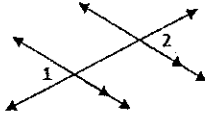33. In the problems below, find the value of x.

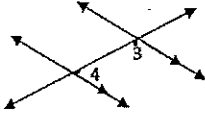a.
$m\angle 1 = (3x-17)^\circ$
$m\angle 2 = (x+1)^\circ$

$3x - 17 = x + 1$
$2x = 18$
$x = 9$

b.
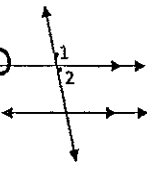$m\angle 3 = (20x+11)^\circ$
$m\angle 4 = (8x+1)^\circ$

$20x + 11 + 8x + 1 = 180$
$28x + 12 = 180$
$28x = 168$
$x = 6$

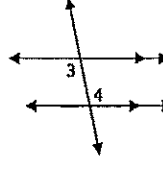c.
$m\angle 1 = (95+7x)^\circ$
$m\angle 2 = (55-x)^\circ$

$95 + 7x + 55 - x = 180$
$150 + 6x = 180$
$6x = 30$
$x = 5$

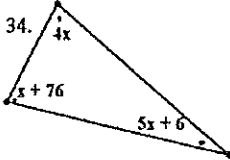d.
$m\angle 3 = (5x+12)^\circ$
$m\angle 4 = (7x-16)^\circ$

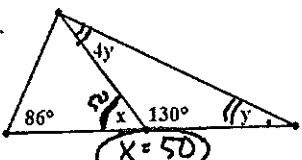$5x + 12 = 7x - 16$
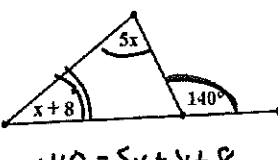$28 = 2x$
$x = 14$

Find the missing angle measures:

34.
$4x$
$x + 76$
$5x + 6$

$4x + x + 76 + 5x + 6 = 180$
$10x + 82 = 180$
$10x = 98$ $x = 9.8$

35.
$4y$
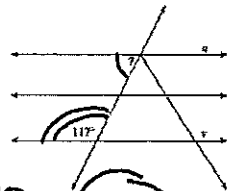86° x 130° y

$x = 50$

$4y + y = 50$
$5y = 50$
$y = 10$

36.
$5x$
$x + 8$ 140°
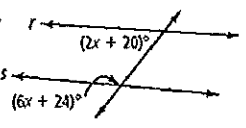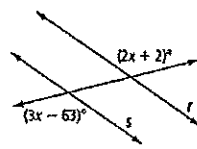
$140 = 5x + x + 8$
$140 = 6x + 8$
$132 = 6x$
$x = 22$

Find the value of x that would the given lines parallel. State the theorem or postulate to support your answer.

37.
117

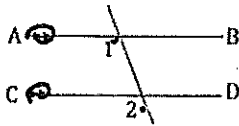$\begin{array}{r} 180 \\ - 117 \\ \hline 63 \end{array}$ SSI

38.
$(2x + 20)^\circ$
$(6x + 24)^\circ$

$2x + 20 + 6x + 24 = 180$
$8x + 44 = 180$
$8x = 136$
$x = 17$ SSI

39.
$(2x + 2)^\circ$
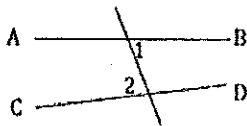$(3x - 63)^\circ$

$3x - 63 = 2x + 2$
$x = 65$

alt. ext. $\angle$

For each of the following statements, write <u>yes</u> or <u>no</u> based on the given information. <u>THEN,</u> if no, explain why, if yes state the theorem or postulate that supports your answer.
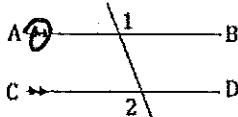
25.   Is $\angle 1 \cong \angle 2$?   (Yes) or No
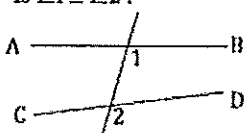
Reasoning: ___corresp. ∢ Thm___

26.   Is $\angle 1 \cong \angle 2$?   Yes or (No)
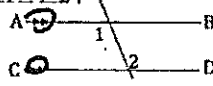
Reasoning: ___not ‖ .___

27.   Is $\angle 1 \cong \angle 2$?   (Yes) or No

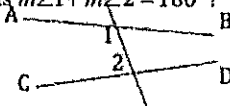Reasoning: ___alt. ∠x+ ∢ Thm___

28.   Is $\angle 1 \cong \angle 2$?   Yes or (No)

Reasoning: ___not ‖___
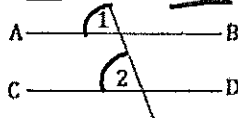
29.   Is $\angle 1 \cong \angle 2$?   (Yes) or No

