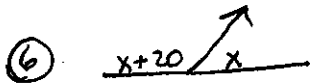


10.1



$$x+20+x=180$$

$$\begin{array}{r} 2x+20 = 180 \\ -20 \quad -20 \\ \hline 2x = 160 \\ \hline x = 80 \end{array}$$

$$\angle 1 \quad x+20 = 80+20 = 100^\circ$$

$$\angle 2 \quad x = 80 \quad 80^\circ$$

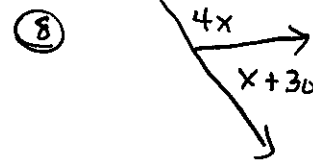


$$x+2x+30=90$$

$$\begin{array}{r} 3x+30 = 90 \\ -30 \quad -30 \\ \hline 3x = 60 \\ \hline x = 20 \end{array}$$

$$2(20)+30=70^\circ$$

$$20^\circ$$



$$4x+x+30=180$$

$$\begin{array}{r} 5x+30 = 180 \\ -30 \quad -30 \\ \hline 5x = 150 \\ \hline x = 30 \end{array}$$

$$4(30) = 120^\circ$$

$$30+30 = 60^\circ$$

$$\angle G + \angle H = 180^\circ$$

$$\angle G = 4\angle H$$

$$4\angle H + \angle H = 180$$

$$\begin{array}{r} 5\angle H = 180 \\ \hline 5 \quad 5 \\ \hline \angle H = 36^\circ \end{array}$$

$$\angle G = 4(36) = 144^\circ$$

$$\angle J + \angle K = 90^\circ$$

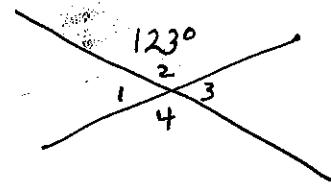
$$3x+10+2x=90$$

$$\begin{array}{r} 5x+10 = 90 \\ -10 \quad -10 \\ \hline 5x = 80 \\ \hline x = 16 \end{array}$$

$$3(16)+10 = 58^\circ$$

$$2(16) = 32^\circ$$

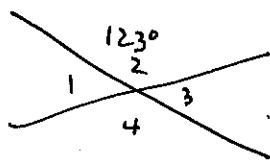
11



$$\angle 1 = 180^\circ - 123^\circ$$

$$\angle 1 = 57^\circ$$

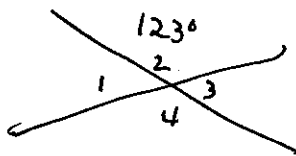
12



$$\angle 3 = 180 - 123$$

$$\angle 3 = 57^\circ$$

13

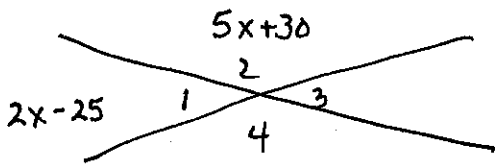


$\angle 4$ is vertical to

$\angle 2$ so it is congruent or equal.

$$123^\circ$$

15



$$5x + 30 + 2x - 25 = 180$$

$$\begin{array}{r} 7x + 5 = 180 \\ -5 \quad -5 \\ \hline 7x = 175 \\ \hline 7 \quad 7 \\ \hline x = 25 \end{array}$$

$$\begin{aligned} \angle 2 \\ 5(25) + 30 = \\ 125 + 30 = 155^\circ \\ \angle 1 \\ 2(25) - 25 = \\ 50 - 25 = 25^\circ \end{aligned}$$

