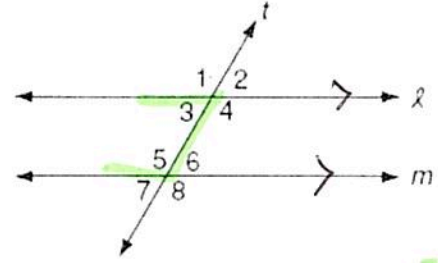


UNKNOWN ANGLES REVIEW #2

1. In the accompanying diagram, line  $\ell$  is parallel to line  $m$ , and line  $t$  is a transversal. Which must be a true statement?

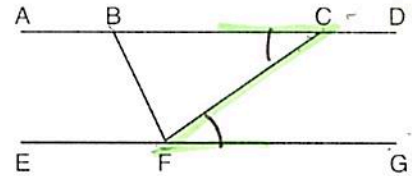
- (1)  ~~$m\angle 1 + m\angle 4 = 180$~~  vertical  $\cong$   
 (2)  ~~$m\angle 1 + m\angle 8 = 180$~~  alt. ext.  $\cong$   
 (3)  ~~$m\angle 3 + m\angle 6 = 180$~~  alt int  $\cong$   
 (4)  $m\angle 3 + m\angle 5 = 180$  same side int supp.!



C!

2. Steve drew line segments  $ABCD$ ,  $EFG$ ,  $BF$ , and  $CF$  as shown in the diagram below. Scalene  $\triangle BFC$  is formed. Which statement will allow Steve to prove  $\overline{ABCD} \parallel \overline{EFG}$ ?

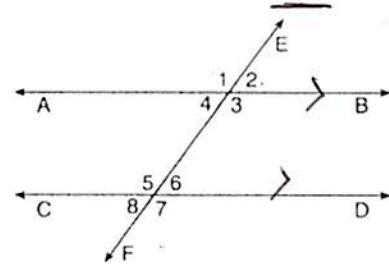
- (1)  $\angle CFG \cong \angle FCB$  alt int  $\angle$ 's  $\cong$   
 (2)  $\angle ABF \cong \angle BFC$   
 (3)  $\angle EFB \cong \angle CFB$   
 (4)  $\angle CBF \cong \angle GFC$



Z!

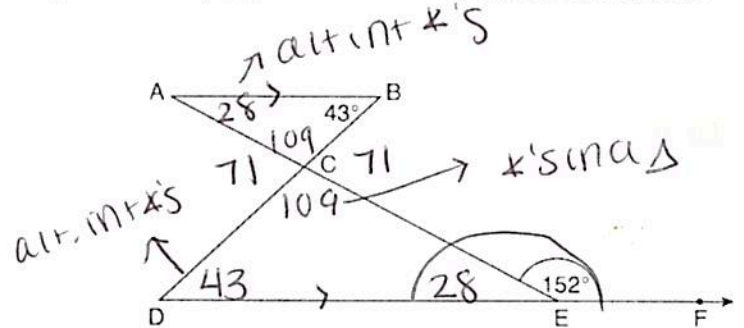
3. Transversal  $\overline{EF}$  intersects  $\overline{AB}$  &  $\overline{CD}$ , as shown in the diagram. If  $\overline{AB} \parallel \overline{CD}$  which statement can not always be proven?

- (1)  ~~$\angle 2 \cong \angle 8$~~  alt ext  $\angle$ 's  
 (2)  ~~$\angle 4 \cong \angle 6$~~  alt int  $\angle$ 's  
 (3)  $\angle 1$  and  $\angle 7$  are supplementary alt. ext  $\cong$ !  
 (4)  $\angle 4$  and  $\angle 5$  are supplementary same side int



4. In the diagram below,  $\overline{AB} \parallel \overline{DEF}$ ,  $\overline{AE}$  and  $\overline{BD}$  intersect at  $C$ ,  $m\angle B = 43^\circ$ , and  $m\angle CEF = 152^\circ$ . Which statement is true?

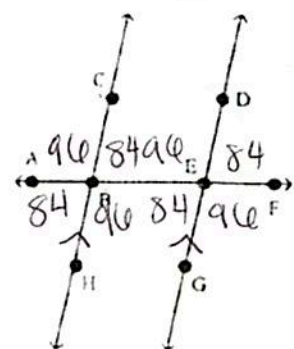
- (1)  ~~$m\angle D = 28^\circ$~~   
 (2)  ~~$m\angle A = 43^\circ$~~   
 (3)  $m\angle ACD = 71^\circ$   
 (4)  ~~$m\angle BCE = 109^\circ$~~



$180 - 152 = 28$

5. In the figure shown,  $\overline{HC} \parallel \overline{GD}$  and  $m\angle ABC = 96$ . Which of the following statements is false?