Reasoning: ___Alt. int. ∢ Thm___

30.   Is $m\angle 1 + m\angle 2 = 180°$?   Yes or (No)

Reasoning: ___not ‖ .___

31.   If $\angle 1 \cong \angle 2$, is $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$?   (Yes) or No

Reasoning: ___Conv. of corresp. ∢ Thm___

32.   If $\angle 1 \cong \angle 2$, is $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$?   Yes or (No)

Reasoning: ___V∠A. ∢'s___

21. Fill out the two-column proof.

Given: $a \parallel b, x \parallel y$

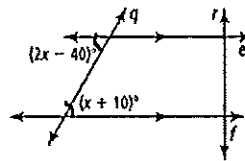Prove: $\angle 4$ and $\angle 15$ are supplementary
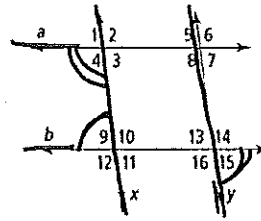
STATEMENTS	REASONS
1. $a \parallel b, x \parallel y$	1. Given
2. $\angle 15$ and $\angle 9$ are alternate exterior angles	2. Defn. alt. ext. $\angle$'s
3. $\angle 15 \cong \angle 9$	3. Alt. ext. $\angle$'s Thm
4. $m\angle 15 = m\angle 9$	4. Definition of angle congruence
5. $\angle 9$ and $\angle 4$ are same side interior angles	5. Defn. SSI $\angle$'s
6. $\angle 9$ and $\angle 4$ are supplementary	6. SSI $\angle$ Post./Thm
7. $m\angle 9 + m\angle 4 = 180°$	7. Defn. Supplem.
8. $m\angle 15 + m\angle 4 = 180°$	8. Substitution Property of Equality
9. $\angle 4$ and $\angle 15$ are supp.	9. Defn. supplem.

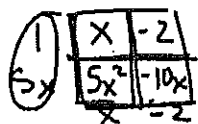22. Error Analysis Which solution for the figure at the right is incorrect? Explain.

$$2x - 40 = x + 10 \qquad 2x - 40 + (x + 10) = 180$$
$$x - 40 = 10 \qquad\qquad 3x - 30 = 180$$
$$x = 50 \qquad\qquad\qquad 3x = 210$$
$$\qquad\qquad\qquad\qquad x = 70$$

alt. int. $\angle \cong$

$(2x - 40)°$ $(x + 10)°$

23. Factor the following polynomial. $5x^2 - 9x - 2$

$(5x + 1)(x - 2)$

$-10x + 1x$

24. Given the following information, find the value of x.

$l \parallel m$

$m\angle 1 = x^2 - 7x$

$m\angle 7 = -x + 7$
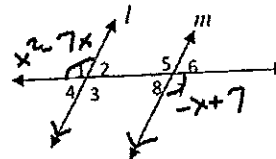
$$x^2 - 7x = -x + 7$$
$$\underline{\quad +x - 7 \quad\quad +x - 7}$$
$$x^2 - 6x - 7 = 0$$
$$(x + 1)(x - 7) = 0$$
$$x = -1$$

Name_____ Period_____ Date_____

Geometry 22: Practice with Lines Cut by a Transversal (3.1-3.5)

Use the diagram to name each of the following.
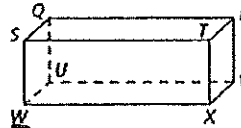
1. a plane parallel to *plane SUQ*   plane TRV

2. two lines that are parallel to $\overline{RV}$ $\overleftrightarrow{QU}$ $\overleftrightarrow{SW}$ $\overleftrightarrow{TX}$

3. three lines that are skew to $\overleftrightarrow{WX}$ $\overleftrightarrow{RV}$ $\overleftrightarrow{QU}$ $\overleftrightarrow{QS}$ $\overleftrightarrow{TR}$

4. two lines that are parallel to plane *QUR* $\overleftrightarrow{ST}$ $\overleftrightarrow{TX}$ $\overleftrightarrow{SW}$ $\overleftrightarrow{WX}$
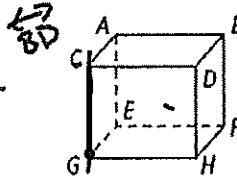
In the following exercises, describe the statement as *true* or *false*. If false, explain why, also state their intersection point(s) if possible.

5. $\overline{AE}$ and $\overline{BF}$ are skew lines.   False, ||

6. plane *DBF* ∥ plane *ABD*   F, ⊥ $\overleftrightarrow{BD}$

7. $\overline{GH} \parallel \overline{EF}$ T

8. $\overline{FH} \parallel \overline{AC}$ T

9. plane *EFH* ∥ $\overleftrightarrow{GC}$ F, ⊥ pt. G

10. $\overline{FH}$ and $\overline{CD}$ are skew lines.   T

Name the special pair of angles listed below.

11. ∠6 and ∠8   corresp.

12. ∠7 and ∠11   alt. int.

13. ∠10 and ∠14   vertical

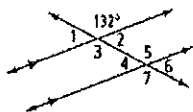14. ∠5 and ∠10   same side int.

15. ∠2 and ∠5   lin. pr.
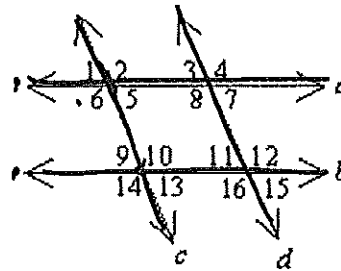
16. Identify all the numbered angles that are congruent to the given angle. State the theorem or postulate that supports your answer.
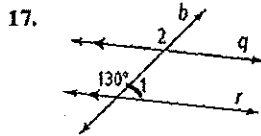
∠3 vert,
∠5 corresp.
∠7 alt. ext.

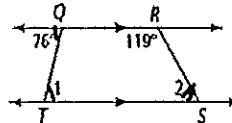Find *m∠1* and *m∠2*. State the theorem or postulate that supports your answer.

17.   m∠1 = 50°   lin. pr. post.
m∠2 = 130°   corresp. ∡

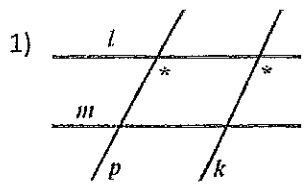18.   m∠1 = 76°   alt. int. ∡
m∠2 = 180 - 119
= 61°   same side int.

