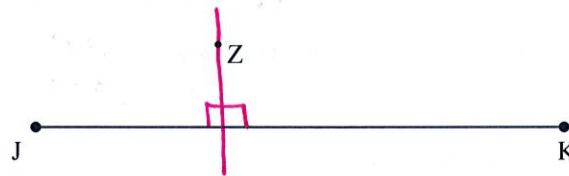
65. Two lines are skew lines if they do not lie in the same __plane__ and do not intersect.

66. Two planes are __parallel__ planes if they do not intersect.

Choices:
CONGRUENT
INTERSECT
PARALLEL
PLANE
RIGHT
RIGHT ANGLES

67. Draw a segment through Z **parallel** to $\overrightarrow{JK}$ (symbols!)

68. Draw a segment through Z **perpendicular** to $\overrightarrow{JK}$ (symbols!)

J ——→ K

J —————— K

Fill in the blank with a number.

69. **Parallel Postulate** If there is a line and a point not on the line, then there is exactly __1__ line through the point parallel to the given line.

70. **Perpendicular Postulate** If there is a line and a point not on the line, then there is exactly __1__ line through the point perpendicular to the given line.
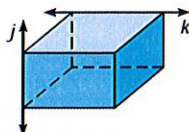
Describe the relationship between the lines shown. (intersecting, parallel, skew)
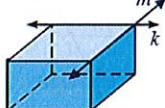
71. lines w and k
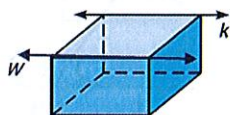
parallel

72. lines j and k
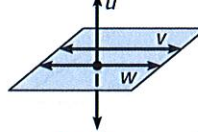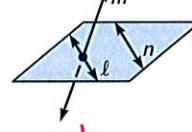
skew

73. lines m and k

intersecting

74. lines u and w

intersecting

75. lines m and n

skew

MATCH each type of triangle with its definition.

Equilateral Triangle **B**	Equiangular Triangle **C**	A. Triangle with **one right** angle.	E. Triangle with **one obtuse** angle.
Isosceles Triangle **F**	Acute Triangle **D**	B. Triangle with **all** (3) equal sides.	F. Triangle with **two** equal sides.
Scalene Triangle **G**	Right Triangle **A**	C. Triangle with **all** (3) equal angles.	G. Triangle with **no** equal sides.
	Obtuse Triangle **E**	D. Triangle with **three acute** angles.	

Classify the triangle by its _sides_.

1. _equilateral_   2. _scalene_   3. _isosceles_   4. _isosceles_

Classify the triangle by its _angles_.

5. _obtuse_   6. _right_   7. _equiangular_   8. _acute_

Classify the triangle by its _angles_ AND _sides_.

9. Sides: equilateral ~~isosceles~~ scalene Angles: acute obtuse equiangular (right)

10. Sides: equilateral isosceles (scalene) Angles: acute (obtuse) equiangular right

11. Sides: (equilateral) isosceles scalene Angles: acute obtuse (equiangular) right

12. Sides: equilateral (isosceles) scalene Angles: (acute) obtuse equiangular rt.

Identify the _side opposite_ each angle.

13.
Side **opposite** ∠X: **YZ**
Side **opposite** ∠Y: **XZ**
Side **opposite** ∠Z: **XY**
*Use correct notation!

Use the picture to name the following.

14.
Legs **AB, BC** Base **AC**
Vertex angle **∠B** Base angles **∠A, ∠C**

Name the _equal sides_ and _equal angles_ in each picture.

15.
Equal **sides:** **CE, ED**
Equal **angles:** **∠C, ∠D**

16.
Equal **sides:** **BA, AC**
Equal **angles:** **∠B, ∠C**

Using △ ABC, name the following.

17. The **interior** angles of this triangle are ___**Acute**___ The **sum** of the interior angles is **180°** degrees.

18. The **exterior** angle of this triangle is **∠4** The **adjacent interior** angle (next to the exterior angle) is **∠3**

19. The exterior and the adjacent interior angle **add** up to **180°** degrees. The **remote interior** angles shown are **∠1, ∠2**

20. The **sum** of the remote interior angles is equal to ___**180°**___

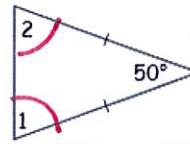**Find the measure of each angle.**

21. m∠1 = **58°**

22. m∠1 = **23°**

23. m∠1 = **60°**
Each angle in an **equiangular** triangle is **60°** degrees.

24. m∠1= **50°** m∠2= **60°** m∠3= **70°**

25. m∠1 = **38°** m∠2 = **142°**

26. m∠1 = **145°**

27. m∠1= **35°**

28. m∠1 = **125°** m∠2= **125°** m∠3= **55°** m∠4= **90°** m∠5= **145°**
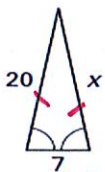
29. x = **20**
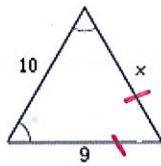
30. x = **9**

31. m∠1 = **65°** m∠2 = **65°**
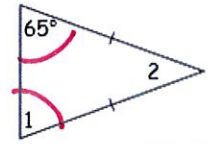
32. m∠1 = **65°** m∠2 = **50°**
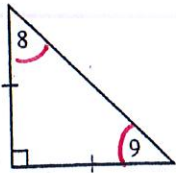
33. m∠8 = **45°** m∠9 = **45°**
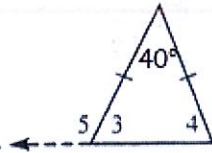
34. m∠3 = **70°** m∠4 = **70°**
m∠5 = **110°**
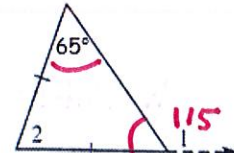
35. m∠2 = **50°** m∠1 = **115°**

36. m∠1 = **60°** m∠2 = **60°**

Write an algebraic _equation_ for each triangle and solve for x.

