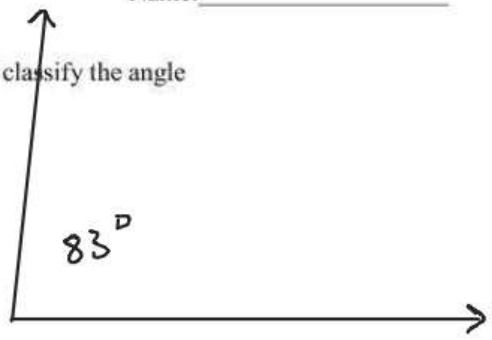
Geometry
RAP – Chapter 1

Name:_____

1. Draw an angle with the measure of 83° and classify the angle

Acute



2. The vertices of triangle ABC are $A(0,-2)$, $B(5,-2)$, and $C(8,2)$. Use the distance formula to find the perimeter of triangle ABC.

$AB = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$= \sqrt{(5-0)^2+(-2-(-2))^2}$

$= \sqrt{5^2+0^2}$

$= \sqrt{25}$

5

$BC = \sqrt{(8-5)^2+(2-(-2))^2}$

$= \sqrt{(3)^2+(4)^2}$

$= \sqrt{9+16}$

$= \sqrt{25}$

5

$AC = \sqrt{(8-0)^2+(2-(-2))^2}$

$= \sqrt{(8)^2+(4)^2}$

$= \sqrt{64+16}$

$= \sqrt{80}$

Perimeter $5+5+\sqrt{80} = 18.94$

3. M is the midpoint of $\overline{AB}$. The coordinates of A are $(-2,3)$ and the coordinates of B are $(4,-3)$. Find the coordinates of M.

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

$\left(\frac{-2+4}{2}, \frac{3+(-3)}{2}\right) \rightarrow \left(\frac{2}{2}, \frac{0}{2}\right) = (1,0)$

4. If $M(0,2)$ is the midpoint of $\overline{AB}$ and the coordinates of A are $(3,6)$, then find the coordinates of B.

$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ $\frac{6+y_2}{2} = 2$ $A(x_1, y_1)$ $B(x_2, y_2)$

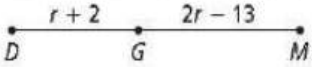
$6+y_2 = 4$ $A(3, 6)$ $(-3, -2)$

$y_2 = -2$

$\frac{3+x_2}{2} = 0$

$3+x_2 = 0$ $x_2 = -3$

5. If $DM = 35$, what is the value of r?



$DG + GM = DM$

$r+2+2r-13 = 35$

$3r-11 = 35$

$3r = 46$

$r = \frac{46}{3} = 15.\overline{3}$

90°

6. If <1 has a measure of 38°, what is the measure of its complement?

$x + 38 = 90$

$x = 52°$

7. Write the **inverse** of the following statement:

"If you enter the Grand Prize drawing, then you will get rich."

If you do not enter the Grand Prize drawing, then you will not Get Rich

8. Write the **converse** of the following statement:

"If you lower your cholesterol, then you eat Quirky oatmeal."

If you eat Quirky oatmeal, then you will Lower your cholesterol

9. Write the **contrapositive** of the following statement:

"If you feed your dog Krazy Kibble, then it will grow three inches."

If your dog does not grow 3 inches, then you do not feed it Krazy Kibble.

10. Given each conditional, write the desired form:

a) If 3 is a prime number, then it is odd. **INVERSE**

If 3 is not a prime number, then it is not odd.

b) If two segments are congruent, then they have the same length. **CONVERSE**

If two segments have the same length, then they are congruent.

c) If the weather is cloudy, then it will rain. **CONTRAPOSITIVE**

If it will not rain, then the weather is not cloudy.

90°

11. Two angles are complementary. The measure of one angle is 15° more than twice the other. What is the measure of the *smaller* angle?

A. 35° B. 65° C. 55° (D. 25°)

$x + 2x + 15 = 90°$

$3x + 15 = 90$

$3x = 75$

$x = 25°$

180°

12. The measure of two supplementary angles are represented by (3x+15) and (2x-10). What is the value of x?

$3x+15+2x-10=180$

$5x+5=180$

$5x=175$

$x=35$

13. In the accompanying figure, two lines intersect, $m\angle 1=2x+18$, and $m\angle 2=8x-30$. Find the number of degrees in $m\angle 4$.