Find the value of *x* and *y*. Then find the measure of each labeled angle.
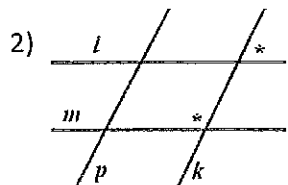
19. $x - 26 + x = 180$
$2x - 26 = 180$
$2x = 206$
$x = 103$
77°

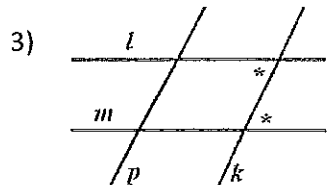20. $3x - 5 = x + 55$
$2x = 60$
$x = 30$

I.   **_Identifying Angle Pairs_** – *Look at each diagram and find the 2 angles that are marked with an asterisk*.*
Then ***a)*** *state what special type of angles they are or write 'no special relationship' if none exists.*
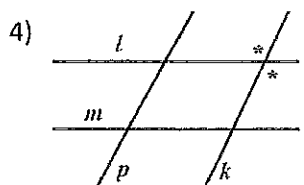*and* ***b)*** *tell which 2 lines, if any, would be parallel to each other if those 2 angles were congruent.*
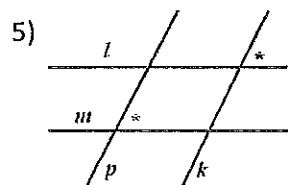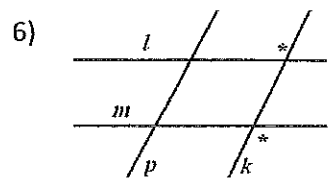
1)

a) Corresponding

b) p ‖ k

2)

a) none

b) ‖ (crossed out)

3)

a) alt. int. ∡'s

b) l ‖ m

4)

a) vertical ∡'s

b) ‖ (crossed out)

5)

a) none

b) ‖ (crossed out)

6)

a) alt. ext. ∡'s

b) l ‖ m

7)

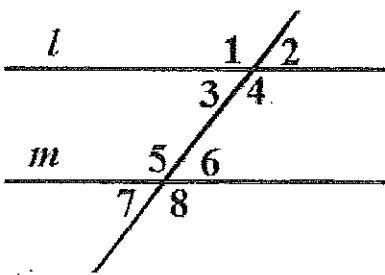a) alt. ext ∡'s

b) p ‖ k

8)

a) alt. int. ∡'s

b) p ‖ k

9)
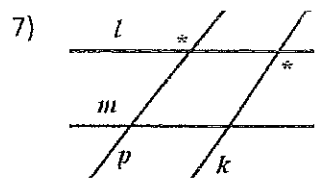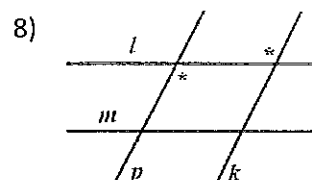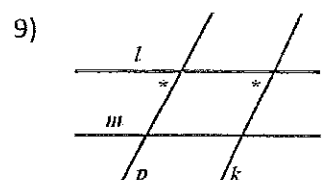
a) corresponding

b) p ‖ k

II.   **_Knowing When to use Which Theorem_** –*Provide the reason that justifies each statement.*
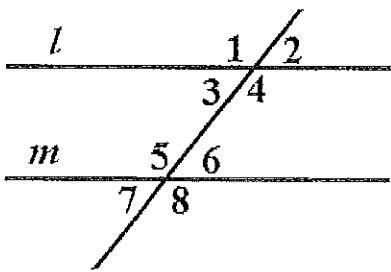
10)

1. $l \parallel m$	1. given
2. $\angle 4 \cong \angle 5$	2. alt. int. ∡'s theorem

11)

1. $\angle 2 \cong \angle 7$	1. given
2. $l \parallel m$	2. Converse of alt. ext. ∡'s thm

Diagram: lines l and m cut by a transversal, with angles labeled 1, 2, 3, 4 at line l and 5, 6, 7, 8 at line m.

12)

1. $l \parallel m$	1. given
2. $<3 \cong <7$	2. corresp $\angle$'s thm.

13)

1. $l \parallel m$	1. given
2. <4 and <6 are supplementary	2. Same side int. $\angle$'s thm.
3. $m<4 + m<6 = 180$	3. Defn. supplmentary

14)

1. <3 and <5 are supplementary	1. given
2. $l \parallel m$	2. Converse of same side int. $\angle$'s thm.
3. $<1 \cong <8$	3.