37.
Equation: **2x=32**

x = **16**

38.
Equation: **X+10 = 45**

x = **35**

39.
Equation: **5x=60**

x = **12**
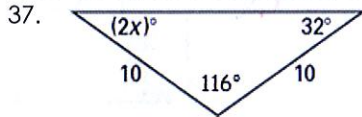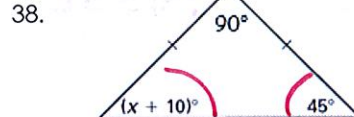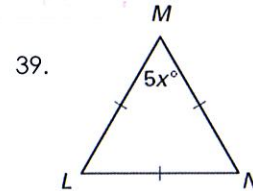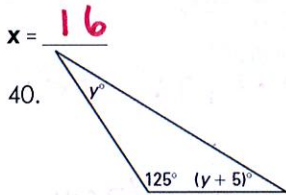
40.
Equation: **Y+125+(Y+5)=180**

y = **25**

41.
Equation: **3x+3=9**

x = **2**

42.
Equation: **2x=62+84**
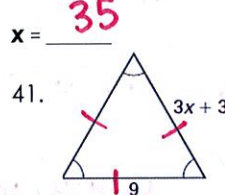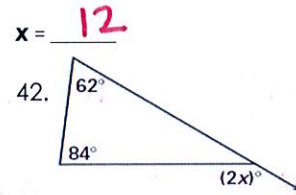
x = **73**

✓ State the **Pythagorean Theorem**: **a²+b²=c²** What is it used for? **Finding sides of RIGHT triangles**

Use the Pythagorean Theorem to find the following missing side. An equation _must_ be given! Round decimals to the nearest 100th.
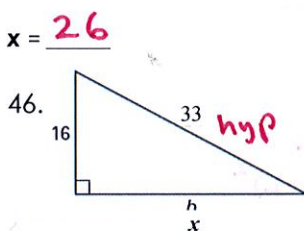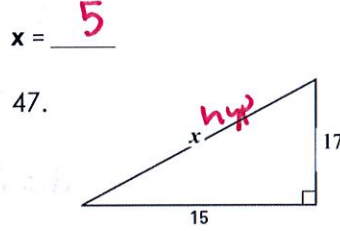
43. hyp
Equation: **10²+24²=X²**

x = **26**
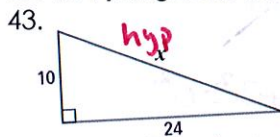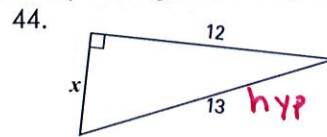
44. hyp
Equation: **X²+12²=13²**

x = **5**

45. hyp
Equation:

x = **50**
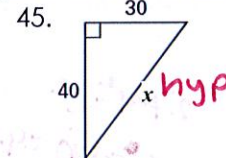
46. hyp
Equation: **16²+x² = 33²**

x ≈ **28.9**

47. hyp
Equation: **15²+17²=X²**

x ≈ **22.7**

48. hyp
juation: **x²+13²=15²**
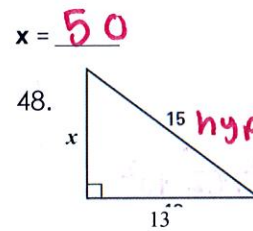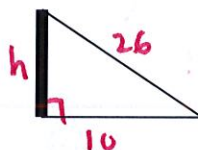
x ≈ **7.5**

49. A 20-foot ladder is leaning against a wall. It reaches up the wall 16 feet. How far is the bottom of the ladder from the wall?
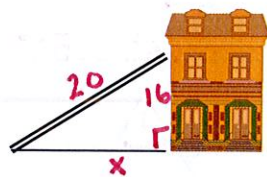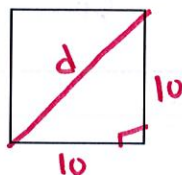
Equation: $x^2 + 16^2 = 20^2$

$X = 12 ft$

50. A 26-ft wire is attached to an electrical pole. The wire attaches to a stake on the ground. If the stake is 10 feet from the base of the pole. How tall is the pole?
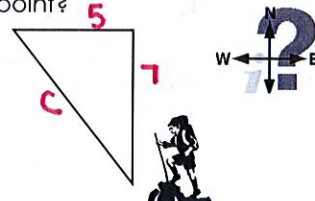
Equation: $h^2 + 10^2 = 26^2$

51. Find the length of the **diagonal** of a square if each side 10

Equation: $10^2 + 10^2 = d^2$

$d \approx 14.14 cm$

52. Mary hikes 7 km north and 5 km west. How far is she from her starting point?

Equation: $7^2 + 5^2 = c^2$

$C = 8.6 km$

---

*Can the given side lengths make a right triangle. Circle yes or no. **You MUST support your answer with an equation!***

53. 4 ft, (9 ft,) 7 ft
Equation:
$4^2 + 7^2 = 9^2$

$65 \neq 81$

yes or (no)

54. 10 in, (26 in,) 24 in.
Equation:
$10^2 + 24^2 = 26^2$

$676 = 676$

(yes) or no

55. (20 cm) 16 cm, 12 cm
Equation:
$12^2 + 16^2 = 20^2$

$400 = 400$

(yes) or no

56. 20 in, (28 in.,) 21 in.
Equation:
$20^2 + 21^2 = 28^2$

$841 \neq 784$

yes or (no)

Given the Pythagorean Triple, state THREE OTHER MULTIPLES that are also Pythagorean Triples.

57. 3, 4, 5

(x2) 6, 8, 10
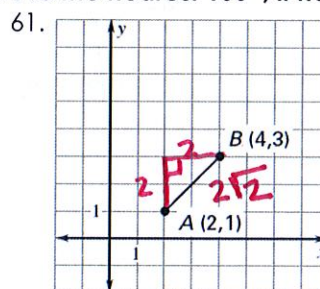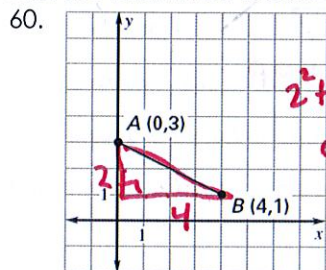(x3) 9, 12, 15
(x4) 12, 16, 20

58. 5, 12, 13

(x2) 10, 24, 26
(x3) 15, 36, 39
(x4) 24, 48, 52

59. 8, 15, 17

(x2) 16, 30, 34
(x3) 24, 45, 51
(x4) 32, 60, 68

Find the DISTANCE between the two points. Round your answers to the nearest 100th, if necessary.