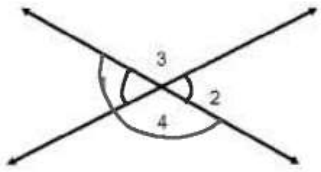
$m\angle 1=m\angle 2$

$2x+18=8x-30$

$18=6x-30$

$48=6x$

$x=8$



$m\angle 1+m\angle 4=180$

$2x+18+m\angle 4=180$

$34+m\angle 4=180$

$m\angle 4=146°$

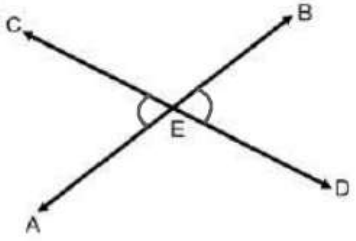
14. In the accompanying diagram, $\overline{AB}$ and $\overline{CD}$ intersect at E. If $m\angle AEC=4x-40$ and $m\angle BED=x+50$, find the number of degrees in $\angle AEC$.

$m\angle AEC=m\angle BED$

$4x-40=x+50$

$3x=90$

$x=30$



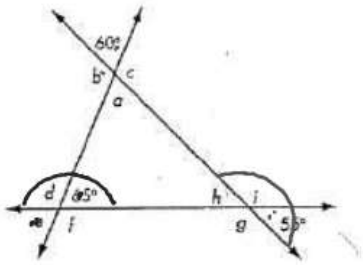
$m\angle AEC=4x-40$

$4(30)-40$

$80°$

15. Find the measure of each letter.

4.



$a=60°$ $d=115$

$b=120°$ $e=65$

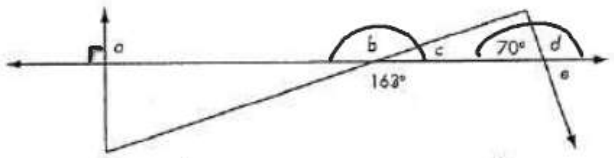
$c=120°$ $f=115$

$h=55°$

$i=125$

$g=125$

5.



$a=90°$

$b=163°$

$c=17°$

$d=110°$

$e=70°$

$3x-5+x+1=180$

$4x-4=180$

$4x=184$

$x=46$

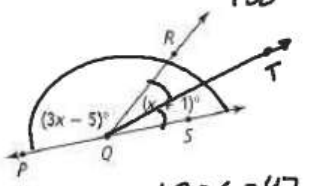
$m\angle PQR = 3x-5$

$3(46)-5)$

133°

16. Points *P*, *Q*, and *S* are collinear.

a. What is $m\angle PQR$?



b. If a ray *QT* bisects $\angle RQS$, what will be the measure of one of the resulting angles?

23.5°

$m\angle RQS = 47$

17. Points *L*, *M*, and *N* are collinear and M is between L and N. You are given *LM* = 13 and *LN* = 20. What is a possible value of *MN*?

$LM+MN=LN$

$13+MN=20$

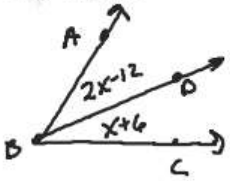
$MN=7$

18. Ray *BD* bisects $\angle ABC$ so that $m\angle DBC = (x + 6)$ and $m\angle ABD = (2x - 12)$. What is *x*?

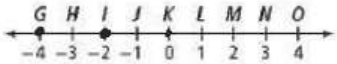
$2x-12=x+6$

$x-12=6$

$x=18$



19. Use the number line.



a. What is *KN* + *IK*?

$3+2=5$

b. What is the coordinate of the midpoint of $\overline{GO}$?

I

20. Use inductive reasoning to find the next two terms in the sequence. Describe the pattern.

a. -4, 2, 8, 14, … 20, 26

+6 +6 +6

Add 6

b. 9, 5, 1, −3, … −7, −11

−4 −4 −4

subtracting 4

21. Draw and label segment AB with midpoint C.

Use your drawing from above: If $\overline{AC} = 8x + 10$ *and* $\overline{CB} = 10x - 6$ find the value of x, AC and AB.

