

More Solving with Parallel Lines

Ex.1 $\angle A$ and $\angle B$ are vertical angles. $m\angle A = 4x - 15$ and $m\angle B = 2x + 35$. Find the value of x . Then find the measure of $\angle A$ and $\angle B$.

Since $\angle A$ & $\angle B$ are vertical,
that means they are \cong .

So $4x - 15 = 2x + 35$

$$\begin{array}{r} 4x - 15 = 2x + 35 \\ -2x \quad -2x \\ \hline 2x - 15 = 35 \end{array}$$

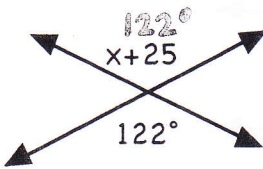
$$\begin{array}{r} 2x - 15 = 35 \\ +15 \quad +15 \\ \hline 2x = 50 \end{array}$$

$$\frac{2x}{2} = \frac{50}{2}$$

$$x = 25$$

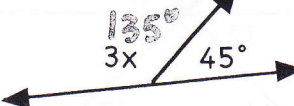
$x = 25$
 $\angle A = 85^\circ$
 $\angle B = 85^\circ$

Find the value of x in each figure. Then find the measure of the missing angle(s).

1. 

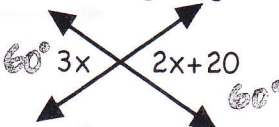
$x + 25 = 122$

$x = 97$

2. 

$3x = 135$

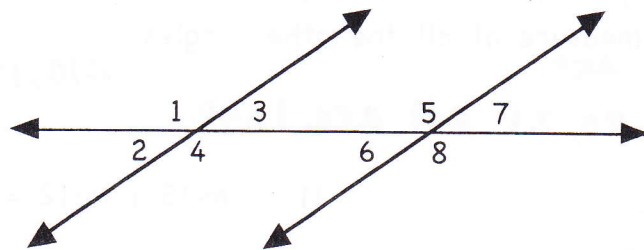
$x = 45$

3. 

$3x = 2x + 20$

$x = 20$

Use the figure below for problems #4 - 7. Find the value of x for each problem. Then give the measure of the angles mentioned in the problem.



4. If $m\angle 3 = 4x + 6$ and $m\angle 4 = 2x$, find the value of x . Then find the $m\angle 3$ and $m\angle 4$.

$$\begin{aligned} \angle 3 + \angle 4 &= 180 \\ 4x + 6 + 2x &= 180 \\ 6x + 6 &= 180 \end{aligned}$$

$x = 29$
 $122^\circ, 58^\circ$

5. If $m\angle 6 = 2x + 35$ and $m\angle 2 = 85^\circ$, find the value of x . Then find $m\angle 6$.

$$\begin{aligned} \angle 6 &= \angle 2 \\ 2x + 35 &= 85 \end{aligned}$$

$x = 25$
 85°

6. If $m\angle 8 = 5x + 10$ and $m\angle 3 = 45^\circ$, find the value of x . Then find $m\angle 8$.

$$\begin{aligned} \angle 8 + \angle 3 &= 180 \\ 5x + 10 &= 135 \end{aligned}$$

$x = 25$
 135°

7. If $m\angle 4 = 4x + 50$ and $m\angle 5 = 6x + 10$, find the value of x . Then find $m\angle 4$ & $m\angle 5$.

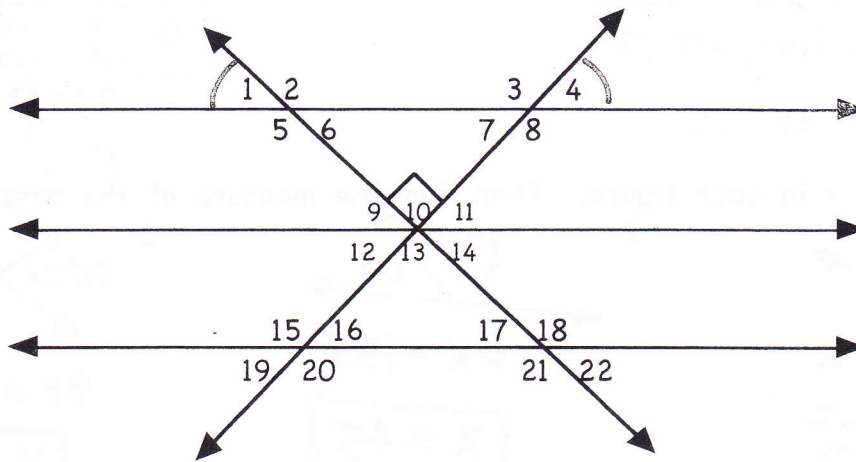
$$\begin{aligned} \angle 4 &= \angle 5 \\ 4x + 50 &= 6x + 10 \end{aligned}$$

$x = 20$
 130°

Use the figure and the given information below to complete #8 - 22.

Given: Three parallel lines cut by two transversals. The transversals are perpendicular to each other.

$\angle 1 \cong \angle 4$



8. Name all angles congruent to $\angle 1$.

$\angle 4, 6, 7, 9, 11, 12, 14, 16, 17, 19, 22$

9. If $m\angle 1 = 45^\circ$, find the measure of all the other angles.

all from #8 are 45° $\angle 10, 13$ are 90°
 $\angle 2, 3, 5, 8, 15, 18, 20, 21$ all are 135°

10. $m\angle 2 + m\angle 6 = \underline{180^\circ}$

11. $m\angle 15 + m\angle 12 = \underline{180^\circ}$

12. $m\angle 14 + m\angle 18 = \underline{180^\circ}$

13. $m\angle 7 + m\angle 8 = \underline{180^\circ}$

14. $m\angle 10 + m\angle 11 + m\angle 14 = \underline{180^\circ}$

15. $m\angle 12 + m\angle 13 + m\angle 14 = \underline{180^\circ}$

16. What is the relationship between $\angle 18$ and $\angle 21$? *vertical*

17. What is the relationship between $\angle 3$ and $\angle 4$? *supplementary*

18. What is the relationship between $\angle 5$ and $\angle 21$? *corresponding*

19. What is the relationship between $\angle 6$ and $\angle 17$? *alternate interior*

20. What is the relationship between $\angle 3$ and $\angle 20$? *alternate exterior*

21. If $m\angle 5 = 115$ and $m\angle 22 = 2x + 5$, find the value of x . Then give $m\angle 22$.

$\angle 5 + \angle 22 = 180$

$2x + 5 = 65$

So $\angle 22 = 65$

$x = 30$

22. If $m\angle 22 = 5x$ and $m\angle 11 = 4x$, find the value of x . Then give $m\angle 22$ and $m\angle 11$.

$\angle 22 \cong \angle 11$
 $= 90$

$5x + 4x = 90$
 $9x = 90$

$x = 10$
 $40^\circ, 50^\circ$