III. **Solving for 'x'** – state what type of angles each pair is, then write an equation and solve for x;
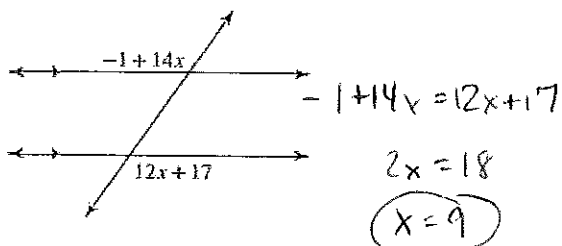
21)

$8x - 4 = 60$

$8x = 64$

$x = 8$

22)

$132 = x + 139$

$x = -7$

23)

$-1 + 14x = 12x + 17$

$2x = 18$

$x = 9$

24)

$23x - 5 = 21x + 5$

$2x = 10$

$x = 5$
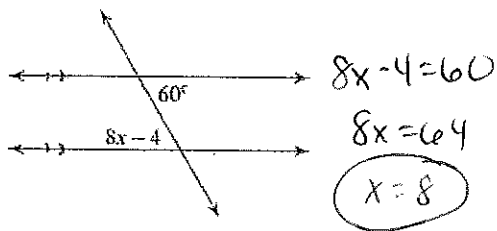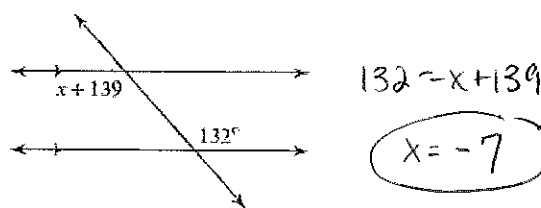
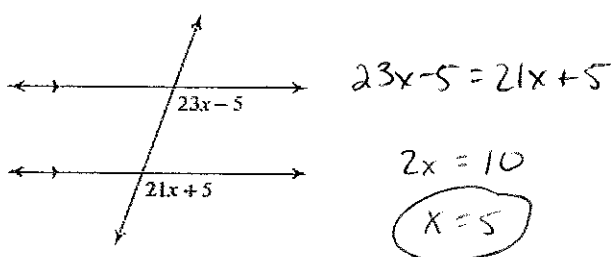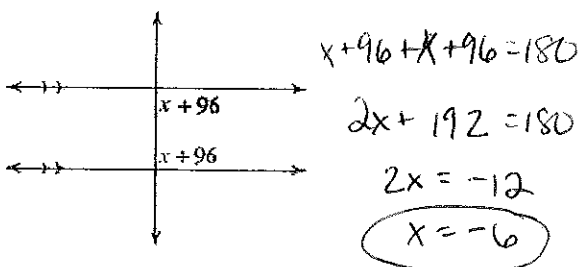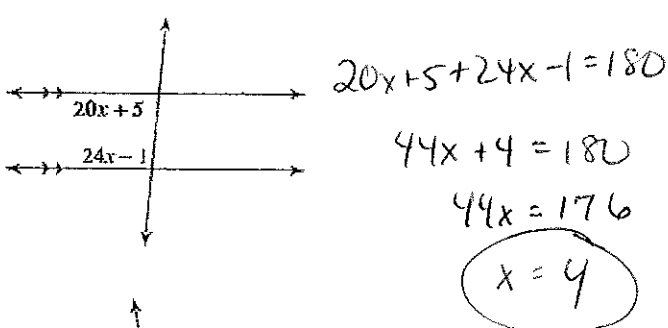**Find the measure of the angle indicated in bold.**

25)

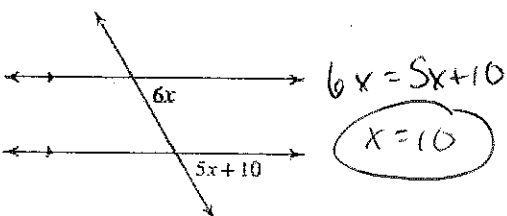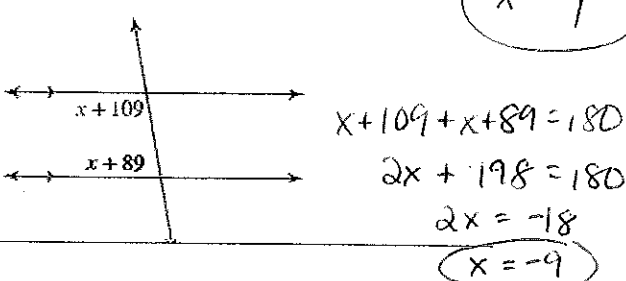$x + 96 + x + 96 = 180$

$2x + 192 = 180$

$2x = -12$

$x = -6$

26)

$20x + 5 + 24x - 1 = 180$

$44x + 4 = 180$

$44x = 176$

$x = 4$

27)

$6x = 5x + 10$

$x = 10$

28)

$x + 109 + x + 89 = 180$

$2x + 198 = 180$

$2x = -18$

$x = -9$

IV. **_Using Theorems in Proofs_**

15) Given: m<1 = 75° ; $l \parallel m$

Prove: m< 3 = 105°
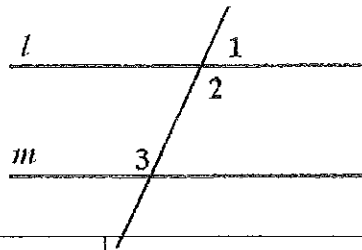
STATEMENTS	REASONS
1) m<1 = 75 ; $l \parallel m$	1) Given
2) <1 and <2 are a linear pair	2) Defn. Lin. Pr.
3) <1 and <2 are supplem.	3) linear pair postulate
4) m<1 + m<2 = 180	4) Defn. supplem.
5) 75 + m<2 = 180	5) Substitution
6) m<2 = 105	6) subtraction
7) <2 and <3 are _alt. int. ∢'s_ angles	7) Defn of alt. int. ∢'s
8) <2 ≅ <3	8) Alt. int. ∢'s thm
9) m<2 = m<3	9) Defn of congruent
10) m<3 = 105	10) Substitution