- (1)  ~~$\angle EBH$  and  $\angle FEG$  are corresponding angles~~ ✓  
 (2)  ~~$m\angle GEF = 96$~~  ✓  
 (3)  $m\angle CBE = 96 \rightarrow 84!$   
 (4)  ~~$\angle EBH$  and  $\angle DEB$  are alternate interior angles.~~ ✓



$180 - 96 = 84$

6. Given straight lines  $p$ ,  $q$ ,  $t$ , and  $s$  and angles as marked, which value of  $x$  will make lines  $p$  and  $q$  parallel?

(1) 73

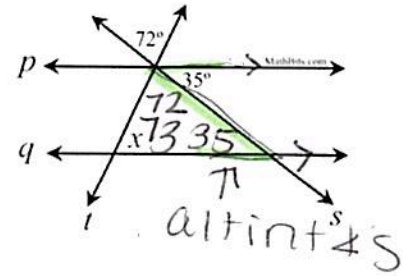
(2) 87

(3) 107

(4) 113

$$72 + 35 = 107$$

$$180 - 107 = 73^\circ$$



7. Given:  $a \parallel b$  and a perpendicular line segment as shown; Find the number of degrees in  $m\angle 2$  if  $m\angle 1 = 3x + 13$  and  $m\angle 2 = 5x - 3$ .

(1) 34.5

(2) 47

(3) 48

(4) 68

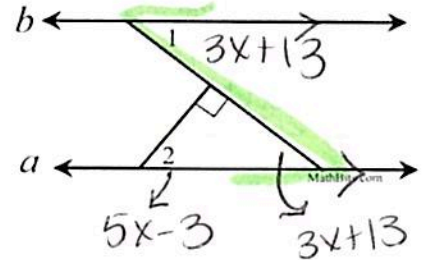
$$5x - 3 + 3x + 13 + 90 = 180$$

$$8x + 100 = 180$$

$$8x = 80$$

$$x = 10$$

$$\angle 2 = 5(10) - 3 = \boxed{47^\circ}$$



8. In the diagram below,  $\triangle ABC$  is shown with  $\overline{AC}$  extended through point  $D$ . If  $m\angle BCD = 6x + 2$ ,  $m\angle BAC = 3x + 15$ , and  $m\angle ABC = 2x - 1$ , what is the value of  $x$ ?

(1) 12

(2)  $14\frac{10}{11}$

(3) 16

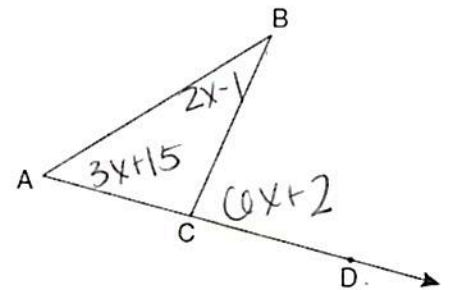
(4)  $18\frac{1}{9}$

$$2x - 1 + 3x + 15 = 6x + 2$$

$$5x + 14 = 6x + 2$$

$$-5x - 2 \quad -5x - 2$$

$$\boxed{12 = x}$$



9. In  $\triangle ABC$  shown below, medians  $\overline{AD}$ ,  $\overline{BE}$ , and  $\overline{CF}$  intersect at point  $R$ . If  $CR = 24$  and  $RF = 2x - 6$ , what is the value of  $x$ ?

(1) 9

(2) 12

(3) 15

(4) 27

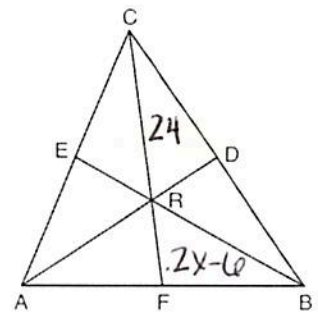
2:1 ratio!

$$24 = 2(2x - 6) \rightarrow \boxed{x = 9}$$

$$24 = 4x - 12$$

$$+12 \quad +12$$

$$36 = 4x$$



10. Given the following constructions of parallel lines. Identify each type of angle relationship.

<p>I.</p> <p>TYPE OF ANGLES: corresponding <math>\angle</math>'s</p>	<p>II.</p> <p>TYPE OF ANGLES: alternate interior <math>\angle</math>'s</p>	<p>III.</p> <p>TYPE OF ANGLES: alternate exterior <math>\angle</math>'s</p>
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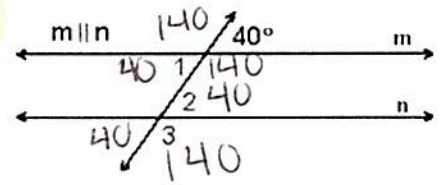


11.

