Geometry
1st Semester Review

Name: Key

1. State the *converse, inverse* and *contrapositive* of the following statement:
"If $m\angle R$ is acute, then $m\angle R$ is less than 90°."

Converse: If mLR is less than 90°, then mLR is acute.

Inverse: If mLR is not acute, then mLR is not less than 90°

Contrapositive: If mLR is not less than 90°, then mLR is not acute.

2. What is the appropriate conjecture based on the given *if... then* statement?
Given: If today is Monday, then tomorrow is Tuesday. Today is Monday.

tomorrow is Tuesday.

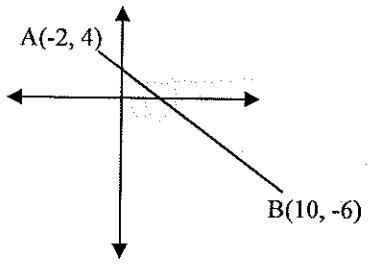
3. Find a counterexample for the following conjecture.
Conjecture: All perfect squares are even numbers. 9

4. Find the coordinates of M, the midpoint of AB.

$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$\left(\frac{-2+10}{2}, \frac{4+-6}{2}\right)$

$(4, -1)$



5. If a // b, $m\angle 1 = 4x+12$, and $m\angle 2 = 9x-58$, the find $m\angle 1$.

14
5 | 70
5
20

Corr ∠s ≅

$4x+12 = 9x-58$ $x=14$

$-4x \quad -4x$

$12 = 5x-58$

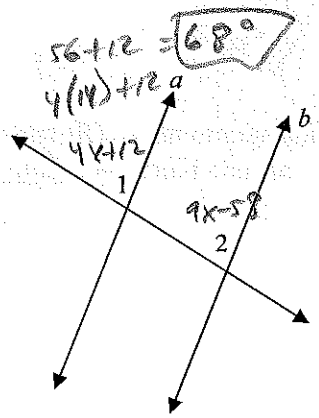
$+58 \quad +58$

$70 = 5x$

14
4
56

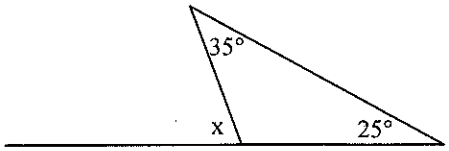
$56+12 = 68°$

$4(14)+12$



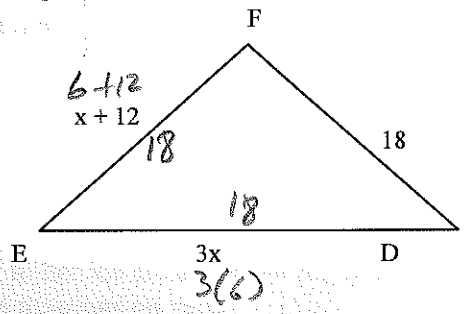
6. Find the $m\angle x$.

$x = 35 + 25$
$x = 60°$



7. The perimeter of ΔFED is 54. By solving for x, determine whether ΔFED is *scalene, isosceles,* or *equilateral.*

$x+12+18+3x = 54$
$4x+30 = 54$
$-30 \quad -30$
$4x = 24$
$\frac{4x}{4} = \frac{24}{4}$
$x = 6$



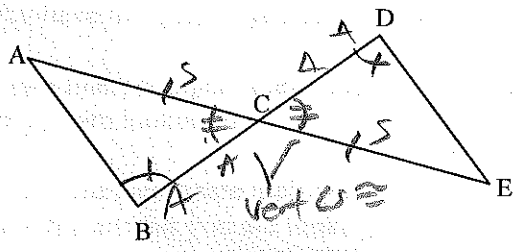
8. Which three lengths could form a triangle? Explain why.

A. 6, 6, 15 no $6+6 < 15$ (2 sides added must be > 3rd side)

B. 7, 10, 12 yes each pair sum is > other side

C. 8, 12, 20 no $8+12 = 20$ (must be > 20)

9. Given $\angle B \cong \angle D$ and $\overline{BD}$ bisects $\overline{AE}$ at C. By what method is $\Delta ACB \cong \Delta ECD$?



AAS

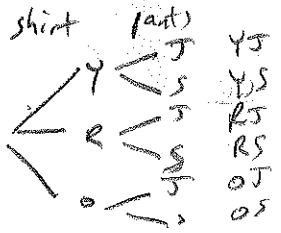
10. Find the sum of the interior angles of a heptagon. $n = 7$

$Si = 180(n-2)$
$Si = 180(7-2)$
$= 180(5)$

$180 \times 5 = 900$

900°

11. For school, Jim must choose either a yellow shirt (Y), red shirt (R), or an orange shirt (O) and jeans (J) or shorts (S). List the outcome set of the outfits he could choose.