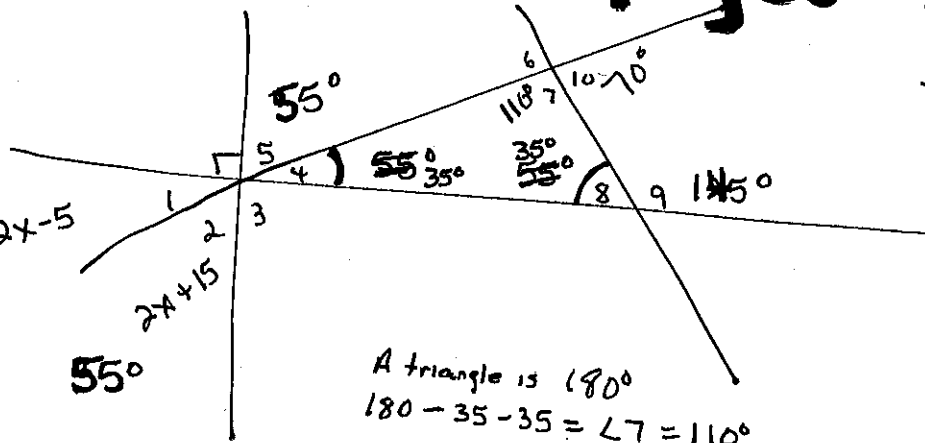
$\angle 2 + \angle 4$ are vertical so if $\angle 2 = 155^\circ$, $\angle 4 = 155^\circ$

$\angle 1 + \angle 3$ are vertical so if $\angle 1 = 25^\circ$, $\angle 3 = 25^\circ$

19

See next pages

35° 55°



$$2x - 5 + 2x + 15 = 90$$

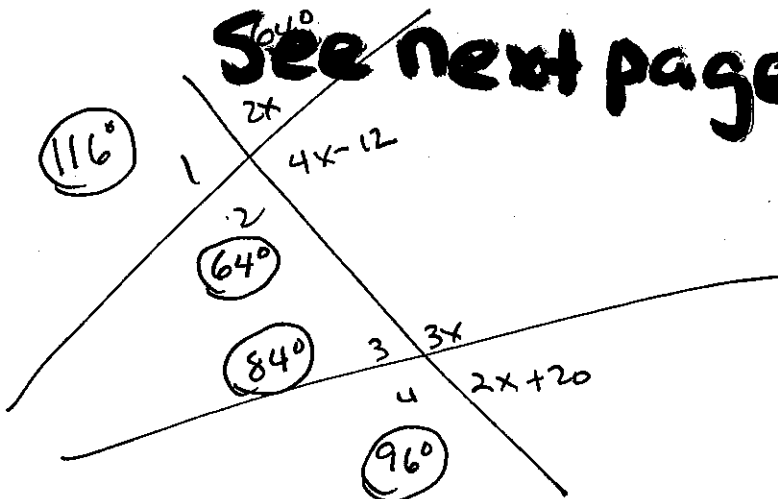
$$\begin{array}{r} 4x + 10 = 90 \\ -10 \quad -10 \\ \hline 4x = 80 \\ \hline 4 \quad 4 \\ \hline x = 20 \end{array}$$

$$\begin{aligned} \angle 1 &= 2(20) - 5 \\ \angle 1 &= 35^\circ \\ \angle 2 &= 90 - 35 \\ \angle 2 &= 55^\circ \end{aligned}$$

18

See next pages

116°



$$4x - 12 = 180$$

$$\begin{array}{r} 4x - 12 = 180 \\ +12 \quad +12 \\ \hline 4x = 192 \\ \hline 4 \quad 4 \\ \hline x = 48 \end{array}$$

$$\begin{aligned} \angle 2 \\ 2(48) = 96^\circ \\ \angle 1 \\ 4(48) - 12 = \\ 192 - 12 = \\ 180^\circ \end{aligned}$$