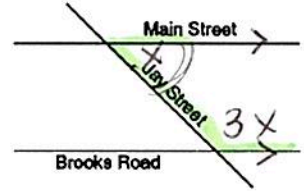
Solve for the missing angles.  $m\angle 1 = 40$   $m\angle 2 = 40$   $m\angle 3 = 140$

$m\angle 1 =$  vertical  $\angle$ 's are  $\cong$   
 $m\angle 2 =$  alt. int.  $\angle$ 's are  $\cong$   
 $m\angle 3 =$  Linear pairs are supplementary

Reasons:



12. The accompanying diagram shows two parallel streets, Main Street and Brooks Road, intersected by Jay Street. The obtuse angle that Jay Street forms with Brooks Road is three times the measure of the acute angle that Jay Street forms with Main Street. What is the measure of the acute angle formed by Jay Street and Main Street?



acute  $\rightarrow < 90$   
 obtuse  $\rightarrow > 90$

$$x + 3x = 180$$

$$4x = 180$$

$$x = 45^\circ$$

Reason: same side interior angles are supplementary

C!

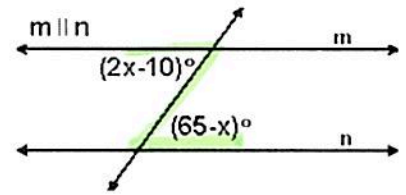
13. Solve for the value of x.

$$2x - 10 = 65 - x$$

$$+x + 10 + 10 + x$$

$$3x = 75$$

$$x = 25$$



Reason: alternate interior  $\angle$ 's are  $\cong$

Z!

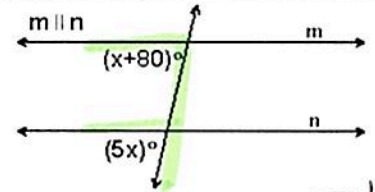
14. Solve for the value of x.

$$x + 80 = 5x$$

$$-x \quad -x$$

$$80 = 4x$$

$$x = 20$$



Reason: corresponding  $\angle$ 's are  $\cong$

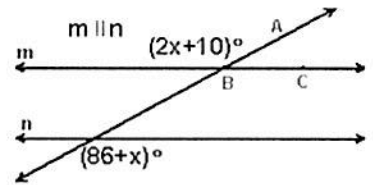
F!

15. Solve for the value of x.

$$2x + 10 = 86 + x$$

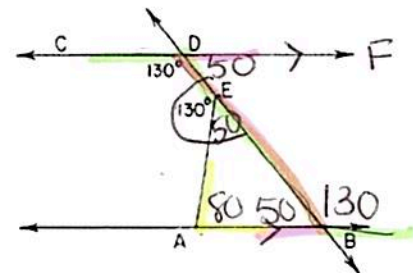
$$-x \quad -10 \quad -10 \quad -x$$

$$x = 76$$



Reason: alternate exterior  $\angle$ 's are  $\cong$

16. In the accompanying diagram, parallel lines  $\overline{AB}$  &  $\overline{CD}$  are cut by transversal  $\overline{DEB}$ . If  $m\angle CDE = m\angle DEA = 130$ , find  $m\angle BAE =$



Reason:  $\angle EDF = 50^\circ$   
 $\angle AEB = 50^\circ$  b/c linear pairs are supp.