60.
$2^2 + 4^2 = c^2$
$c = \sqrt{20} \approx 4.47$

A (0,3)
B (4,1)

61.
$2^2 + 2^2 = c^2$
$c = \sqrt{8} = 2\sqrt{2} \approx 2.82$

B (4,3)
$2\sqrt{2}$
A (2,1)

---

62. (-2, 1) and (3, 2)   d= $\sqrt{(x-x)^2 + (y-y)^2}$

$d = \sqrt{(3-(-2))^2 + (2-1)^2}$

$d = \sqrt{26} \approx 5.1$

63. (-1, 2) and (3, 0)

$d = \sqrt{(3-(-1))^2 + (0-2)^2}$

$d = \sqrt{20} \approx 4.47$
$2\sqrt{5}$

Matching:

64. A segment from a vertex to the **midpoint** of the opposite side __median__

65. A segment from a vertex **perpendicular** to the opposite side __altitude__

66. A segment from a vertex that **bisects** the corner angle __angle bisector__

67. Cuts a segment in half **and** makes a 90° angle __perpendicular bisector__

A. Altitude

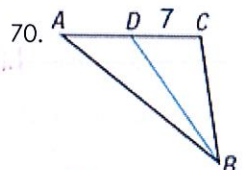B. Angle Bisector

C. Median

D. Perpendicular Bisector

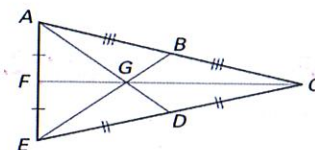
$\overline{BD}$ is a **MEDIAN** of $\triangle ABC$. **Find each length.**

68.

AD = __5__   AC = __10__

69.

AD = __7__   DC = __7__

70.
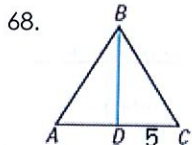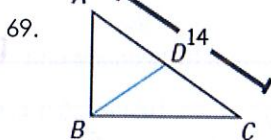
AD = __7__   AC = __14__

71. The **medians** on this picture are segments: __$\overline{AD}, \overline{EB}, \overline{CF}$__

Draw and label the MEDIAN from vertex X.

72.
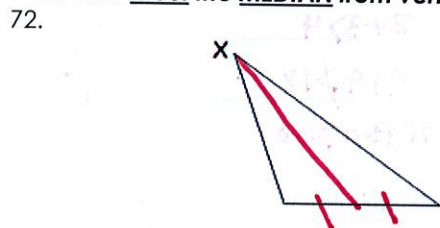
73.

Fill in the blank.

74. If a point is on the **angle bisector**, then it is __equidistant__ from the two sides of the angle.
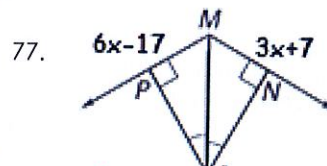
Write an equation and solve for x.

75.
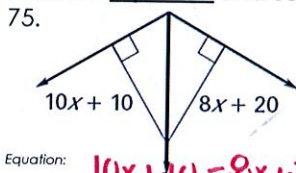
$10x + 10$ $8x + 20$

Equation: $10x+10=8x+20$

x = __5__

76.
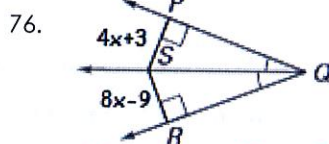
$4x+3$ $8x-9$

Equation: $4x+3=8x-9$

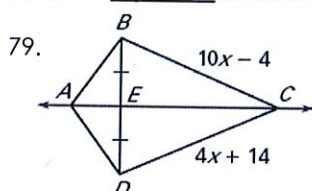x = __3__   PS = __15__   RS = __15__

77.

$6x-17$ $3x+7$

Equation: $6x-17=3x+7$
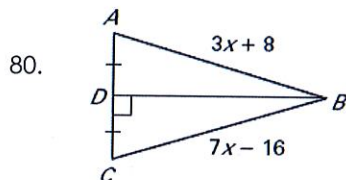
x = __8__   PM = __31__   MN = __31__

78. If a point is on the **perpendicular bisector** of a segment, then it is __equidistant__ from the endpoints of the segment.
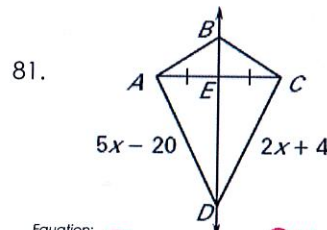
Write an equation and solve for x.

79.

$10x - 4$ $4x + 14$

Equation: $10x-4=4x+14$

x = __3__   BC = __26__   DC = __26__

80.

$3x + 8$ $7x - 16$

Equation: $3x+8=7x-16$

x = __6__   AB = __26__   CB = __26__

81.

$5x - 20$ $2x + 4$

Equation: $5x-20=2x+4$

x = __8__   AD = __20__   CD = __20__

Write an _equation_ and solve for x.

82.

$\overline{PS}$ is a _median_.

Equation: $5x + 7 = 22$

x = __3__

83.

$\overline{XY}$ is the _angle bisector_ of $\angle X$.
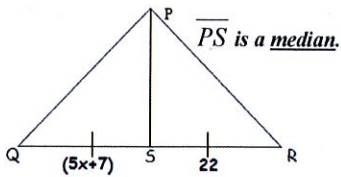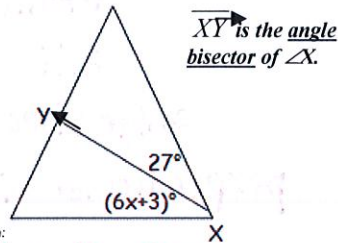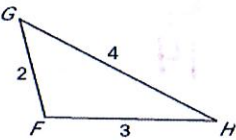
Equation: $6x + 3 = 27$

x = __4__

Fill in the blanks:

__BIG__ sides are across from BIG angles, __LITTLE__ sides are across from LITTLE angles and __EQUAL__ sides are across form EQUAL angles.
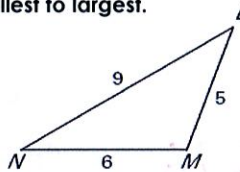
List the ANGLES in each triangle from smallest to largest.
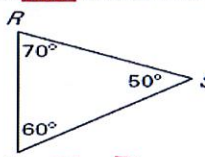
84.