{YJ, YS, RJ, RS, OJ, OS}

12. Determine whether each situation involves a *permutation* or a *combination*.

A. 6 books selected from a group of 15. Combination (order doesn't matter)

B. arrangement of 6 CD's on a shelf. permutation (order matters)

13. Jane has 4 kinds of lettuce growing in her garden. How many different salads can she make using 2 of the types of lettuce? Comb. choose 2 of 4

$_4C_2 = 6$

0 — 1
1 — 1 1
2 — 1 2 1
3 — 1 3 3 1
4 — 1 4 6 4 1

or $\frac{n!}{r!(n-r)!} = \frac{4!}{2!(4-2)!} = \frac{4!}{2!2!} = \frac{4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 1 \cdot 2 \cdot 1} = \frac{12}{2} = 6$

14. Paula has 5 different mix-ins to add to her ice cream. How many different ice cream combos can she make if she wants 3 toppings on each?

order doesn't matter $_5C_3 = \frac{5!}{3!(2!)} = \frac{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{3 \cdot 2 \cdot 1 \cdot 2 \cdot 1} = \frac{20}{2} = 10$

15. Which of the following algorithms are equivalent? algorithm = procedure / steps

I. Given two lines, draw a transversal. If the alternate interior angles are equal, then you have the answer you are looking for. lines are parallel

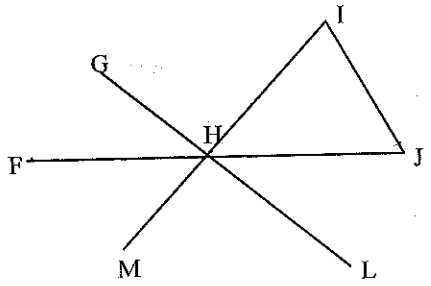
II. Given two lines, compare their slopes. If they are equal, then you have the answer you are looking for. lines are parallel

III. Given two lines, compare their slopes. If they are negative reciprocals, then you have the answer you are looking for. lines are perpendicular

I and II

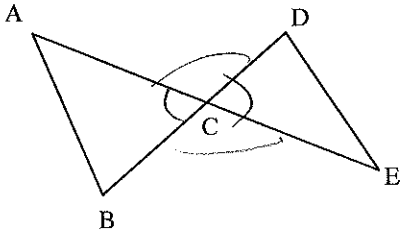
16. In the figure, what point is collinear to F and J?

H



17. In the diagram, name a pair of congruent angles.

$\angle ACB, \angle ECD$ or $\angle ACD \angle ECB$



18. What is the *complement* of 37°? What is the *supplement* of 37°?

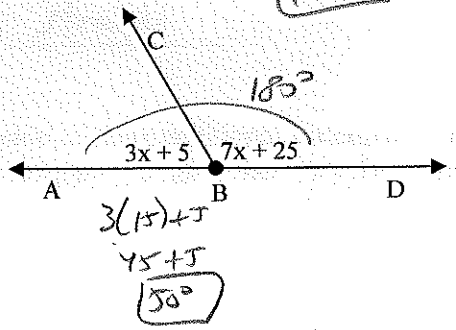
Complement: add to 90°

$90 - 37 = 53°$

Supplement: add to 180°

$180 - 37 = 143°$

19. Find the measure of $\angle ABC$.



$3x + 5 + 7x + 25 = 180$

$10x + 30 = 180$

$-30 \quad -30$

$10x = 150$

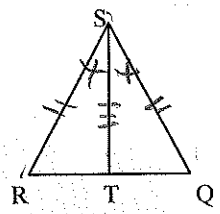
$x = 15$

$3(15) + 5$

$45 + 5$

$50°$

20. Given $\angle RST \cong \angle QST$ and $RS \cong QS$. Which postulate can be used to prove that $\Delta STR \cong \Delta STQ$?

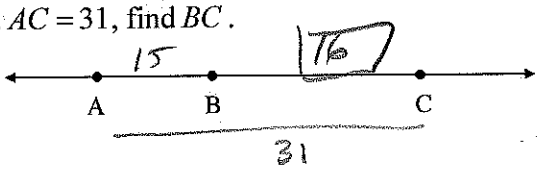


SAS

21. Find the sum of the measures of the exterior angles of an octagon.

$360°$ $(S_e = 360)$

22. If $AB = 15$ and $AC = 31$, find BC.



$31 - 15 = 16$

23. What symbol is used to indicate the following:

A. two line segment are parallel ___||___

B. two line segments a perpendicular ___⊥___

C. two line segments are congruent ___≅___

24. What word describes an angle

A. whose measure is greater than 0° and less than 90° ___acute___

B. whose measure is equal to 90° ___right___

C. whose measure is greater than 90° and less than 180° ___obtuse___

D. whose measure is equal to 180° ___straight___

25. Identify the hypothesis and conclusion of this conditional statement: "*If two lines meet to form non-adjacent, non-overlapping angles, then they form vertical angles.*"