Reason:  $\angle ABE = 130^\circ$  b/c alt. int.  $\angle$ 's are  $\cong$

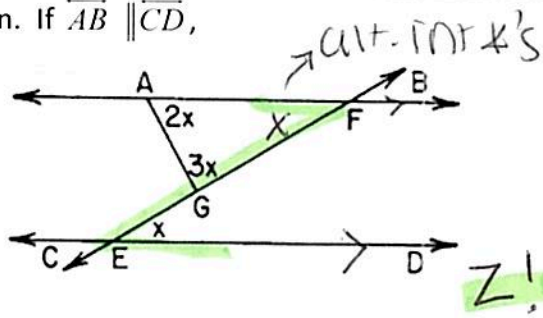
Reason:  $\angle BAE = 80^\circ$  b/c  $\angle$ 's in a  $\Delta$  sum to  $180^\circ$

17. In the accompanying diagram,  $\overline{EGF}$  intersects  $\overline{AB}$  &  $\overline{CD}$  and  $\overline{AG}$  is drawn. If  $\overline{AB} \parallel \overline{CD}$ ,  $m\angle FED = x$ ,  $m\angle GAF = 2x$ ,  $m\angle FGA = 3x$ , solve for  $x$ .

$$x + 2x + 3x = 180$$

$$6x = 180$$

$$x = 30$$



Reason:  $\angle GFA = x$  b/c alt. int. angles are  $\cong$

Reason:  $x = 30$  b/c  $\angle$ 's in a  $\Delta$  sum to  $180^\circ$

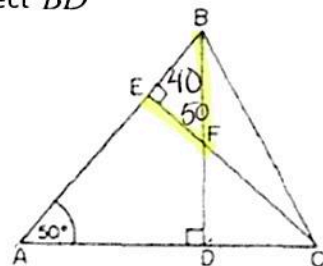
18. In the accompanying diagram of  $\Delta ABC$ ,  $\overline{BD} \perp \overline{AC}$ ,  $\overline{CE} \perp \overline{AB}$ , and  $\overline{CE}$  intersect  $\overline{BD}$  at F. If  $m\angle BAD = 50$ , what is  $m\angle BFE$ ?

$$90 + 50 = 140$$

$$180 - 140 = 40$$

$$90 + 40 = 130$$

$$180 - 130 = 50$$



Reason:  $\angle EBF = 40^\circ$  b/c  $\angle$ 's in a  $\Delta$  sum to  $180$

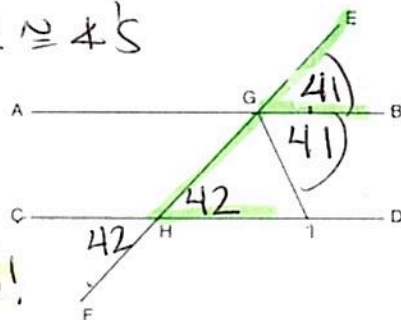
Reason:  $\angle BFE = 50^\circ$  b/c  $\angle$ 's in a  $\Delta$  sum to  $180$

19. Given:  $m\angle BGI = 41$ ,  $m\angle CHF = 42$  and  $\overline{GB}$  bisects  $\angle EGI$ ; Are the lines parallel? Why or why not?

$\angle EGB = 41^\circ$  b/c a bisector creates 2  $\cong$   $\angle$ 's

$\angle IHG = 42^\circ$  b/c vertical  $\angle$ 's are  $\cong$

$\angle EGB \neq \angle IHG$ ,  $\therefore$  corresponding  $\angle$ 's are not  $\cong$  so  $\overline{AB}$  is not  $\parallel$  to  $\overline{CD}$ !



F!

20. In the diagram below of quadrilateral ABCD with diagonal  $\overline{BD}$ ,  $m\angle A = 93$ ,  $m\angle ADB = 43$ ,  $m\angle C = 3x + 5$ ,  $m\angle BDC = x + 19$ , and  $m\angle DBC = 2x + 6$ . Determine if  $\overline{AB}$  is parallel to  $\overline{DC}$ . Explain your reasoning.

$$2x + 6 + x + 19 + 3x + 5 = 180$$

$$6x + 30 = 180$$

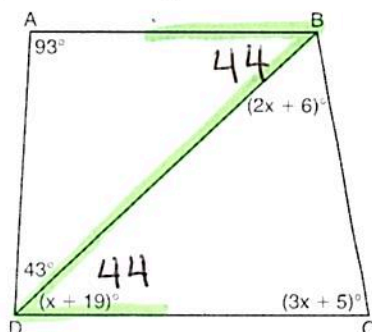
$$6x = 150$$

$$x = 25$$

$$x(25 + 19) = 44^\circ$$

$$93 + 43 = 136$$

$$180 - 136 = 44^\circ$$



Reason:  $x = 25$  b/c  $\angle$ 's in a  $\Delta$  sum to  $180^\circ$

$\angle ABD = 44^\circ$  b/c  $\angle$ 's in a  $\Delta$  sum to  $180$

$\overline{AB} \parallel \overline{CD}$  b/c alt. int.  $\angle$ 's are  $\cong$

Z!