$8x+10=10x-6$

$10=2x-6$

$16=2x$

$x=8$

$AC = 8(8)+10$

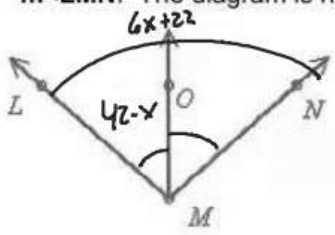
$64+10$

74

$AB = 74+74$

$=148$

22. $\overline{MO}$ bisects $\angle LMN, m\angle LMO = 42 - x$ *and* $m\angle LMN = 6x + 22$. Solve for **x** and find **m<LMN**. The diagram is not to scale.



$2(42-x) = 6x+22$

$84-2x = 6x+22$

$84 = 8x+22$

$62 = 8x$

$x = 7.75$

$m\angle LMN = 6x+22$

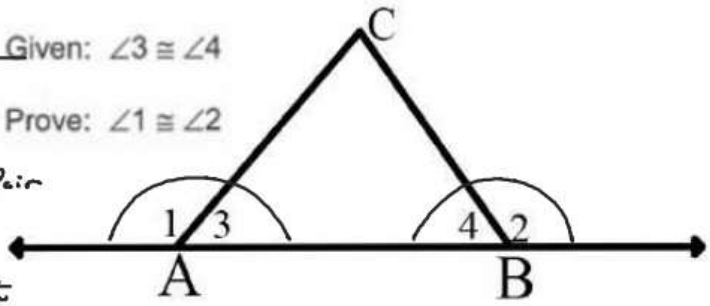
$6(7.75)+22$

$= 68.5$

23. Write a proof.

Given: $\angle 3 \cong \angle 4$

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

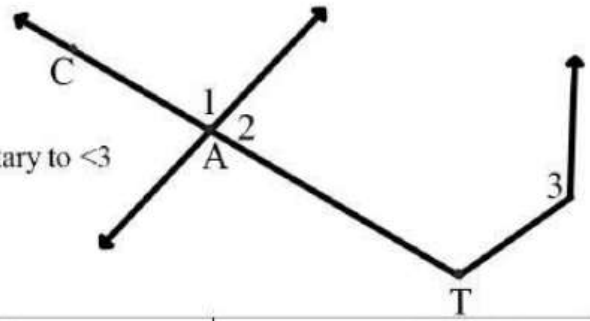


Statement	Reason
1) $\angle 3 \cong \angle 4$	1) Given
2) $m\angle 3 = m\angle 4$	2) Def $\cong$ $\angle$'s.
3) $\angle 1$ & $\angle 3$ form Linear Pair $\angle 2$ & $\angle 4$ form Linear Pair	3) Def of Linear Pair
4) $m\angle 1 + m\angle 3 = 180$ $m\angle 2 + m\angle 4 = 180$	4) Linear Pair Post
5) $m\angle 1 + m\angle 3 = m\angle 2 + m\angle 4$	5) Sub Prop.
6) $m\angle 1 = m\angle 2$	6) Subt Prop.
7) $\angle 1 \cong \angle 2$	7) Def $\cong$ $\angle$'s.

24. Complete the proof:

Given: $<1 \cong <3$

Prove: <2 is supplementary to <3

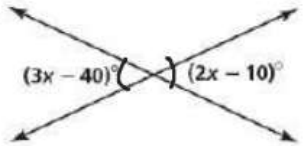


Statements	Reasons
1. $\angle 1 \cong \angle 3$	1. Given
2. $m\angle 1 = m\angle 3$	2. definition of congruent angles
3. <1 and <2 are a linear pair	3. Def Linear Pair
4. $m\angle 1 + m\angle 2 = 180$	4. Linear Pair Postulate

5. $m\angle 3 + m\angle 2 = 180$	5. Substitution
6. $\angle 2$ is supplementary to $\angle 3$	6. Def of Supp $\angle$'s.

25. Find the value of the variable. Be sure to show your work.

1.

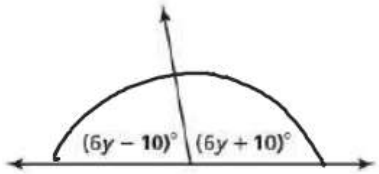


$3x - 40 = 2x - 10$

$x - 40 = -10$

$x = 30$

2.