$\angle H, \angle G, \angle F$

85.

$\angle N, \angle L, \angle M$

List the SIDES of each triangle from shortest to longest

86.

$\overline{RT}, \overline{RS}, \overline{TS}$

87.

Find $m\angle J$ first.
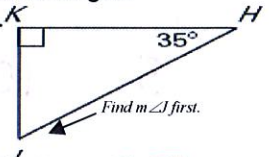
$\overline{KJ}, \overline{KH}, \overline{JH}$

88. Triangle Inequality Theorem: _The sum of any two sides of a triangle must be ..._ __Bigger than 3rd side__
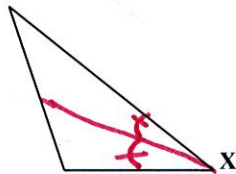
Can the following side lengths make a triangle? Circle yes or no. _Explain all answers!_

89. 1 cm, 2 cm, 3 cm $1 + 2 \not> 3$ yes or (no)

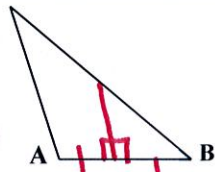90. 2 mm, 3 mm, 4 mm $2 + 3 > 4$ yes or no

91. 8 cm, 8 cm, 8 cm $8 + 8 > 8$ (yes) or no

92. 9 mm, 9 mm, 18 mm $9 + 9 \not> 18$ yes or (no)

93. 21 m, 4 m, 13 m $4 + 13 \not> 21$ yes or (no)

94. 50 cm, 50 cm, 25 cm $25 + 50 > 50$ yes or no

95. Draw and _label_ the ANGLE BISECTOR of X.

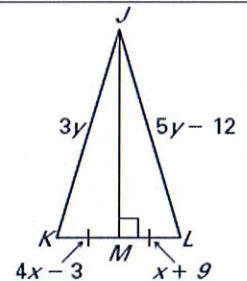**96. Draw and _label_ the PERPENDICULAR BISECTOR of $\overline{AB}$.**

97. What is the length of $\overline{LK}$?
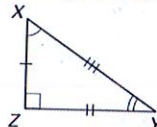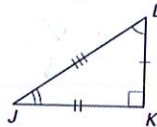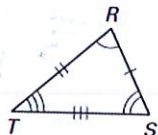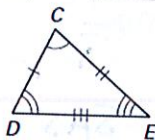
(A) 4   (B) 13   (C) 18

(D) 19   (E) 26

98. What is the length of $\overline{JK}$?

(A) 6   (B) 13   (C) 18

(D) 26   (E) 36

1. What does it mean for two triangles to be **congruent**? _Corresponding sides & angles are congruent_

Study the picture to name all the pairs of corresponding sides and angles. Order of the letters matters!

2.
Pairs of Corresponding Sides	Pairs of Corresponding Angles
$\overline{CD} \cong$ _RS_	$\angle C \cong$ _∠R_
$\overline{EC} \cong$ _RT_	$\angle D \cong$ _∠S_
$\overline{DE} \cong$ _ST_	$\angle E \cong$ _∠T_

Congruence Statement: $\triangle ECD \cong \triangle$ _TRS_

3.
Pairs of Corresponding Sides	Pairs of Corresponding Angles
$\overline{XZ} \cong$ _LK_	$\angle X \cong$ _∠L_
$\overline{YX} \cong$ _JL_	$\angle Y \cong$ _∠J_
$\overline{ZY} \cong$ _JK_	$\angle Z \cong$ _∠K_

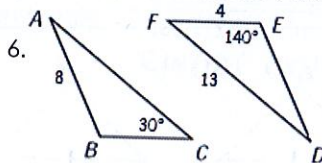Congruence Statement: $\triangle ZXY \cong \triangle$ _KLJ_

4. Mark each **pair** of corresponding **angles** and corresponding **sides** to show the congruen parts. $\triangle PQR \cong \triangle ABC$
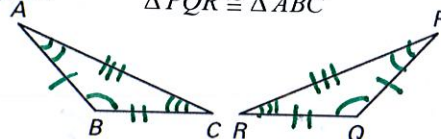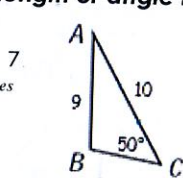
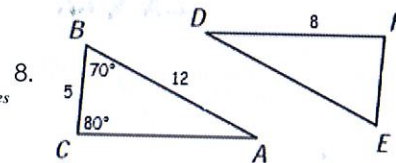5. **CPCTC** stands for: _Corresponding_ Parts of _Congruent_ Triangles are _congruent_.

Given $\triangle ABC \cong \triangle DEF$, find the missing length or angle measure.

6. *Hint: How many degrees are in a triangle?*

$\overline{DE} =$ _8_ $\overline{BC} =$ _4_ $\overline{AC} =$ _13_

$m\angle B =$ _140°_ $m\angle F =$ _30°_ $m\angle A =$ _10°_

7. *Hint: How many degrees are in a triangle?*

$\overline{DE} =$ _9_ $\overline{BC} =$ _3_ $\overline{DF} =$ _10_

$m\angle A =$ _30°_ $m\angle F =$ _50°_ $m\angle B =$ _100°_

8.

