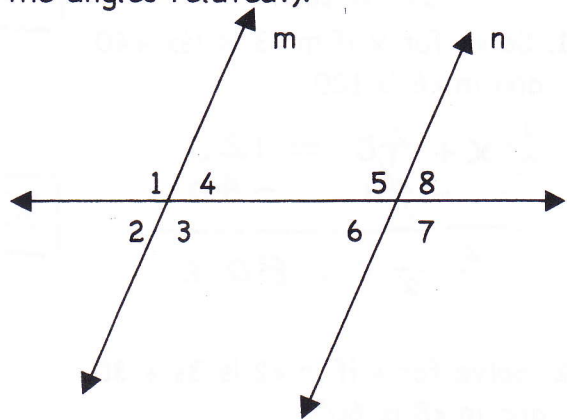


Finding Angle Measures with Indirect Relationships

Using the diagram at the right, answer the following questions. Note: $m \parallel n$.

Explain how you determined your answer (how are the angles related?).



1. If $m \angle 1 = 100^\circ$, what is $m \angle 8$?

80°

$\angle 1$ is corresponding to $\angle 5$
 $\angle 5$ is supplementary to $\angle 8$.

2. If $m \angle 4 = 68^\circ$, what is $m \angle 6$?

68°

they are alternate interior angles

3. If $m \angle 3 = 102^\circ$, what is $m \angle 6$?

78°

They are consecutive interior angles.

4. If $m \angle 7 = 98^\circ$, what is $m \angle 1$?

98°

They are alternate exterior angles.

5. If $m \angle 2 = 65^\circ$, what is $m \angle 7$?

115°

$\angle 2$ is corresponding to $\angle 6$
 $\angle 6$ is supplementary to $\angle 7$

6. If $m \angle 5 = 125^\circ$, what is $m \angle 2$?

55°

$\angle 5$ is alt. int. to $\angle 3$
 $\angle 3$ is supplementary to $\angle 2$

7. If $m \angle 6 = 53^\circ$, what is $m \angle 5$?

127°

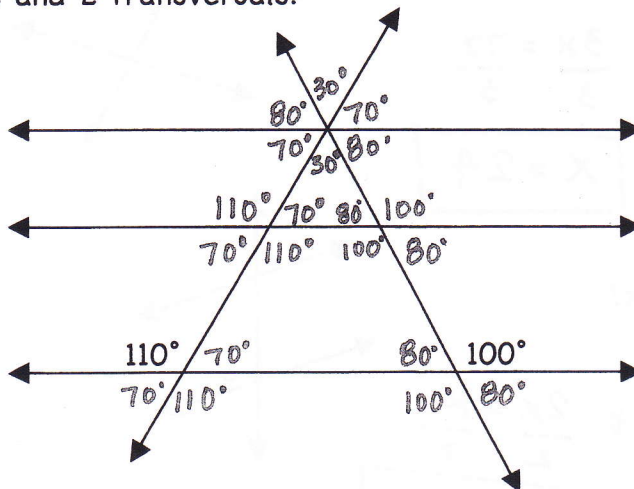
$\angle 6$ is supplementary to $\angle 5$

8. If $m \angle 8 = 54^\circ$, what is $m \angle 4$?

54°

They are corresponding angles.

9. Find the measure of as many of these angles as you can using this diagram of 3 parallel lines and 2 transversals.



Using the diagram at the right, answer the following questions. Note: $r \parallel s$

10. Solve for r if $m \angle 1$ is $5r - 25$
and $m \angle 5$ is 75° .

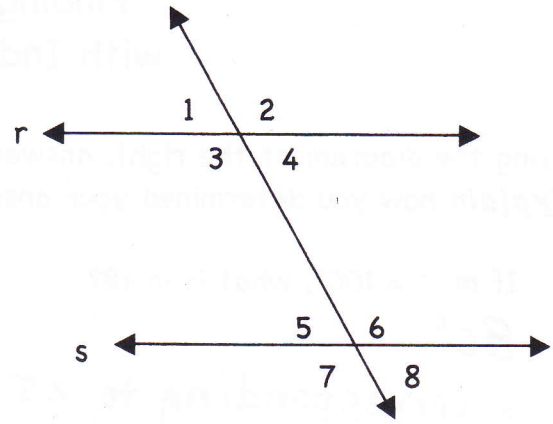
$$\begin{array}{r} 5r - 25 = 75 \\ + 25 \quad + 25 \\ \hline 5r = 100 \end{array} \quad \rightarrow \quad \frac{5r}{5} = \frac{100}{5}$$

$$\boxed{r = 20}$$

11. Solve for x if $m \angle 3$ is $\frac{1}{2}x + 40$
and $m \angle 6$ is 120° .

$$\begin{array}{r} \frac{1}{2}x + 40 = 120 \\ - 40 \quad - 40 \\ \hline \frac{1}{2}x = 80 \end{array} \quad \rightarrow \quad \frac{2}{1} \cdot \frac{1}{2}x = 80 \cdot 2$$

$$\boxed{x = 160}$$



12. Solve for s if $m \angle 2$ is $3s + 30$
and $m \angle 8$ is 60° .

$$\begin{array}{r} 3s + 30 = 60 \\ - 30 \quad - 30 \\ \hline 3s = 30 \end{array} \quad \rightarrow \quad \frac{3s}{3} = \frac{30}{3}$$

$$\boxed{s = 30}$$

13. Solve for z if $m \angle 7$ is $2z - 12$
and $m \angle 4$ is 80° .

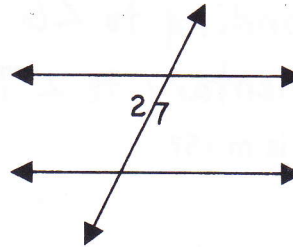
$$\begin{array}{r} 2z - 12 = 80 \\ + 12 \quad + 12 \\ \hline 2z = 92 \end{array} \quad \rightarrow \quad \frac{2z}{2} = \frac{92}{2}$$

$$\boxed{z = 46}$$

Solve each problem using the diagram to the right of the problem. Each diagram has a pair of parallel lines cut by a transversal.

14. If $m \angle 2 = 70^\circ$, what is $m \angle 7$?
How would you determine that?

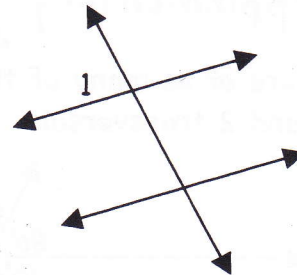
110° They are supplementary.



15. If $m \angle 1 = 3x + 12$ and its adjacent angle measure is 96° , what is the value of x ?

$$\begin{array}{r} 3x + 12 = 96 \\ - 12 \quad - 12 \\ \hline 3x = 84 \end{array} \quad \rightarrow \quad \frac{3x}{3} = \frac{84}{3}$$

$$\boxed{x = 28}$$



16. If $m \angle 6 = 2x - 4$ and its corresponding angle measure is 76° , what is the value of x ?

$$\begin{array}{r} 2x - 4 = 76 \\ + 4 \quad + 4 \\ \hline 2x = 80 \end{array} \quad \rightarrow \quad \frac{2x}{2} = \frac{80}{2}$$

$$\boxed{x = 40}$$