A. hypothesis: two lines meet to form non-adjacent, non-overlapping angles

B. conclusion: they form vertical angles

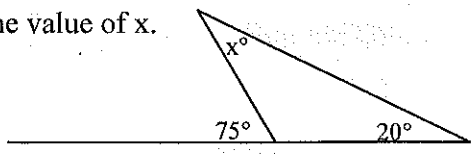
26. The measures of two angles of a triangle are 43° and 56°. What is the measure of the third angle?

$43 + 56 = 99$ $180 - 99 = 81$ 81°

27. The measure of a base angle of an isosceles triangle is 57°. What is the measure of the vertex angle?

$57 + 57 = 114$ $180 - 114 = 66$

28. Find the value of x.



$75 = x + 20$
$-20 \quad -20$
$55° = x$

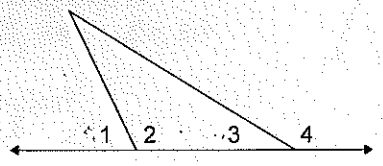
29. In ΔTUV, $m\angle T = 4x+6$, $m\angle U = x-5$, and $m\angle V = 3x+19$. List the angle from largest to smallest.

$4x+6+x-5+3x+19 = 180$
$8x+20 = 60$
$8x = 160$
$x = 20$

T, V, U

30. Choose the correct statement.

A. $m\angle 1 < m\angle 3$ ✗
B. $m\angle 1 = m\angle 3$ ✗
C. $m\angle 1 > m\angle 3$ ✓



31. Define the following terms:

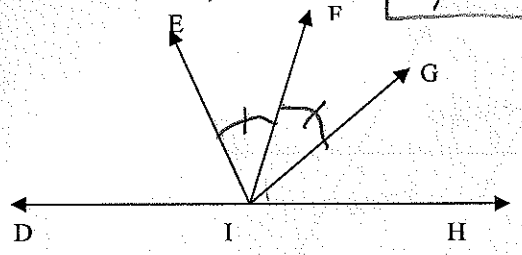
A. Altitude Segment from vertex ⊥ to opp. side

B. Median Segment from vertex to midpt of opp side.

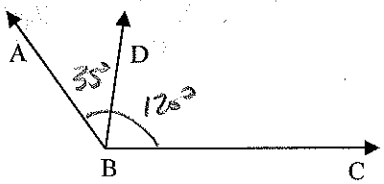
C. Perpendicular bisector line ⊥ to segment, through midpt

32. If $\angle EIF \cong \angle FIG$, then what is the best description of $\overrightarrow{IF}$?

angle bisector

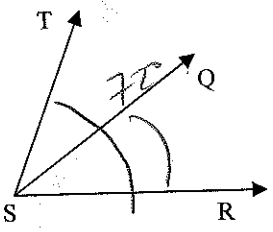


33. If $m\angle ABD = 35°$ and $m\angle ABC = 120°$, find $m\angle DBC$.



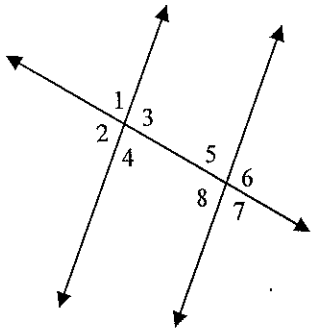
120
−35°
85°

34. Given $\overrightarrow{SQ}$ bisects $\angle RST$. Find $m\angle QSR$ if $m\angle TSR = 72°$.



36
2(72
6
12

35. Refer to the figure at the right to answer the following questions.



A. Which two pairs of angles are same side interior angles?

∠4, ∠8 ∠3, ∠5

B. Which two pairs of angles are alternate interior angles?

∠4, ∠5 ∠3, ∠8

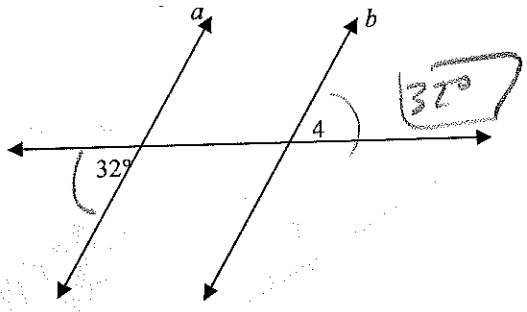
C. Which four pairs of angles are corresponding angles?