$\overline{EF} =$ _5_ $\overline{ED} =$ _12_ $\overline{CA} =$ _8_

$m\angle D =$ _30°_ $m\angle F =$ _80°_ $m\angle E =$ _70°_
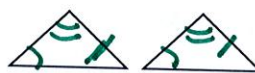
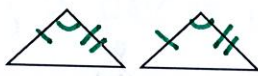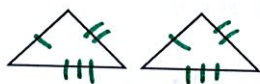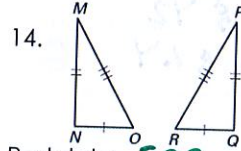**Mark the triangles to correspond to each postulate:**
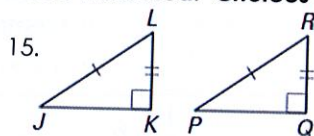
9. SSS 10. SAS 11. ASA 12. AAS 13. H-L
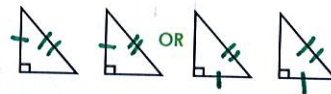
Name the postulate which could be used to show the triangles are congruent. Don't forget to mark "free" sides and angles! Fill in the congruence statement where indicated. Choices are: SSS, SAS, ASA, AAS, H-L or none.
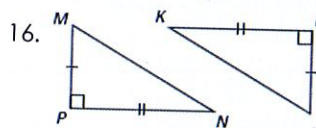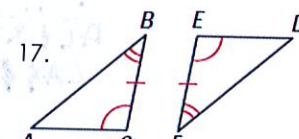
14. Postulate _SSS_

$\triangle MON \cong \triangle$ _PRQ_

15. Postulate _HL_

$\triangle PQR \cong \triangle$ _JKL_

16. Postulate _SAS_

$\triangle LJK \cong \triangle$ _PMN_

17. Postulate _ASA_

$\triangle FED \cong \triangle$ _BCA_
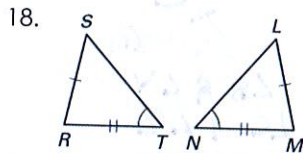
18. Postulate _None_

$\triangle STR \cong \triangle$ _____
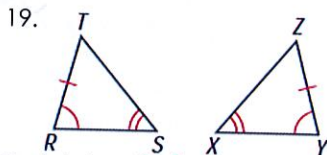
19. Postulate _AAS_

$\triangle ZYX \cong \triangle$ _TRS_
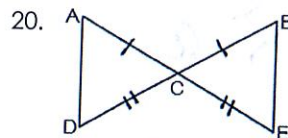
20. Postulate _SAS_

$\triangle ADC \cong \triangle$ _BEC_

21. Postulate _SAS_

$\triangle ADC \cong \triangle$ _EBC_
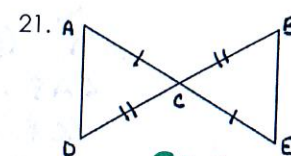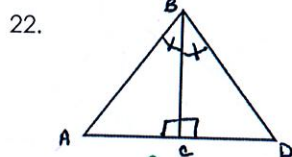
22. Postulate _ASA_

$\triangle ABC \cong \triangle$ _DBC_
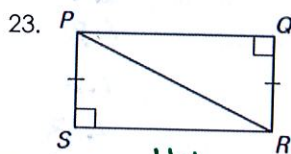
23. Postulate _HL_

$\triangle PQR \cong \triangle$ _RSP_
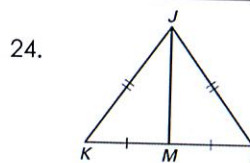
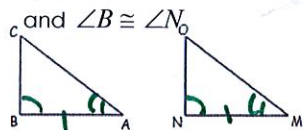24. Postulate _SSS_

$\triangle KJM \cong \triangle$ _LJM_
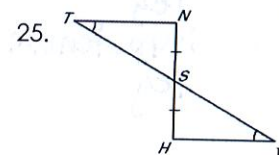
25. Postulate _AAS_

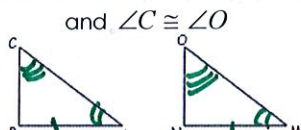$\triangle UHS \cong \triangle$ _TNS_

Mark the pictures _first_ and then state what postulate proves the triangles congruent. Choices: SSS, SAS, ASA, AAS, H-L or none.

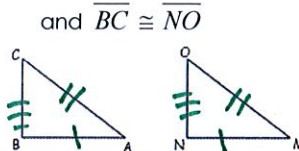26. $\overline{AB} \cong \overline{MN}$; $\angle A \cong \angle M$ and $\angle B \cong \angle N$

Postulate __ASA__

27. $\overline{AB} \cong \overline{MN}$; $\angle A \cong \angle M$ and $\angle C \cong \angle O$
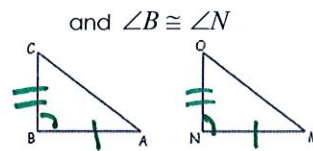
Postulate __AAS__

28. $\overline{AB} \cong \overline{MN}$; $\overline{AC} \cong \overline{MO}$ and $\overline{BC} \cong \overline{NO}$
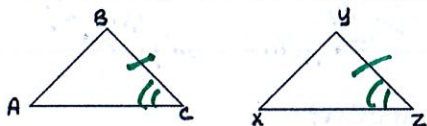
Postulate __SSS__

29. $\overline{AB} \cong \overline{MN}$; $\overline{BC} \cong \overline{NO}$ and $\angle B \cong \angle N$
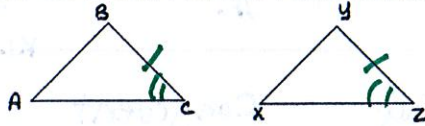
Postulate __SAS__

Using the given information and method, state the _PAIRS_ of _additional information_ needed to prove the triangles congruent.

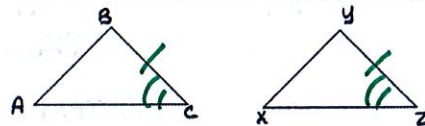30. $\overline{BC} \cong \overline{YZ}$; $\angle C \cong \angle Z$ **AAS** Postulate

Pair of sides or angles needed __$\angle A$ & $\angle X$__

31. $\overline{BC} \cong \overline{YZ}$; $\angle C \cong \angle Z$; **SAS** Postulate

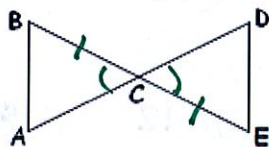Pair of sides or angles needed __$\overline{AC}$ & $\overline{XZ}$__

32. $\overline{BC} \cong \overline{YZ}$; $\angle C \cong \angle Z$ **ASA** Postulate
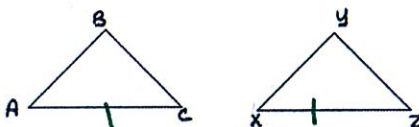
Pair of sides or angles needed __$\angle B$ & $\angle Y$__