16) Given: <1 and <3 are supplementary

Prove: $l \parallel m$
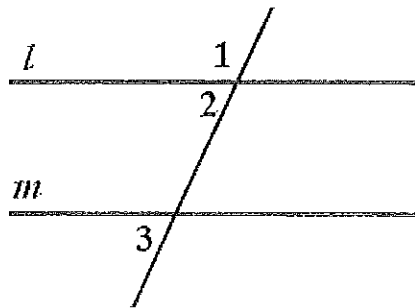
STATEMENTS	REASONS
1) <1, <3 are supple.	1) Given
2) m<1 + m<3 = 180	2) definition of supplementary
3) <1 and <2 form a _linear_ pair	3) defn. of _linear_ pair
4) <1 and <2 are supplementary	4) Lin. Pr. Postulate
5) m<1 + m<2 = 180	5) defn. of supplementary
6) m<1 + m<3 = m<1 + m<2	6) Substitution
7) m<3 = m<2	7) subtraction
8) <3 ≅ <2	8) defn. of congruent
9) $l \parallel m$	9) Converse of corresponding ∢ Thm

17) Given : <1 ≅ <2 ; <5 ≅ <4

Prove: $\overline{PQ} \parallel \overline{RS}$
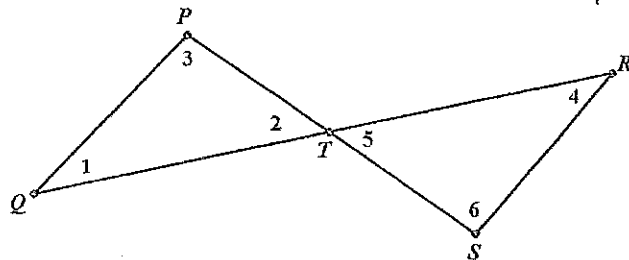
STATEMENTS	REASONS
1) <1 ≅ <2	1) Given
2) <2 ≅ <5	2) Vertical ∢ Thm
3) <5 ≅ <4	3) given
4) <1 ≅ <4	4) Transitive property of congruence
5) $PQ \parallel RS$	5) Conv. of alt. int. ∢ Thm

Name_____

Solving Quadratic Equations by Factoring

Date_____ Period_____

Solve each equation by factoring.

5) $x^2 - 11x + 19 = -5$

6) $n^2 + 7n + 15 = 5$

7) $n^2 - 10n + 22 = -2$

8) $n^2 + 3n - 12 = 6$

9) $6n^2 - 18n - 18 = 6$
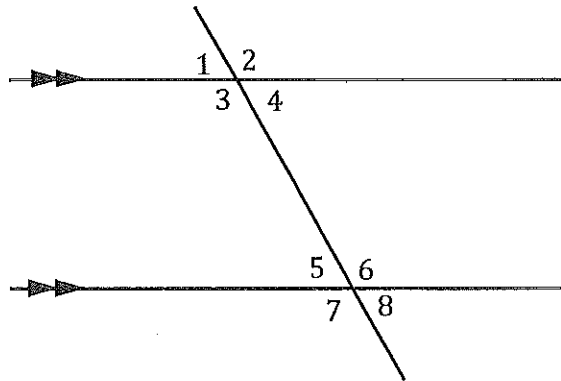
10) $7r^2 - 14r = -7$

11) $n^2 + 8n = -15$

12) $5r^2 - 44r + 120 = -30 + 11r$

13) $-4k^2 - 8k - 3 = -3 - 5k^2$

14) $b^2 + 5b - 35 = 3b$

For each, state the angle relationship.

1. Angle ∠1 and ∠8 are...

   alternate exterior angles

2. Angle ∠3 and ∠5 are...

   Same side interior ∡'s

3. Angle ∠1 and ∠5 are...

   Corresponding ∡'s

4. Angle ∠4 and ∠8 are...

   corresponding ∡'s

5. Angle ∠2 and ∠6 are...

   corresponding

6. Angle ∠4 and ∠5 are...

   alternate interior ∡'s

7. Angle ∠2 and ∠7 are...

   alternate exterior ∡'s

8. Angle ∠3 and ∠6 are...

   alternate interior ∡'s

9. Angle ∠4 and ∠6 are...

   Same side interior ∡'s

10. Angle ∠3 and ∠7 are...

    corresponding ∡'s

The next set might have some from other sections! You can do it!

11. Angle ∠7 and ∠6 are...

    vertical angles

12. Angle ∠5 and ∠7 are...

    linear pair

13. Angle ∠1 and ∠4 are...

    vertical ∡'s

14. Angle ∠6 and ∠3 are...

    alternate interior ∡'s

15. Angle ∠5 and ∠6 are...

    linear pair

16. Angle ∠7 and ∠8 are...

    linear pair

17. Angle ∠7 and ∠3 are...

    corresponding

18. Angle ∠5 and ∠8 are...

    Vertical ∡'s

Okay good, you're getting faster at it I bet. Let's do some matching. Write the letter of each picture in the right column in the blank next to its description in the left column.

_G_ 1. alternate interior angles

A.

_D_ 2. corresponding angles

B.

78°
102°

_I_ 3. alternate exterior angles

C.