∠1, ∠5 ∠2, ∠8 ∠3, ∠6 ∠4, ∠7

D. Which four pairs of angles are vertical angles?

∠1, ∠4 ∠2, ∠3 ∠5, ∠7 ∠6, ∠8

36. Given $a \parallel b$. Find $m\angle 4$.



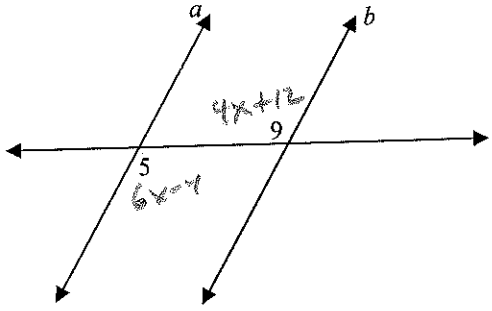
37. If $a \parallel b$ and $m\angle 9 = 4x + 12$ and $m\angle 5 = 6x - 4$, then find the value of x.

$4x+12 = 6x-4$

$12 = 2x-4$

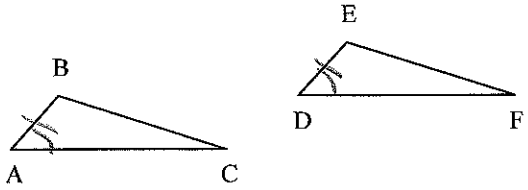
$16 = 2x$

$x = 8$

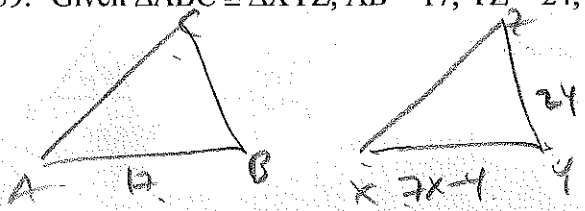


38. Given that $\overline{AB} \cong \overline{DE}$ and $\angle A \cong \angle D$. Name one additional pair of corresponding parts that needs to be congruent in order to prove $\Delta ABC \cong \Delta DEF$ by SAS.

AC ≅ DF



39. Given $\Delta ABC \cong \Delta XYZ$, AB = 17, YZ = 24, and XY = 7x – 4. Find the value of x.



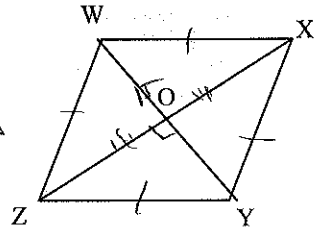
$7x-4=17$
$+4 \quad +4$
$7x=21$
$x=3$

40. List the properties of rectangles.

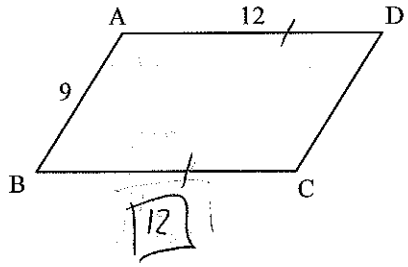
- opp sides ∥
- opp sides ≅
- all rt ∠
- diags. ≅
- diags. bis. each other

41. *WXZY* is a rhombus. If $XZ = 15$, then find OZ.

