

## 3-2 Proving Lines Parallel

Converse of ...

### Corresponding $\angle$ s Postulate

If 2 lines are intersected by a transversal, and corresponding angles are  $\cong$ , then the lines are  $\parallel$ .

### Alternate Interior Angles Theorem:

If 2 lines are cut by a transversal, and alternate interior angles are  $\cong$ , then the lines are  $\parallel$ .

### Alternate Exterior Angles Theorem:

If 2 lines are cut by a transversal, and alternate exterior angles are  $\cong$ , then the lines are  $\parallel$ .

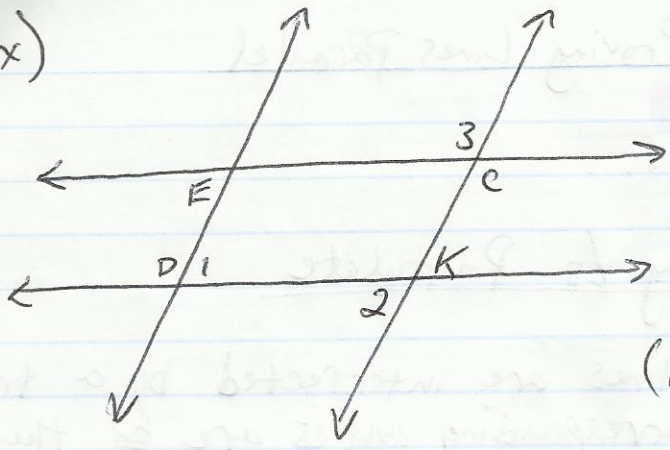
### Same-Side Interior Angles Theorem:

If 2 lines are cut by a transversal, and same-side interior angles are supplementary, then the lines are  $\parallel$ .

### Same-Side Exterior Angles Theorem:

If 2 lines are cut by a transversal, and same-side exterior angles are supplementary, then the lines are  $\parallel$ .

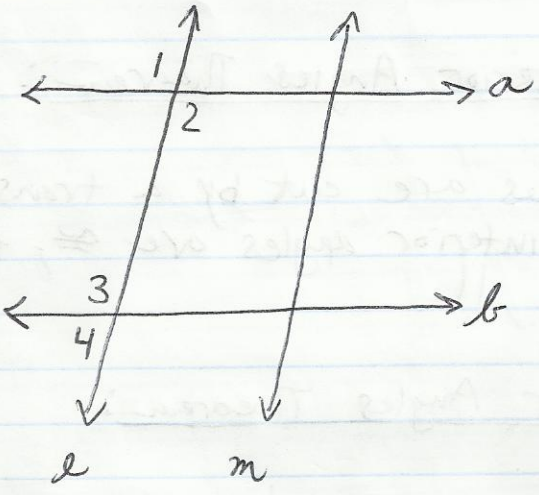
Ex)



If  $\angle 1$  and  $\angle 2$   
are  $\cong$ , which  
lines are  $\parallel$ .

$\longleftrightarrow$   $DE \parallel CK$   $\longleftrightarrow$   
( $\angle 1$  and  $\angle 2$  are alternate  
interior  $\angle$ s).

Ex)



If  $\angle 1$  and  $\angle 2$  are supp.  
~~which lines are  $\parallel$ .~~  
which lines are  $\parallel$ .

\* In-class practice 3.1 + 3.2

In the figure below (right),  $l \parallel m$ . For each of the following,

- (a) State the transversal that forms each pair of angles
- (b) Identify the angle pair name
- (c) Find the measure of the indicated angle.

1. a) line f 1. Find  $m\angle 15$  if  $m\angle 1 = 110^\circ$

b) alternate exterior

c)  $m\angle 15 = 110^\circ$

2. a) line f 2. Find  $m\angle 1$  if  $m\angle 13 = 115^\circ$

b) corresponding  $\angle$ s

c)  $m\angle 1 = 115^\circ$

3. a) line k 3. Find  $m\angle 11$  if  $m\angle 5 = 83^\circ$

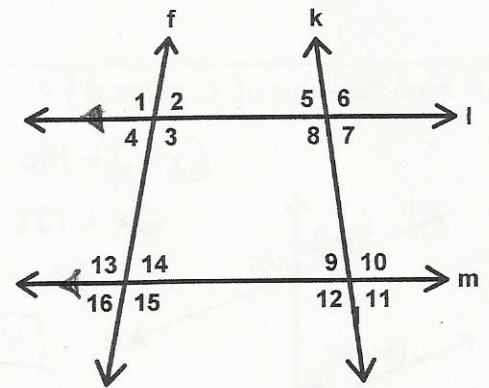
b) alternate exterior

c)  $m\angle 11 = 83^\circ$

4. a) line k 4. Find  $m\angle 8$  if  $m\angle 12 = 107^\circ$

b) corresponding  $\angle$ s

c)  $m\angle 8 = 107^\circ$



In the figure, figure,  $x \parallel y$ ,  $\overline{ST} \parallel \overline{RQ}$ , and  $m\angle 1 = 131^\circ$ . Find the measure of each angle.