_E_ 4. complementary angles

D.
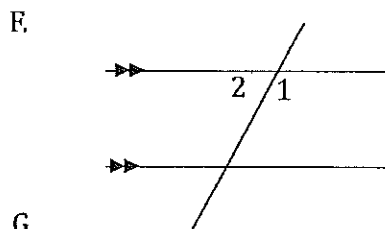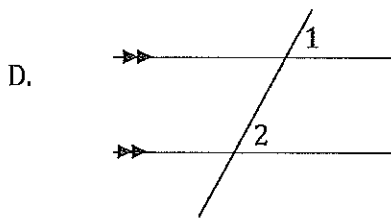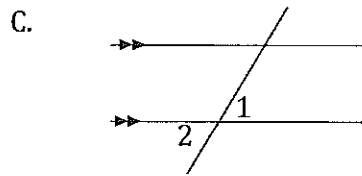

_C_ 5. vertical angles

E.

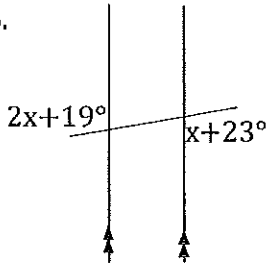_B_ 6. supplementary angles

F.

_F_ 7. linear pair

G.

_A_ 8. consecutive angles   *same side int.*

H.

_H_ 9. adjacent angles

I.
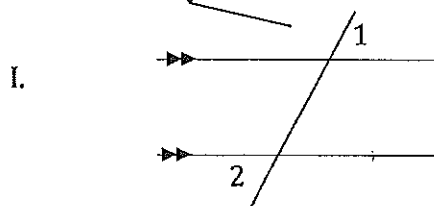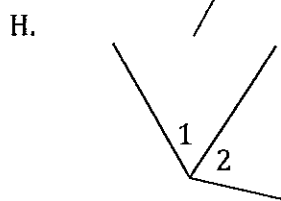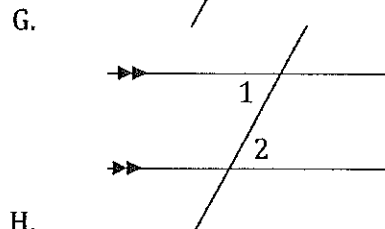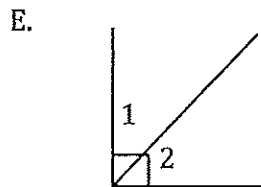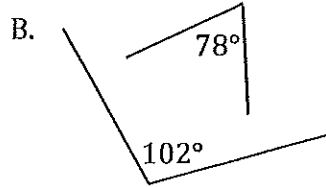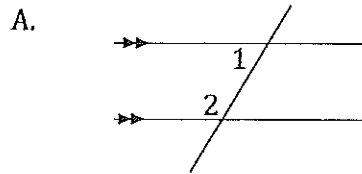
On these state the angle relationship, write a statement about whether they add to 180° or are equal, and find the value of x.

16.

$2x+19°$ $x+23°$

Alternate exterior

$2x+19°=x+23°$
$-x$ $-x$
$x+19°=23°$
$-19°-19°$
$x=4°$
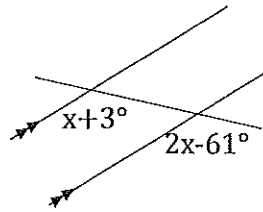
17.

$x+3°$ $2x-61°$

Corresp.

$x+3=2x-61$

$\boxed{64=x}$

18.

$x+34°$
$2x-12°$

alt. int. ∢'s

$x+34=2x-12$

$\boxed{46=x}$

19.
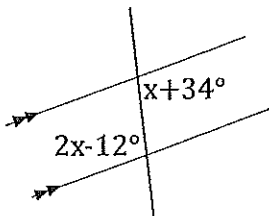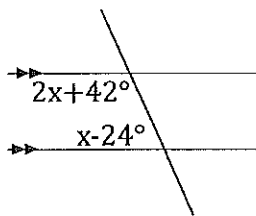
$2x+42°$
$x-24°$

same side int.

$2x+42+x-24=180$

$3x+18=180$

$3x=162$

$\boxed{x=54}$

20.

$3x+21°$ $x+57°$

vertical ∢'s

$3x+21=x+57$
-21

$2x=36$

$\boxed{x=18}$

21.
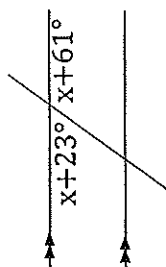
$x+23°$ $x+61°$

linear pair

$x+23+x+61=180$

$2x+84=180$

$2x=96$

$\boxed{x=48}$
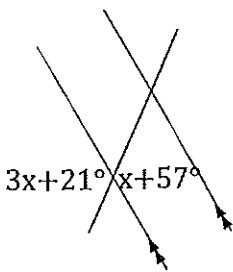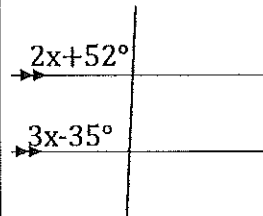
22.

$2x+52°$
$3x-35°$

corresponding

$2x+52=3x-35$

$\boxed{87=x}$

Bubble all the correct answers from above. Don't bubble incorrect answers.

○72° ○4° ○12° ●46° ●18° ●64° ●54° ○42° ○30° ●48° ○97° ○28° ●87° ○83°
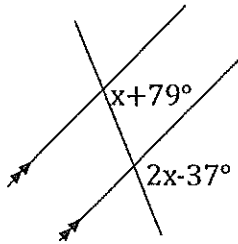
23.
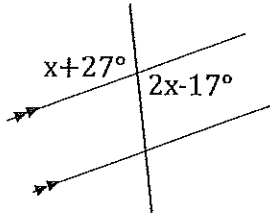
$x+27°$ $2x-17°$

Vertical ∡'s

$x+27 = 2x-17$

$\boxed{44 = x}$

24.