$\frac{15}{2} = 7.5$



42. Given: parallelogram ABCD as marked. Find BC.



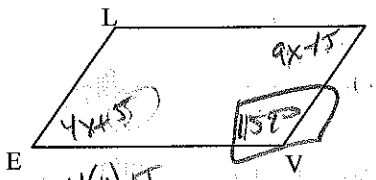
12

43. Fill in the blanks for the characteristics of a rhombus.

A. The sides of the rhombus are congruent.

B. The diagonals of the rhombus are perpendicular and bisectors!

44. Given parallelogram $LOVE$, $m\angle O = 9x-15$ and $m\angle E = 4x+5$. Find $m\angle V$.



$4x+5 = 9x-15$

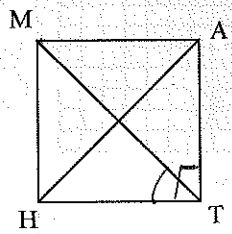
$5x = 20$

$x = 4$

$4(4)+5$

$21°$

45. If $MATH$ is a square, find $m\angle MTH$.



$\frac{1}{2}\,90 = 45°$

46. Fill in the blanks for the characteristics of an isosceles trapezoid.

A. The diagonals are congruent.

B. The bases are parallel

C. The legs are congruent

D. The base angles are congruent

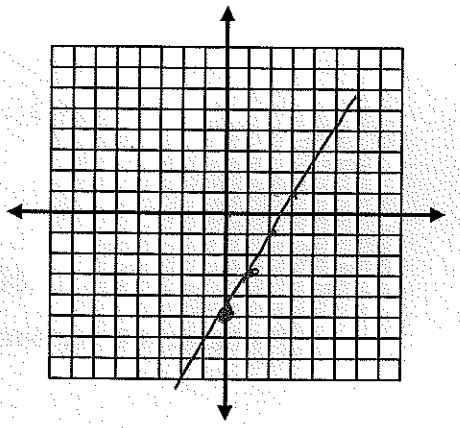
47. IF $ABCD$ is a trapezoid with bases of 6 and 12, what is the measure of its median?

$\frac{6+12}{2} = \frac{18}{2} = 9$

48. Find the slope of a line passing through (-3, 7) and (5, -9).

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - (-9)}{-3 - 5} = \frac{16}{-8} = -2$

49. Graph the line with a slope of 2 passing through point $R(0, -5)$.



50. What is the slope of the line perpendicular to a line with slope $\frac{4}{7}$?

neg. recip. $-\frac{7}{4}$

Geometry 1st Semester
Open-ended Review – Key

1. If $m\angle R$ is less than 90°, then $\angle R$ is acute.
If $\angle R$ is not acute, then $m\angle R$ is not less than 90°
If $m\angle R$ is not less than 90°, then $\angle R$ is not acute
2. Tomorrow is Tuesday
3. 49, 9, etc.
4. (4, -1)
5. $m\angle 1 = 68^\circ$
6. x = 60°
7. Equilateral
8. A. no, B. yes, C. No
9. AAS
10. 900
11. YJ, YS, RJ, RS, OJ, OS
12. A. combination, B. Permutation
13. 6
14. 10
15. I and II
16. H
17. $\angle ACB \cong \angle ECD or \angle ACD \cong \angle ECB$
18. Complement: 53°, Supplement: 143°
19. 50°
20. 360°
21. 360
22. BC = 16
23. A. // B. $\perp$ C. $\cong$
24. A. acute B. right C. obtuse D. straight
25. A. two lines meet to form non-adjacent non-overlapping angles.
    B. they form vertical angles.
26. 81°
27. 66°
28. 55°
29. $\angle T > \angle V > \angle U$
30. C
31. A. A segment from a vertex $\perp$ to the opposite side.
B. A segment from a vertex to the midpoint of the opposite side.
C. A line $\perp$ to a side of a triangle passing through the midpoint.
32. $\overrightarrow{IF}$ is an angle bisector
33. 85°
34. 36°
35. A. $\angle 4 and \angle 8, \angle 3 and \angle 5$
    B. $\angle 3 and \angle 8, \angle 4 and \angle 5$
    C. $\angle 1 and \angle 5, \angle 3 and \angle 6, \angle 2 and \angle 8, \angle 4 and \angle 7$
    D. $\angle 1 and \angle 4, \angle 2 and \angle 3, \angle 5 and \angle 7, \angle 6 and \angle 8$
36. 32°
37. x = 8
38. $\overline{AC} \cong \overline{DF}$
39. x = 3
40. opposite sides //, opposite sides ≅, diagonals ≅, diagonals bisect each other, 4 right angles
41. OZ = 7.5
42. BC = 12
43. A. congruent, B. Perpendicular & $\angle$ bisectors
44. 159°
45. 45°
46. A. ≅, B. //, C. ≅, D. ≅
47. 9
48. -2
49. graph
50. $\frac{-7}{4}$

Geometry **Name:**_____
1st Semester Review

1. State the *converse, inverse* and *contrapositive* of the following statement:
"If $m\angle R$ is acute, then $m\angle R$ is less than 90°."

Converse:_____

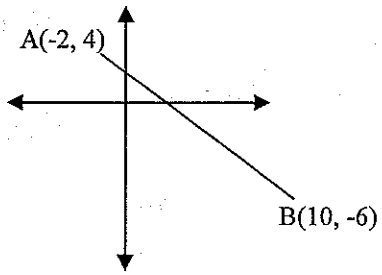
Inverse:_____

Contrapositive:_____

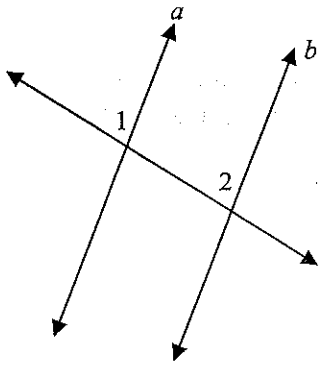
2. What is the appropriate conjecture based on the given *if...then* statement?
Given: If today is Monday, then tomorrow is Tuesday. Today is Monday.

