

Math 7  
Unit 8 - Day 102

Name: \_\_\_\_\_

Angles with Algebra

Define complementary: two angles that add to 90°

Define supplementary: two angles that add to 180°

Find each angle if the two angles are complementary:

1)  $x$  and  $2x$

$$x + 2x = 90$$

$$\frac{3x}{3} = \frac{90}{3}$$

$$x = 30$$

$x = 30$   
 $2x = 60$

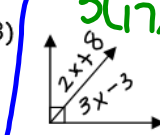
2)  $3x$  and  $x + 6$

$$3x + x + 6 = 90$$

$$4x + 6 = 90$$

$$\frac{4x}{4} = \frac{84}{4}$$

$$x = 21$$

3) 

$$2(17) + 8 = 42$$

$$3(17) - 3 = 48$$

$$2x + 8 + 3x - 3 = 90$$

$$5x + 5 = 90$$

$$\frac{5x}{5} = \frac{85}{5}$$

$$x = 17$$

Find each angle if the two angles are supplementary:

4)  $3x$  and  $2x$

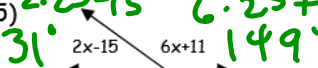
$$3x + 2x = 180$$

$$5x = 180$$

$$\frac{5x}{5} = \frac{180}{5}$$

$$x = 36$$

$3x = 108°$   
 $2x = 72°$

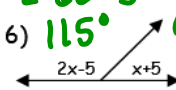
5) 

$$2x - 15 + 6x + 11 = 180$$

$$8x - 4 = 180$$

$$\frac{8x}{8} = \frac{184}{8}$$

$$x = 23$$

6) 

$$115 + 2x - 5 = 180$$

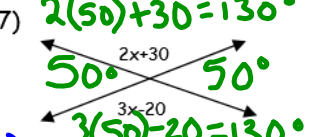
$$2x - 5 + x + 5 = 180$$

$$3x = 180$$

$$\frac{3x}{3} = \frac{180}{3}$$

$$x = 60$$

The following angles are vertical

7) 

$$2(50) + 30 = 130$$

$$3(50) - 20 = 130$$

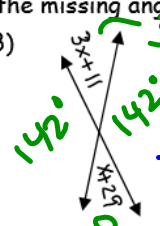
$$2x + 30 = 3x - 20$$

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

$$\frac{30}{+20} \quad \frac{1x - 20}{+20}$$

$$50 = x$$

Find the missing angles:

8) 

$$3(9) + 11 = 38$$

$$3x + 11 = x + 29$$

$$-x \quad -x$$

$$\frac{2x + 11}{-11} \quad \frac{29}{-11}$$

$$\frac{2x}{2} = \frac{18}{2}$$

$$x = 9$$

Try these. On the line write the relationship of the angles and then find the angle measures.

9) The angles are supplementary 10) The angles are vertical

$$3x + 25 + x + 15 = 180$$

$$4x + 40 = 180$$

$$-40 \quad -40$$

$$\frac{4x}{4} = \frac{140}{4}$$

$$x = 35$$

$$3(35) + 25 = 130^\circ$$

$$35 + 15 = 50^\circ$$

$$5x - 10 = 2x + 28$$

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

$$\frac{3x - 10}{+10} = \frac{28}{+10}$$

$$\frac{3x}{3} = \frac{38}{3}$$

$$x = 12.\bar{6}$$

11) The angles are complementary

$$2x - 8 + 4x + 14 = 90$$

$$6x + 6 = 90$$

$$-6 \quad -6$$

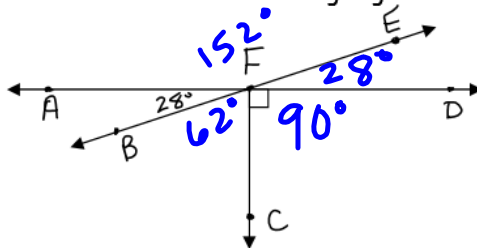
$$\frac{6x}{6} = \frac{84}{6}$$

$$x = 14$$

$$2(14) - 8 = 20^\circ$$

$$4(14) + 14 = 70^\circ$$

12) Use the diagram below to find all the missing angles and then answer the following questions.



- a) What two angles are vertical angles?  $\angle AFB$  and  $\angle EFD$
- b) Name two angles that are complementary.  $\angle AFB$  and  $\angle BFC$
- c) Name two angles that are supplementary.  $\angle AFE$  and  $\angle EFD$
- d) Name two angles that are adjacent.  $\angle FA$  and  $\angle CF$