$x+23°$ $x+54°$

same side int. ∡'s

$x+23+x+54 = 180$

$2x+77 = 180$

$2x = 103$

$\boxed{x = 51.5}$

25.

$x+79°$ $2x-37°$

corresp.

$x+79 = 2x-37$

$\boxed{116 = x}$

26.

$3x+71°$ $5x+37°$

corresp.

$3x+71 = 5x+37$
-31

$34 = 2x$

$\boxed{x = 17}$

27.
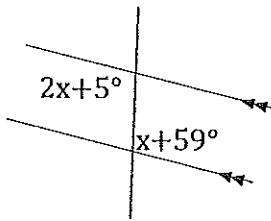
$2x+5°$ $x+59°$

alt. interior

$2x+5 = x+59$

$\boxed{x = 54}$

28.

$x+64°$ $3x-26°$

alt. ext. ∡'s

$x+64 = 3x-26$
26

$90 = 2x$

$\boxed{x = 45}$

29.

$2x+17°$ $x+77°$

corresp.

$2x+17 = x+77$

$\boxed{x = 60}$

30.
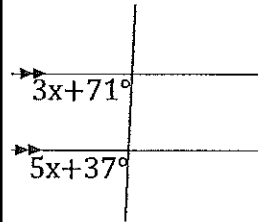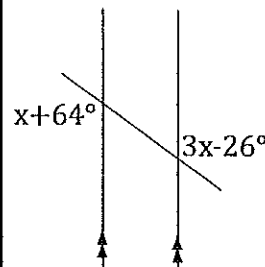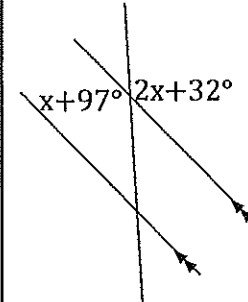
$x+97°$ $2x+32°$

Vertical ∡'s

$x+97 = 2x+32$
-32 -32
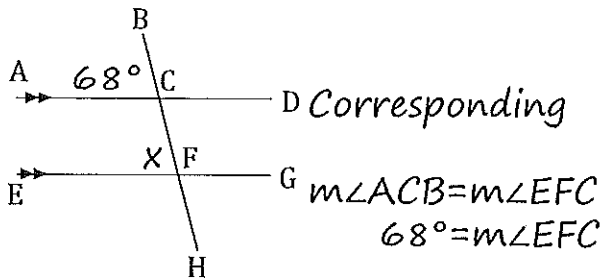
$\boxed{65 = x}$

Bubble all the correct answers from above. Don't bubble incorrect answers.
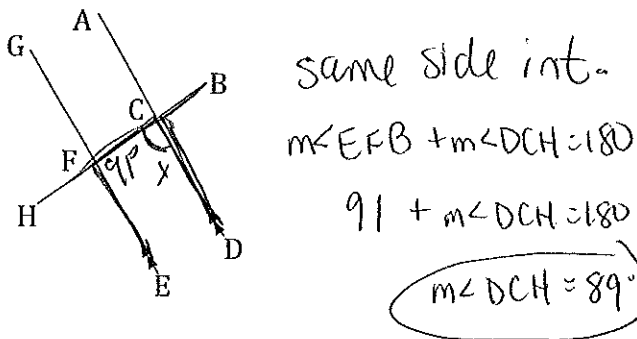
◯31° ⬤116° ◯20° ⬤17° ⬤54° ◯98° ⬤51.5° ⬤45° ⬤60° ◯72.5° ⬤65° ⬤44° ◯30.5° ◯24°

Mark the diagram with the given information, state the angle relationship, and then solve for the indicated angle.
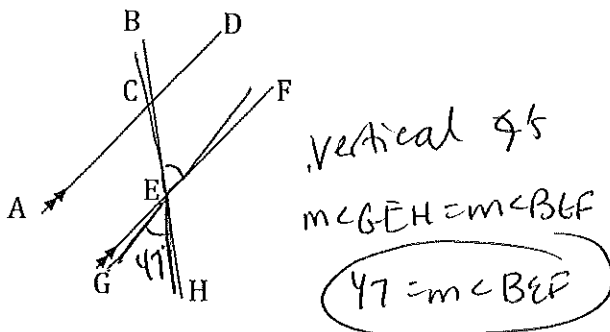
31. m∠ACB is 68° Find the m∠EFC.

Corresponding
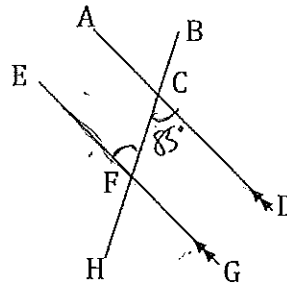
m∠ACB=m∠EFC
68°=m∠EFC

32. m∠DCH=85° Find m∠BFE.

alt. int
m∠DCH=m∠BFE
85°= m∠BFE

33. m∠EFB=91° Find m∠DCH.

same side int.
m∠EFB +m∠DCH=180
91 + m∠DCH=180
m∠DCH = 89°

34. m∠HFG=103° Find m∠BCD.
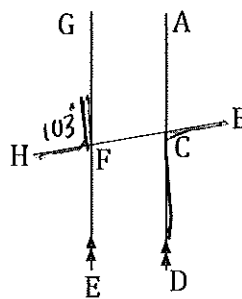
alt. ext. ∡
m∠BCD = m∠HFG
m∠BCD =103°

35. m∠GEH=47° Find m∠BEF.

vertical ∡'s
m∠GEH=m∠BEF
47 = m∠BEF

36. m∠DCH=63° Find m∠ACH.
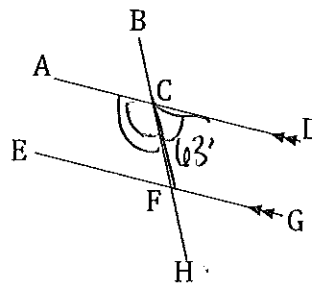
Linear Pair
m∠ACH + m∠DCH=180
m∠ACH+63 = 180
  -63   -63
m∠ACH = 117

?
↓

Bubble all the correct answers from above. Don't bubble incorrect answers.