3. Find a counterexample for the following conjecture.
Conjecture: All perfect squares are even numbers.

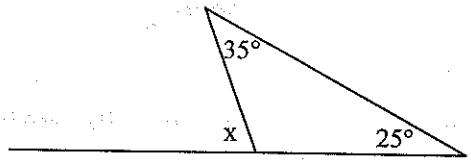
4. Find the coordinates of M, the midpoint of AB.



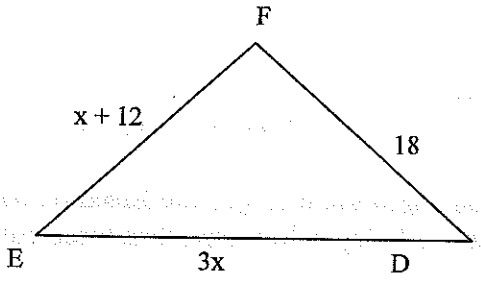
5. If a // b, $m\angle 1 = 4x + 12$, and $m\angle 2 = 9x - 58$, the find $m\angle 1$.



6. Find the $m\angle x$.



7. The perimeter of ΔFED is 54. By solving for x, determine whether ΔFED is *scalene, isosceles,* or *equilateral.*



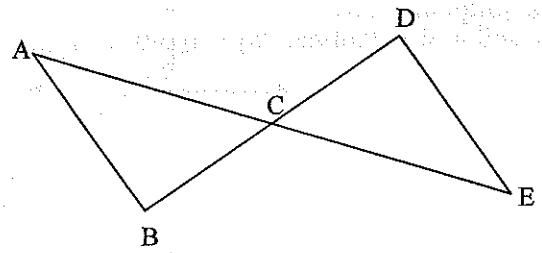
8. Which three lengths could form a triangle? Explain why.

A. 6, 6, 15 _____

B. 7, 10, 12 _____

C. 8, 12, 20 _____

9. Given $\angle B \cong \angle D$ and $\overline{BD}$ bisects $\overline{AE}$ at C. By what method is $\Delta ACB \cong \Delta ECD$?



10. Find the sum of the interior angles of a heptagon.

11. For school, Jim must choose either a yellow shirt (Y), red shirt (R), or an orange shirt (O) and jeans (J) or shorts (S). List the outcome set of the outfits he could choose.

12. Determine whether each situation involves a *permutation* or a *combination.*

A. 6 books selected from a group of 15.

B. arrangement of 6 CD's on a shelf.

13. Jane has 4 kinds of lettuce growing in her garden. How many different salads can she make using 2 of the types of lettuce?

14. Paula has 5 different mix-ins to add to her ice cream. How many different ice cream combos can she make if she wants 3 toppings on each?

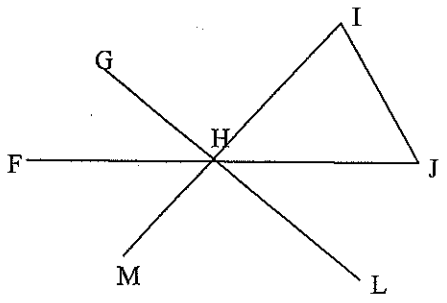
15. Which of the following algorithms are equivalent?

I. Given two lines, draw a transversal. If the alternate interior angles are equal, then you have the answer you are looking for.

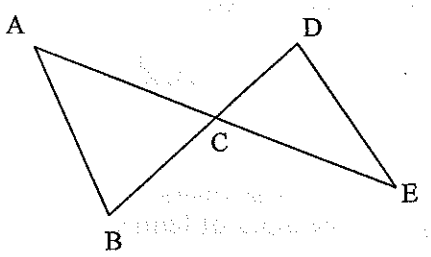
II. Given two lines, compare their slopes. If they are equal, then you have the answer you are looking for.

III. Given two lines, compare their slopes. If they are negative reciprocals, then you have the answer you are looking for.

16. In the figure, what point is collinear to F and J?



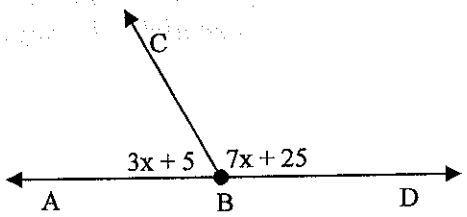
17. In the diagram, name a pair of congruent angles.



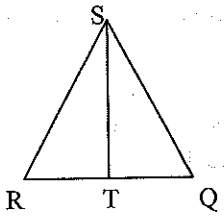
18. What is the *complement* of 37°? What is the *supplement* of 37°?