$$3x + 2x + 20 = 180$$

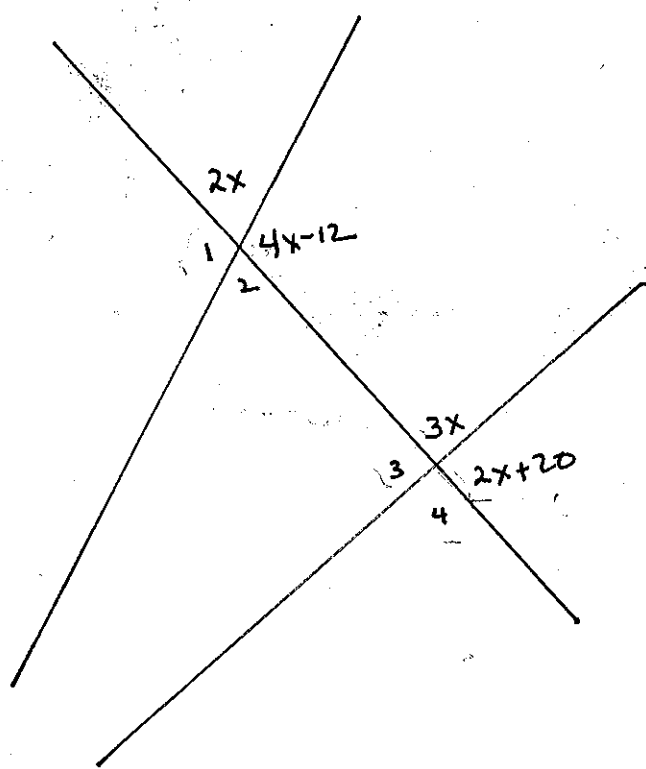
$$\begin{array}{r} 5x + 20 = 180 \\ -20 \quad -20 \\ \hline 5x = 160 \\ \hline 5 \quad 5 \\ \hline x = 32 \end{array}$$

$$\begin{aligned} \angle 2 \\ 3(32) + 20 = \\ 96 + 20 = \\ 116^\circ \end{aligned}$$

$$\angle 4 = 3(32) = 96^\circ$$

$$\angle 3 = 2(32) + 20 = 84^\circ$$

18



$$\angle 1 = 116^\circ$$

$$\angle 2 = 64^\circ$$

$$\angle 3 = 84^\circ$$

$$\angle 4 = 96^\circ$$

① $2x + 4x - 12 = 180^\circ$

$$\begin{array}{r|l} 6x - 12 & = 180^\circ \\ +12 & +12 \\ \hline 6x & = 192 \\ \hline \frac{6x}{6} & = \frac{192}{6} \\ x & = 32 \end{array}$$

② $\angle 1 = 4x - 12$ because they are vertical angles

$$\angle 1 = 4(32) - 12$$

$$\angle 1 = 128 - 12$$

$$\angle 1 = 116^\circ$$

③ $\angle 2 = 2x$ because they are vertical angles

$$\angle 2 = 2(32) = 64^\circ$$

④ $3x + 2x + 20 = 180$

$$\begin{array}{r|l} 5x + 20 & = 180 \\ -20 & -20 \\ \hline 5x & = 160 \\ \hline \frac{5x}{5} & = \frac{160}{5} \\ x & = 32 \end{array}$$