33. $\overline{BC} \cong \overline{EC}$; **SAS** Postulate

(Hint: Mark "free" angles!)
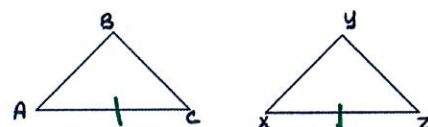
Pair of sides needed __$\overline{AC}$ & $\overline{CD}$__

34. $\overline{AC} \cong \overline{XZ}$ **ASA** Postulate

Pair of angles needed __$\angle A$ & $\angle X$__

Pair of angles needed __$\angle C$ & $\angle Z$__

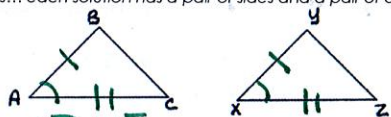35. $\overline{AC} \cong \overline{XZ}$ **SSS** Postulate

Pair of sides needed __$\overline{AB}$ & $\overline{XY}$__

Pair of sides needed __$\overline{BC}$ & $\overline{YZ}$__

---

36. $\overline{AB} \cong \overline{XY}$; **SAS** Postulate   *(TWO solutions)*

(Hint: Mark given sides… each solution has a pair of sides and a pair of angles.)

ONE WAY:

Pairs of sides needed __$\overline{AC}$ & $\overline{XZ}$__

Pairs of angles needed __$\angle A$ & $\angle X$__

OR   **THE "OTHER WAY":**

Pairs of sides needed __$\overline{BC}$ & $\overline{YZ}$__

Pairs of angles needed __$\angle B$ & $\angle Y$__

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37. $\overline{AB} \cong \overline{XY}$; **AAS** Postulate   *(TWO solutions)*

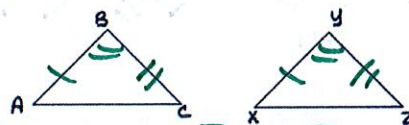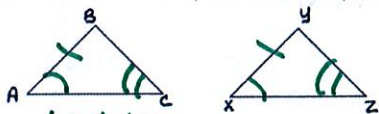*(Hint: Mark given angles… each solution has a pair of sides and a pair of angles.)*

ONE WAY:

Pairs of angles needed __$\angle A$ & $\angle X$__

Pairs of angles needed __$\angle C$ & $\angle X$__

OR   **THE "OTHER WAY":**

Pairs of angles needed __$\angle B$ & $\angle Y$__

Pairs of angles needed __$\angle C$ & $\angle Z$__

Is the segment a _LEG_ or the _HYPOTENUSE_ ?

38. $\overline{FE}$ __leg__

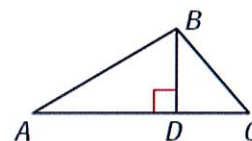39. $\overline{FD}$ __hypotenuse__

40. $\overline{DE}$ __leg__
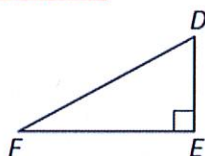
Name the _ANGLE_ that is _included_ between the two sides.

41. $\overline{CD}$ and $\overline{BC}$ __$\angle C$__

42. $\overline{AB}$ and $\overline{CB}$ __$\angle B$__

43. $\overline{DC}$ and $\overline{BD}$ __$\angle D$__

44. $\overline{AB}$ and $\overline{BD}$ __$\angle B$__

For each of the following shapes, state the definition, draw a picture, and choose the letter that corresponds to the properties.

Parallelogram

Definition: _opposite sides are parallel_

Picture:

Properties: 1. _A_ 2. _B_ 3. _C_ 4. _D_

CHOICES FOR PROPERTIES:

A. Opposite sides are congruent

B. Opposite angles are congruent

C. Consecutive angles are supplementary

D. Diagonals bisect each other

E. Diagonal bisect the corner angles

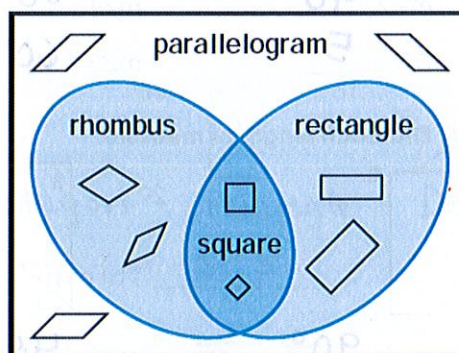F. Diagonals are congruent

G. Diagonals are perpendicular

Rhombus

Definition: _All sides ≅_

Picture:

Properties: 1. _A_ 2. _B_ 3. _C_ 4. _D_
5. _E_ 6. _G_

Rectangle

Definition: _Corner angles are 90°_

Picture:

Properties: 1. _A_ 2. _B_ 3. _C_ 4. _D_
5. _F_

Square

Definition: _All sides ≅, all angles = 90°_

Picture:

Properties: 1. _A_ 2. _B_ 3. _C_ 4. _D_
5. _E_ 6. _F_ 7. _G_

Trapezoid

Definition: _exactly 1 pair of parallel sides_

Picture:

An **isosceles** trapezoid has _≅ legs_

The **base angles** of an **isosceles** trapezoid are
_≅_

To find the length of the **midsegment**, you _add_ the bases
together and divide by _2_. $\frac{b_1 + b_2}{2}$

Study the Venn Diagram which relates all of these quadrilaterals..

Venn Diagram: parallelogram containing rhombus and rectangle, with square at their intersection.

Answer true or false.