Complement: Supplement:

19. Find the measure of $\angle ABC$.

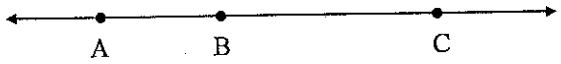


20. Given $\angle RST \cong \angle QST$ and $RS \cong QS$. Which postulate can be used to prove that $\Delta STR \cong \Delta STQ$?



21. Find the sum of the measures of the exterior angles of an octagon.

22. If $AB = 15$ and $AC = 31$, find BC.



23. What symbol is used to indicate the following:

A. two line segment are parallel _____

B. two line segments a perpendicular_____

C. two line segments are congruent_____

24. What word describes an angle

A. whose measure is greater than 0° and less than 90°_____

B. whose measure is equal to 90°_____

C. whose measure is greater than 90° and less than 180°_____

D. whose measure is equal to 180°_____

25. Identify the hypothesis and conclusion of this conditional statement: "*If two lines meet to form non-adjacent, non-overlapping angles, then they form vertical angles.*"

A. hypothesis: _____

_____

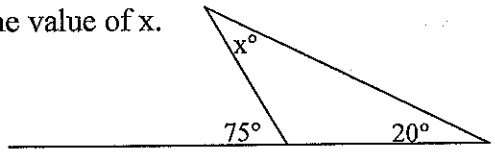
B. conclusion: _____

_____

26. The measures of two angles of a triangle are 43° and 56°. What is the measure of the third angle?

27. The measure of a base angle of an isosceles triangle is 57°. What is the measure of the vertex angle?

28. Find the value of x.



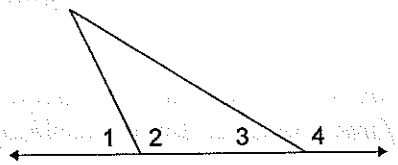
29. In ΔTUV, $m\angle T = 4x+6$, $m\angle U = x-5$, and $m\angle V = 3x+19$. List the angle from largest to smallest.

30. Choose the correct statement.

A. $m\angle 1 < m\angle 3$

B. $m\angle 1 = m\angle 3$

C. $m\angle 1 > m\angle 3$



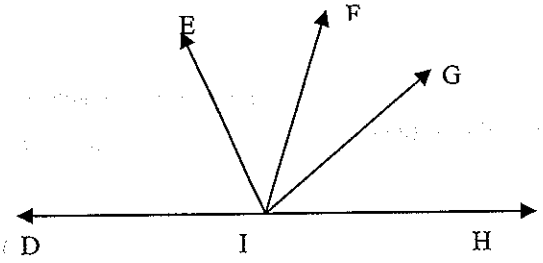
31. Define the following terms:

A. Altitude _____

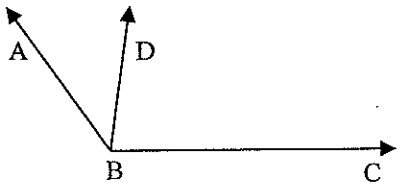
B. Median _____

C. Perpendicular bisector _____

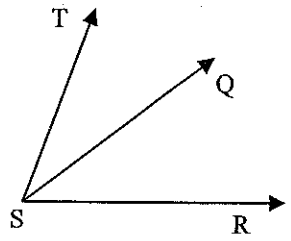
32. If $\angle EIF \cong \angle FIG$, then what is the best description of $\overrightarrow{IF}$?



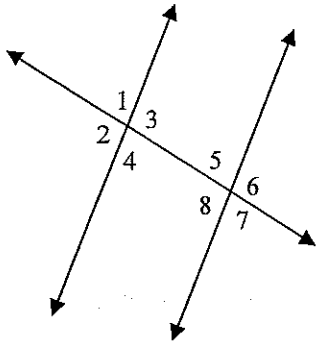
33. If $m\angle ABD = 35°$ and $m\angle ABC = 120°$, find $m\angle DBC$.



34. Given $\overrightarrow{SQ}$ bisects $\angle RST$. Find $m\angle QSR$ if $m\angle TSR = 72°$.



35. Refer to the figure at the right to answer the following questions.



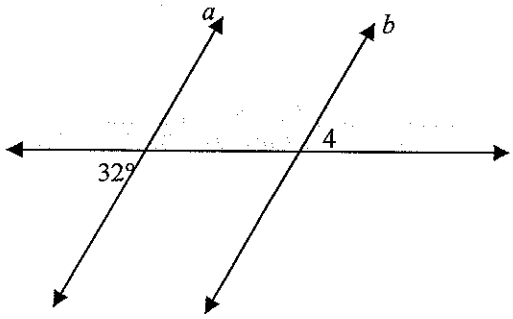
A. Which two pairs of angles are same side interior angles?