$6y - 10 + 6y + 10 = 180$

$12y = 180$

$y = 15$

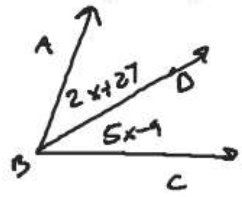
26. Ray *BD* bisects $\angle ABC$ so that $m\angle DBC = (5x - 9)°$ and $m\angle ABD = (2x + 27)°$. What is *x*? (hint: create a picture)

$2x + 27 = 5x - 9$

$27 = 3x - 9$

$36 = 3x$

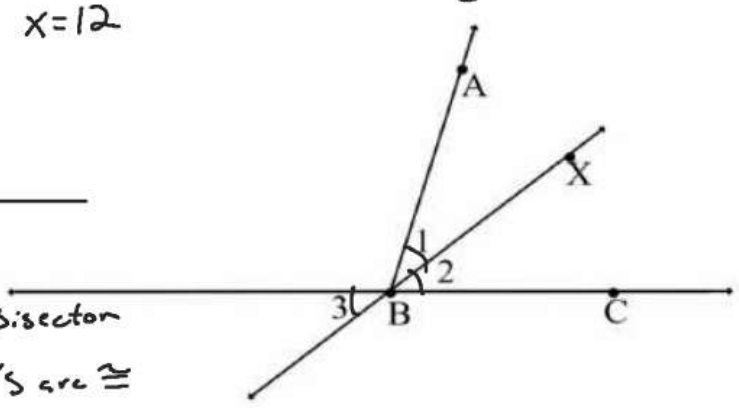
$x = 12$



27. Write a proof:

Given: $\overrightarrow{BX}$ *bisects* $< ABC$,

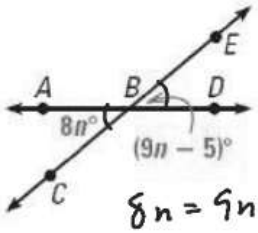
prove: $< 1 \cong < 3$



Statement	Reason
1) $\overrightarrow{BX}$ bisects $\angle ABC$	1) Given
2) $\angle 1 \cong \angle 2$	2) Def of Bisector
3) $\angle 2 \cong \angle 3$	3) Vertical $\angle$'s are $\cong$
4) $\angle 1 \cong \angle 3$	4) Transative prop.

Using Algebra Find the value of the variable. Then use substitution to find $m\angle ABC$.

54.



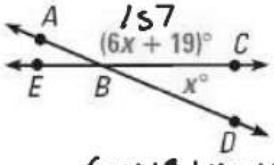
$8n = 9n - 5$

$n = 5$

$m\angle ABC = 8n$

$= 40$

55.



$6(23)+19$

157

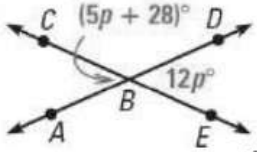
$6x+19+x=180$

$7x+19=180$

$7x = 161$

$x = 23$

56.



$5(4)+28 = 48$

$5p+28=12p$

$28=7p$

$p=4$

28. Find a counterexample for the following statement? "All even numbers are multiples of 4."

$\frac{6}{4} = 1.5$

11 13

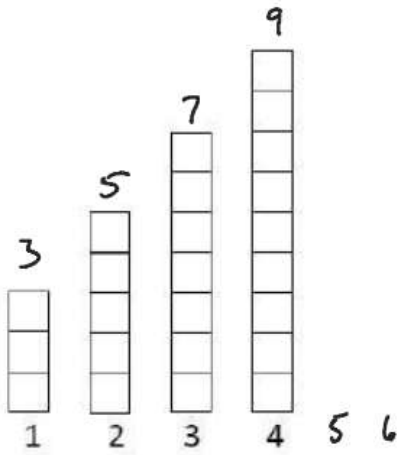
29. Scott has decided to add push-ups to his daily exercise routines. He has created a chart that shows how many push-ups he has done in a day.

a. How many push-ups will he have on day 6?

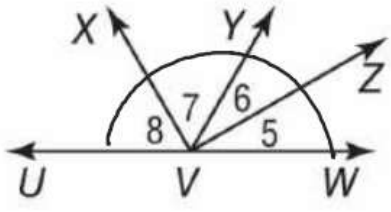
13

b. Make a conjecture about how many push-ups he has at any given day.