1. Every **rectangle** is a **square** ___F___

2. Every **square** is a **rectangle** ___T___

3. Every **parallelogram** is a **rhombus** ___F___

4. Every **rhombus** is a **rectangle** ___F___

5. Every **square** is a **quadrilateral** ___T___

6. Every **square** is a **rhombus** ___T___

7. The diagonals of a **rectangle** are **perpendicular** ___F___

8. The diagonals of a **square** are **perpendicular** ___T___

9. The diagonals of a **rectangle** are **congruent** ___T___

10. The diagonals of a **rhombus** are **congruent** ___F___

11. The opposite sides of a **parallelogram** are **congruent** ___T___

12. The opposite angles of a **parallelogram** are **supplementary** ___F___

13. The diagonals of all **parallelograms** bisect each other ___T___

14. The diagonals of all **parallelograms** are **congruent** ___F___
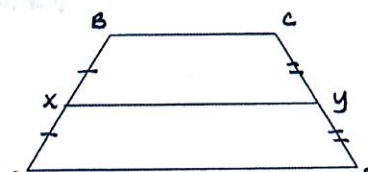
Name the following segments or angles in the trapezoid. Use the correct notation!

15. Two **Bases:** _$\overline{BC}, \overline{AD}$_
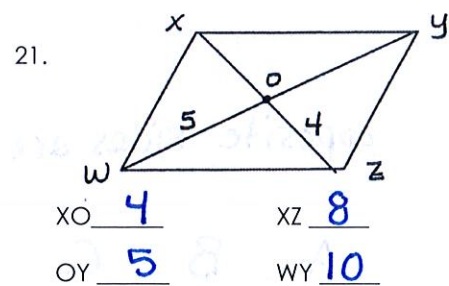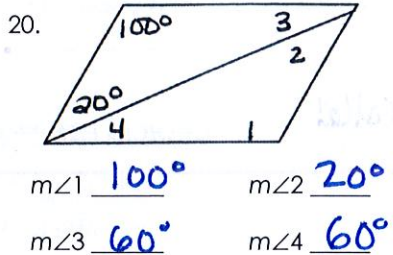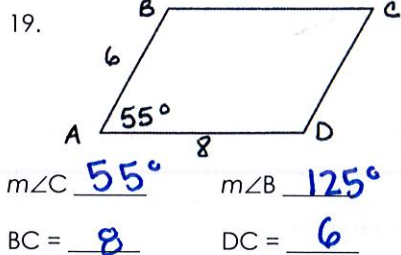
16. Two **Legs:** _$\overline{AB}, \overline{CD}$_

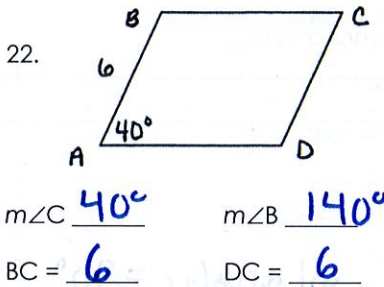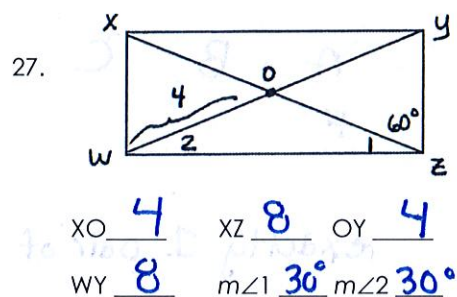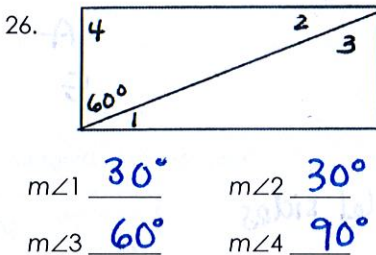17. **Midsegment:** _$\overline{XY}$_

18. Two pairs of **Base Angles:** _∠A, ∠D & ∠C, ∠B_

For each _PARALLELOGRAM_, find each length or measure.

19.

m∠C __55°__   m∠B __125°__
BC = __8__   DC = __6__

20.

m∠1 __100°__   m∠2 __20°__
m∠3 __60°__   m∠4 __60°__
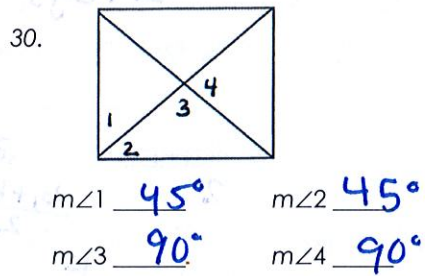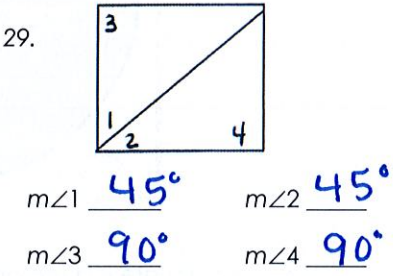
21.

XO __4__   XZ __8__
OY __5__   WY __10__

For each _RHOMBUS_, find each length or measure.

22.

m∠C __40°__   m∠B __140°__
BC = __6__   DC = __6__

23.

m∠1 __20°__   m∠2 __20°__
m∠3 __20°__   m∠4 __140°__

24.

m∠1 __20°__   m∠2 __90°__
m∠3 __70°__   m∠4 __70°__
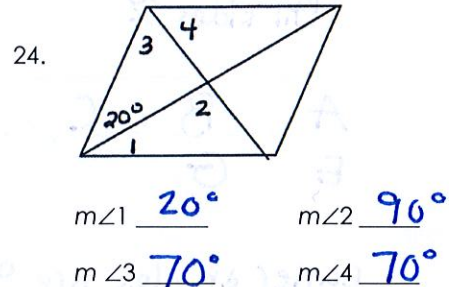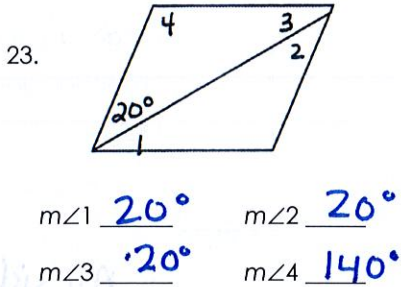
For each _RECTANGLE_, find each length or measure.

25.

m∠1 __90°__   m∠2 __90°__
BC = __10__   DC = __5__

26.

m∠1 __30°__   m∠2 __30°__
m∠3 __60°__   m∠4 __90°__

27.