5.  $\angle 6$   $131^\circ$

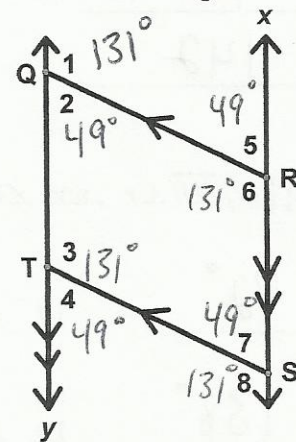
6.  $\angle 7$   $49^\circ$

7.  $\angle 4$   $49^\circ$

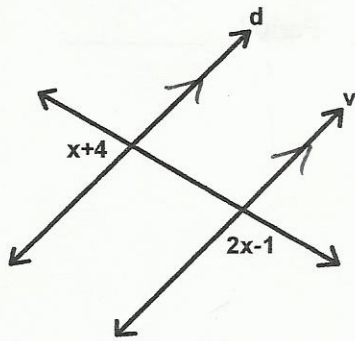
8.  $\angle 2$   $49^\circ$

9.  $\angle 5$   $49^\circ$

10.  $\angle 8$   $131^\circ$

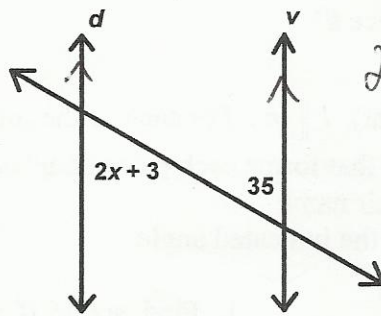


12. Find the value of  $x$ , given  $d \parallel v$ .



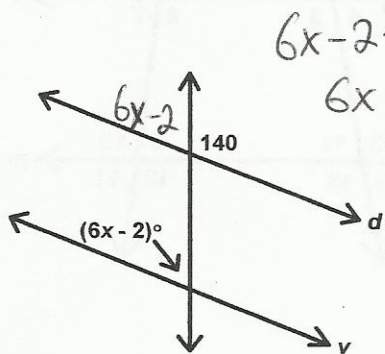
$$\begin{aligned} x+4+2x-1 &= 180 \\ 3x+3 &= 180 \\ 3x &= 177 \\ \boxed{x=59} \end{aligned}$$

13. Find the value of  $x$ , given  $d \parallel v$ .



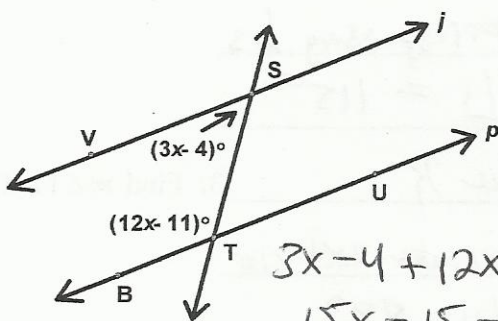
$$\begin{aligned} 2x+3 &= 35 \\ 2x &= 32 \\ \boxed{x=16} \end{aligned}$$

14. Find the value of  $x$ , given  $d \parallel v$ .



$$\begin{aligned} 6x-2+140 &= 180 \\ 6x+138 &= 180 \\ 6x &= 42 \\ \boxed{x=7} \end{aligned}$$

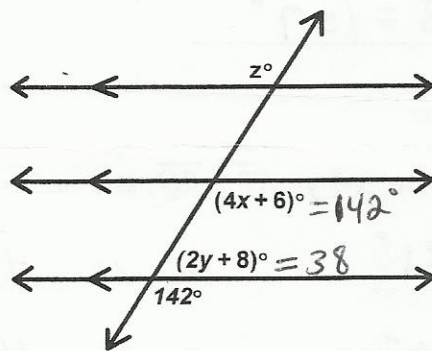
15. Find the value of  $x$  and  $m\angle VST$  so that  $j \parallel p$ .



$$\begin{aligned} 3x-4+12x-11 &= 180 \\ 15x-15 &= 180 \\ 15x &= 195 \\ \boxed{x=13} \\ \boxed{m\angle VST=35^\circ} \end{aligned}$$

Find the values of  $x$ ,  $y$ , and  $z$  the figure to the right.

15.  $x = \underline{34}$   
 $y = \underline{15}$   
 $z = \underline{142}$



$$\begin{aligned} 4x+6 &= 142 \\ 4x &= 136 \\ \boxed{x=34} \\ 2y+8 &= 38 \\ 2y &= 30 \\ \boxed{y=15} \\ \boxed{z=142^\circ} \end{aligned}$$

Given  $p \parallel q$ ,  $q \parallel r$ ,  $\overline{AB} \perp r$ , and  $\angle 1 = 42$ , find the measure of each angle.

16.  $\angle 5 = \underline{42^\circ}$       17.  $\angle 8 = \underline{138^\circ}$   
 18.  $\angle 10 = \underline{138^\circ}$       19.  $\angle 2 = \underline{90^\circ}$