○112°   ○95°   ○91°   ◉89°   ◉47°   ◉103°   ○63°   ○68°   ○77°   ◉85°
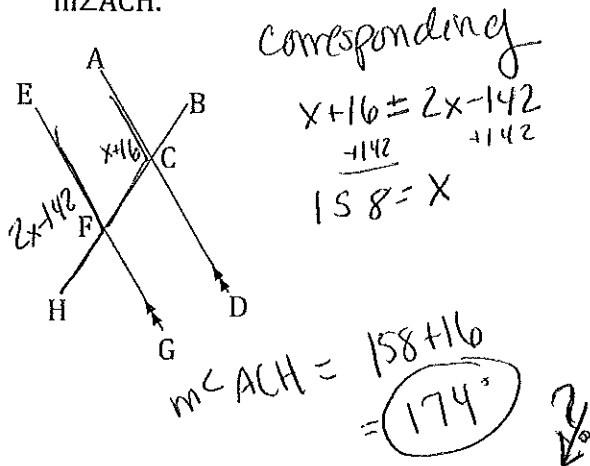
37. m∠ACH=X+24°, m∠DCH=X-8°. Find m∠ACH.

$$\frac{2x=164°}{2} \quad \frac{}{2}$$
$$x=82°$$

A
B
C
x+24°
E
X-8° →D
F
G
H
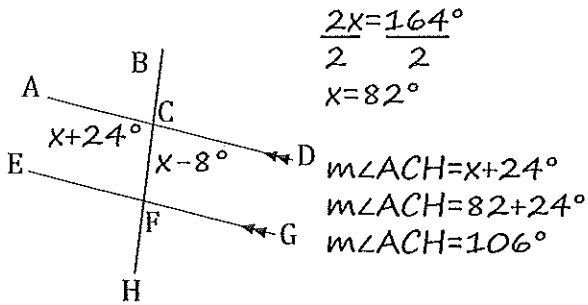
m∠ACH=X+24°
m∠ACH=82+24°
m∠ACH=106°

Linear Pair
m∠ACH+m∠DCH=180°
(X+24°)+(X-8°)=180°
X+24°+X-8°=180
2X+16°=180°
−16° −16°

38. m∠ACB=2X-45°, m∠HFG=X+23°. Find m∠HFG.

A
E
2x-45
C
B
F
H x+23
D
G

Altern. Ext. ∡'s

2x-45 = x+23
-x +45 -x +45
X = 68

m∠HFG = 68+23
91°

39. m∠EFH=2X-142°, m∠ACH=X+16°. Find m∠ACH.

E
A
B
x+16 C
2x+142 F
H
D
G

corresponding

X+16 ≐ 2x-142
+142   +142
158 = X

m∠ACH = 158+16
= **174°**
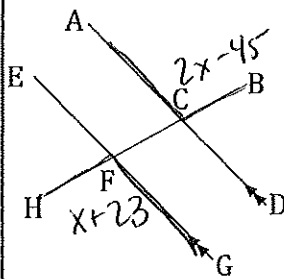
40. m∠GFB=x+32°, m∠DCH=X+24°. Find m∠DCH.

A
E
B
C
F x+24
x+32
H
D
G
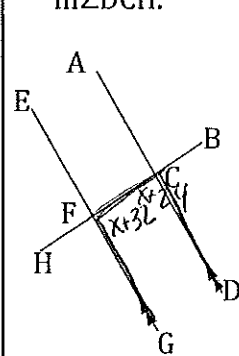
same side interior

m∠GFB +m∠DCH=180
X+32 +x+24 =180
2x+56 =180
2x = 124
x=62

m∠DCH=62+24
86°

41. m∠BCD=X+26°, m∠BFG=2X-24°. Find m∠BFG.

B
A
C x+26
D
E
F 2x-24
G
H

corresponding ∡'s

x+26=2x-24
+24   +24
50 = X

m∠BFG = 2(50)-24
76°

42. m∠ADF=2X+4°, m∠HEC=4X-14°. Find m∠HEC.

A
B
C
D 2x+4
E
4x-14 F
G H
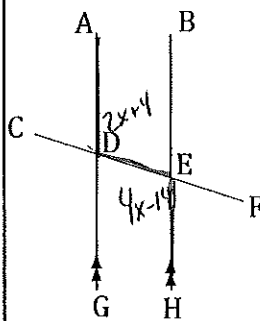
Alt. inter. ∡'s

2x+4 = 4x-14
-2x   -2x
18 = 2x
x=9

m∠HEC= 4(9)-14
36-14 = **22°**

Bubble all the correct answers from above. Don't bubble incorrect answers.

⬤ 76°   ○ 110°   ⬤ 91°   ○ 94°   ○ 106°   ○ 97°   ⬤ 22°   ○ 165°   ⬤ 86°   ○ 92°