$2n+1$



30. Find x



$m\angle 5 = 5x$,

$m\angle 6 = 4x + 6$,

$m\angle 7 = 10x$,

$m\angle 8 = 12x - 12$

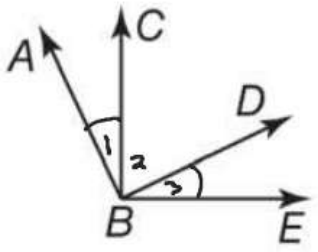
$5x+4x+6+10x+12x-12=180$

$31x-6=180$

$31x=186$

$x=6$

Example: Write a two-column proof.



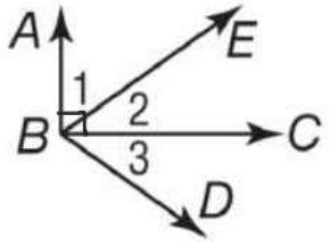
Given: ∠ ABC and ∠CBD are complementary.
~~∠DBE and ∠CBD~~ $\overrightarrow{CB}$ & $\overrightarrow{BE}$ form a right angle.

Prove: ∠ ABC ≅ ∠DBE

Statement	Reason
1) ∠ABC & ∠CBD are Comp $\overrightarrow{CB}$ & $\overrightarrow{BE}$ form Rt ∠	1) Given
2) $m\angle 1 + m\angle 2 = 90$	2) Def comp ∠'s
3) $m\angle CBE = 90^\circ$	3) Def Rt ∠.
4) $m\angle 2 + m\angle 3 = 90^\circ$	4) Angle Add Post
5) $m\angle 1 + m\angle 2 = m\angle 2 + m\angle 3$	5) Sub prop
6) $m\angle 1 = m\angle 3$	6) Subtr prop
7) ∠ABC ≅ ∠DBE	7) Def ≅ ∠'s

Complete each proof.

1. **Given:** ⊥; ∠1 and ∠3 are complementary.

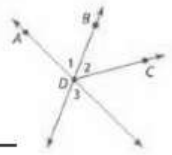


Prove: ∠2 ≅ ∠3

Proof:

Statements	Reasons
a. ⊥, ∠1 and ∠3 are complementary	a. Give
b. ∠ABC is Rt ∠.	b. Definition of ⊥
c. $m\angle ABC = 90$	c. Def. of right angle
d. $m\angle ABC = m\angle 1 + m\angle 2$	d. Angle Add Post
e. $90 = m\angle 1 + m\angle 2$	e. Substitution
f. ∠1 and ∠2 are compliments	f. Def comp ∠'s
g. ∠2 ≅ ∠3	g. ≅ complement theorem

7. Complete the following proof.
Given: bisects $\overrightarrow{BD}$ bisects $\angle ADC$
Prove: $\angle 2 \cong \angle 3$

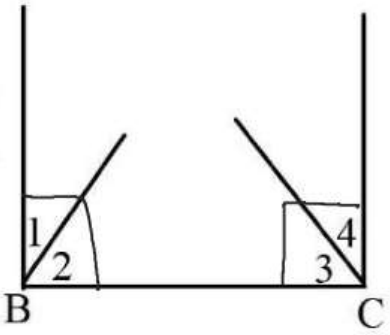


Proof:

Statements	Reason
1) $\overrightarrow{BD}$ Bisects $\angle ADC$	1) Given
2) $\angle 1 \cong \angle 2$	2) Def of Bisecter
3) $\angle 1 \cong \angle 3$	3) Vertical $\angle$'s $\cong$
4) $\angle 2 \cong \angle 3$	4) Substitution prop

Given: $<B$ is a right angle,
$<C$ is a right angle,
$<1 \cong <4$

Prove: $<2 \equiv <3$



Statement	Reason
1) $\angle B$ is Rt $\angle$ $\angle C$ is Rt $\angle$ $\angle 1 \cong \angle 4$	1) Given
2) $m\angle 1 = m\angle 4$	2) Def $\cong$ $\angle$'s
3) $m\angle B = 90$ $m\angle C = 90$	3) Def of Rt $\angle$
4) $m\angle 1 + m\angle 2 = m\angle B$ $m\angle 3 + m\angle 4 = m\angle C$	4) Angle Add Post
5) $m\angle 1 + m\angle 2 = 90$ $m\angle 3 + m\angle 4 = 90$	5) Sub Prop.
6) $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	6) Sub Prop.
7) $m\angle 2 = m\angle 3$	7) Subtr prop
8) $\angle 2 \cong \angle 3$	8) Def $\cong$ $\angle$'s