XO __4__   XZ __8__   OY __4__
WY __8__   m∠1 __30°__ m∠2 __30°__
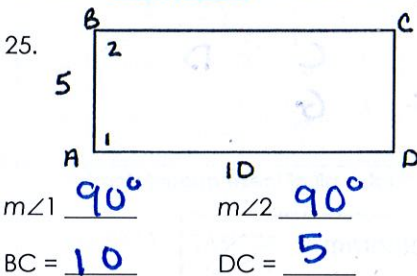
For each _SQUARE_, find each length or measure.

28.

m∠1 __90°__   m∠2 __90°__
BC = __5__   DC = __5__

29.

m∠1 __45°__   m∠2 __45°__
m∠3 __90°__   m∠4 __90°__

30.

m∠1 __45°__   m∠2 __45°__
m∠3 __90°__   m∠4 __90°__
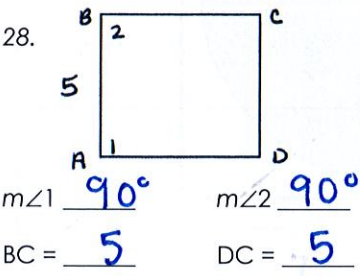
For each _TRAPEZOID_, find each length or angle measure

31.

m∠R __102°__   m∠T __48°__

32.

m∠P __113°__   m∠S __67°__
m∠A __67°__   PA __8__

33.

m∠1 __72°__   18 m∠2 __108°__
m∠3 __140°__ m∠4 __40°__   y = $\frac{15+18}{2}$ = 16.5
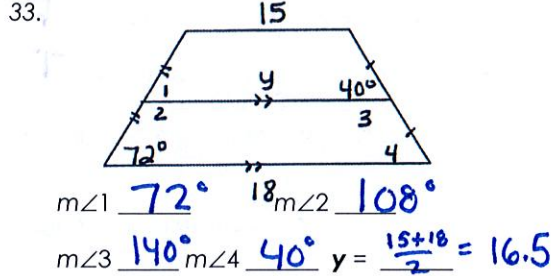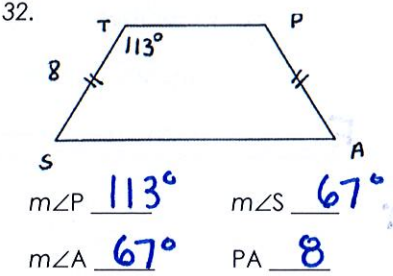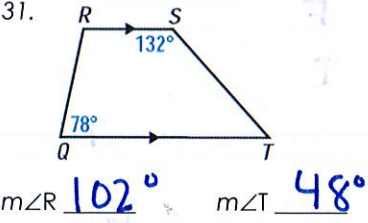
Name all the quadrilaterals that have each property. Choices: parallelogram, rhombus, rectangle, square.
There will be more than one answer!

34. All angles congruent __Rectangle, Square__

35. Opposite angles are congruent __Parallelogram, Rhombus, Rec., S__

36. The diagonals are perpendicular __Rhombus, Square__

37. The diagonals bisect each other __Parallelogram__

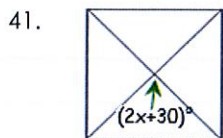*Using the properties of each shape to write and solve an algebraic __equation__ for each picture.*

Parallelogram

38.
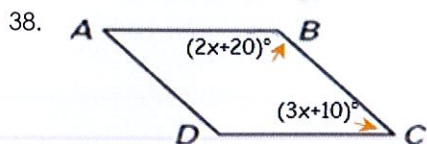
(2x+20)°
(3x+10)°

Equation: **2x+20+3x+10=180**

x = **30** m∠ABC = **80°** m∠BCD = **100°**

Rhombus

39.

(5x)°
(3x+10)°
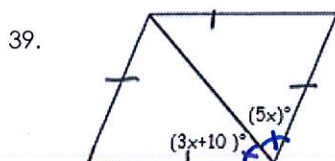
Equation: **3x+10=5x**

x = **5**

Rectangle

40.

(2x + 5)°
(5x + 15)°

Equation: **2x+5 +5x+15=90**

x = **10**

Square

41.

(2x+30)°

Equation: **2x+30=90**

x = **30**

Trapezoid

42.

(10x)°
(10x+20)°
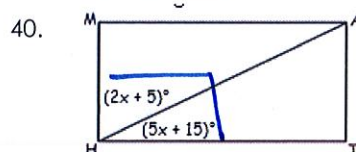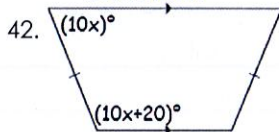
Equation: **10x +10x+20=180**

x = **8**

IsoscelesTrapezoid

43.
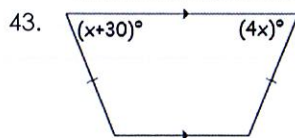
(x+30)°   (4x)°

Equation: **x+30=4x**

x = **10**

MATCH the name of each polygon with the number of sides.

44. Decagon **(H)**   45. Octagon **(F)**   **A.** 3 sides   **E.** 7 sides

46. Quadrilateral **(B)**   47. Hexagon **(D)**   **B.** 4 sides   **F.** 8 sides

48. Nonagon **(G)**   49. Pentagon **(C)**   **C.** 5 sides   **G.** 9 sides

50. Heptagon **(E)**   51. Triangle **(A)**   **D.** 6 sides   **H.** 10 sides

Classify (Name) the polygon by its number of sides.

52. **Hexagon**   53. **Pentagon**   54. **Quadrilateral**   55. **Octagon**   56. **Triangle**   57. **Decagon**

Name the following for the pentagon shown.

58. Two **sides** adjacent to $\overline{RS}$ **ST, RQ**   59. Two **vertices** consecutive to T **S, P**

60. Two **angles** consecutive to ∠T **∠S, ∠P**   61. Two **diagonals** with endpoint R **TR, PR**

66. The sum of the angles of a **TRIANGLE** is **180°**   67. The sum of the angles of a **QUADRILATERAL** is **360°**

Use the formulas to find the measure of the missing angle.

62.

92°
1   30°

m∠1= **58°**

63.

67°
1

m∠1= **23°**

64.

65°
115°   103°

m∠D= **77°**

65.

60°
95°   135°

m∠D= **70°**