B. Which two pairs of angles are alternate interior angles?

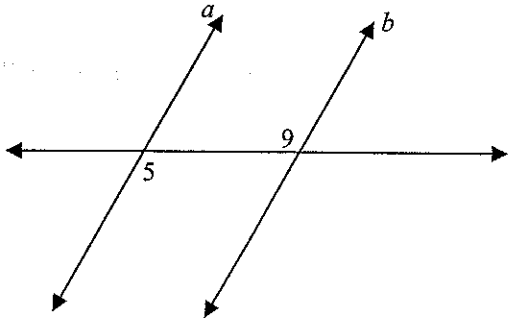
C. Which four pairs of angles are corresponding angles?

D. Which four pairs of angles are vertical angles?

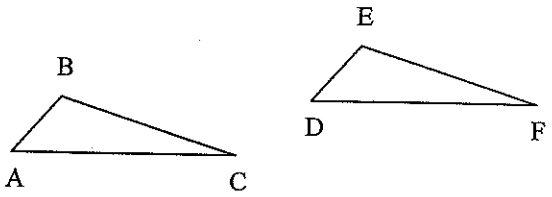
36. Given $a \parallel b$. Find $m\angle 4$.



37. If $a \parallel b$ and $m\angle 9 = 4x + 12$ and $m\angle 5 = 6x - 4$, then find the value of x.



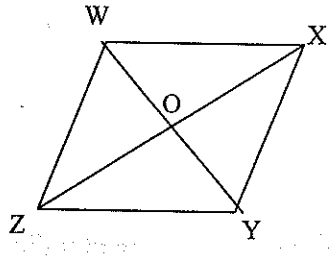
38. Given that $\overline{AB} \cong \overline{DE}$ and $\angle A \cong \angle D$. Name one additional pair of corresponding parts that needs to be congruent in order to prove $\Delta ABC \cong \Delta DEF$ by SAS.



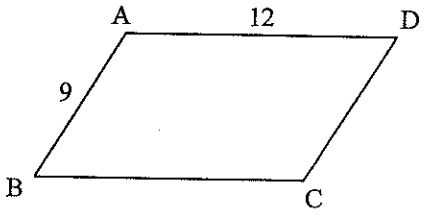
39. Given $\Delta ABC \cong \Delta XYZ$, $AB = 17$, $YZ = 24$, and $XY = 7x - 4$. Find the value of x.

40. List the properties of rectangles.

41. *WXZY* is a rhombus. If $XZ = 15$, then find OZ.



42. Given: parallelogram ABCD as marked. Find BC.

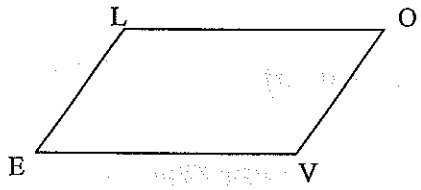


43. Fill in the blanks for the characteristics of a rhombus.

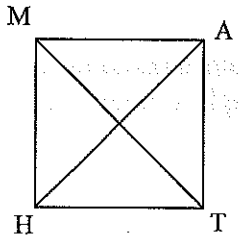
A. The sides of the rhombus are _____.

B. The diagonals of the rhombus are _____ and _____.

44. Given parallelogram $LOVE$, $m\angle O = 9x - 15$ and $m\angle E = 4x + 6$. Find $m\angle V$.



45. If $MATH$ is a square, find $m\angle MTH$.



46. Fill in the blanks for the characteristics of an isosceles trapezoid.

A. The diagonals are _____

B. The bases are _____

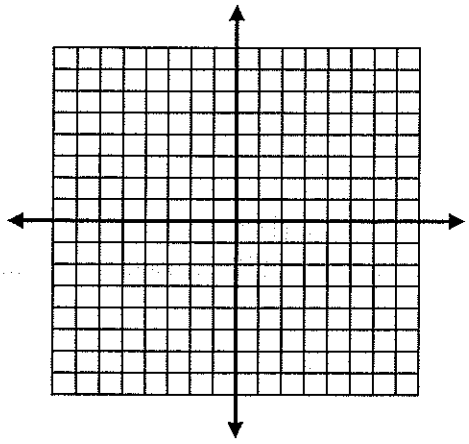
C. The legs are _____

D. The base angles are _____

47. IF $ABCD$ is a trapezoid with bases of 6 and 12, what is the measure of its median?

48. Find the slope of a line passing through (-3, 7) and (5, -9).

49. Graph the line with a slope of 2 passing through point $R(0,-5)$.



50. What is the slope of the line perpendicular to a line with slope $\frac{4}{7}$?