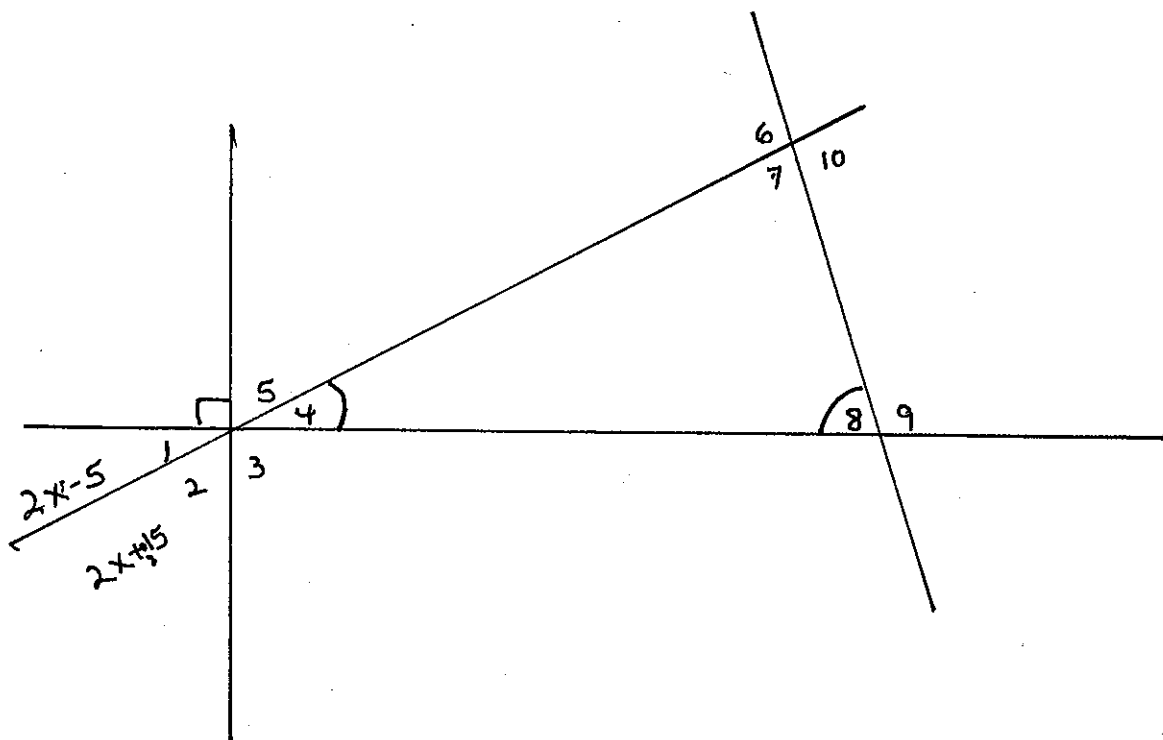
⑤ $\angle 4 = 3x$ because they are vertical angles

$$\angle 4 = 3(32) = 96^\circ$$

⑥ $\angle 3 = 2x + 20$ because they are vertical angles.

$$\angle 3 = 2(32) + 20$$

$$= 84^\circ$$



- ① Because they share a line with a 90° angle, $\angle 1 + \angle 2 = 90^\circ$

$$2x - 5 + 2x + 15 = 90$$

$$4x + 10 = 90$$

$$\begin{array}{r} 4x + 10 = 90 \\ -10 \quad -10 \\ \hline 4x = 80 \\ \hline x = 20 \end{array}$$

$$x = 20$$

$$\angle 1 = 2x - 5 = 2(20) - 5 = 40 - 5 = 35^\circ$$

$$\angle 2 = 2x + 15 = 2(20) + 15 = 40 + 15 = 55^\circ$$

- ② $\angle 1$ and $\angle 4$ are vertical so they are congruent. If $\angle 1 = 35^\circ$, $\angle 4 = 35^\circ$
 $\angle 2$ and $\angle 5$ are vertical so they are congruent. If $\angle 2 = 55^\circ$, $\angle 5 = 55^\circ$

- ③ $\angle 4$ and $\angle 8$ are congruent (given info in the exercise) so, if $\angle 4 = 35^\circ$, $\angle 8 = 35^\circ$

- ④ $\angle 4$, $\angle 8$, and $\angle 7$ are part of a triangle. Triangles have 180° .

$$\angle 4 + \angle 8 + \angle 7 = 180^\circ$$

$$35 + 35 + \angle 7 = 180^\circ$$

$$\begin{array}{r} 70 + \angle 7 = 180 \\ -70 \quad -70 \\ \hline \angle 7 = 110^\circ \end{array}$$

$$\angle 7 = 110^\circ$$

- ⑤ $\angle 8 + \angle 9$ are part of a straight angle.

$$35 + \angle 9 = 180^\circ$$

$$\begin{array}{r} 35 + \angle 9 = 180^\circ \\ -35 \quad -35 \\ \hline \angle 9 = 145^\circ \end{array}$$

- ⑥ $\angle 7$ and $\angle 10$ are part of a straight angle.

$$\angle 7 + \angle 10 = 180^\circ$$

$$110 + \angle 10 = 180$$

$$\begin{array}{r} 110 + \angle 10 = 180 \\ -110 \quad -110 \\ \hline \angle 10 = 70^\circ \end{array}$$

$$\angle 10 = 70^\circ$$