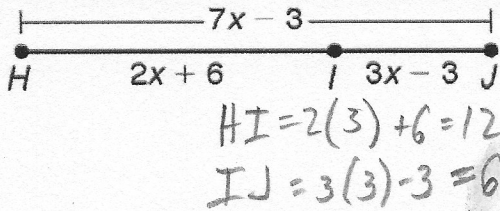


Reasoning and Proof

Practice and Problem Solving: A/B

1. Given I is between HJ. Find x and HI and IJ. Set up an equation and solve for x.



$$2x + 6 + 3x - 3 = 7x - 3$$

$$5x + 3 = 7x - 3$$

$$6 = 2x$$

$$x = 3$$

In Exercises 2 and 3, find the measure of each angle.

2. $\angle WXY$ and $\angle YXZ$ are supplementary angles, $m\angle WXY = (6x + 59)^\circ$, and $m\angle YXZ = (3x - 14)^\circ$.

$$6x + 59 + 3x - 14 = 180$$

$$9x + 45 = 180$$

$$9x = 135$$

$$x = 15$$

$$m\angle WXY = 6(15) + 59 = 149$$

$$m\angle YXZ = 3(15) - 14 = 31$$

3. $\angle ABC$ and $\angle CBD$ are supplementary angles, $m\angle ABC = 7x^\circ$ and $m\angle CBD = 8x^\circ$.

$$7x + 8x = 180$$

$$15x = 180$$

$$x = 12$$

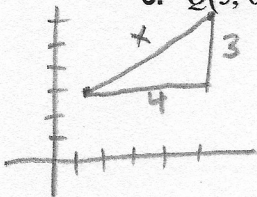
$$m\angle ABC = 7(12) = 84$$

$$m\angle CBD = 8(12) = 96$$

4. $\angle 3$ is a supplement of $\angle 4$, and $m\angle 4 = 75^\circ$. Find $m\angle 3$. $= 180 - 75 = 105$

In Exercises 5 and 6, find the distance between the two points.

5. $Q(5, 6)$ and $P(1, 3)$



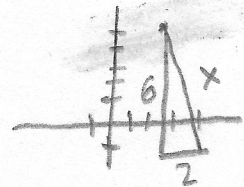
$$3^2 + 4^2 = x^2$$

$$9 + 16 = x^2$$

$$25 = x^2$$

$$x = 5$$

6. $G(2, 5)$ and $H(4, -1)$



$$2^2 + 6^2 = x^2$$

$$4 + 36 = x^2$$

$$x^2 = 40$$

$$x = \sqrt{40} = 6.3$$

In Exercises 7 and 8, the endpoints of \overline{LN} are given. Find the coordinates of the midpoint M .

7. $L(2, 1)$ and $N(2, 13)$

$$\left(\frac{2+2}{2}, \frac{1+13}{2} \right)$$

$$\left(\frac{4}{2}, \frac{14}{2} \right) = (2, 7)$$

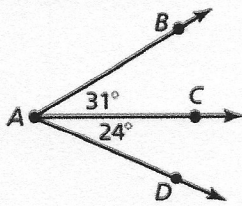
8. $L(-6, 0)$ and $N(6, 6)$

$$\left(\frac{-6+6}{2}, \frac{0+6}{2} \right)$$

$$\left(\frac{0}{2}, \frac{6}{2} \right) = (0, 3)$$

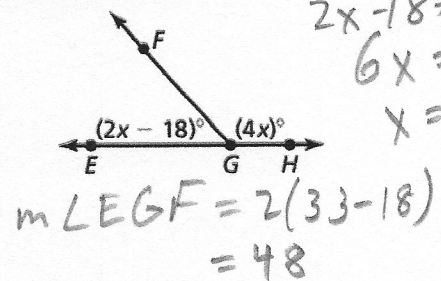
In Exercises 9 and 10, find the indicated angle measure.

9. Find $m\angle BAD = 31 + 24 = 55$



10.

Find x and $m\angle EGF$.



$$2x - 18 + 4x = 180$$

$$6x = 198$$

$$x = 33$$

$$m\angle EGF = 2(33 - 18)$$

$$= 48$$

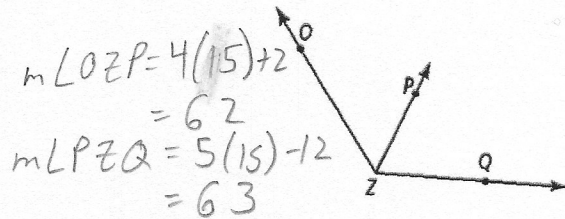
11. $m\angle OZP = 4r + 2$, $m\angle PZQ = 5r - 12$, and $m\angle OZQ = 125$. What are $m\angle OZP$ and $m\angle PZQ$?

$$4r + 2 + 5r - 12 = 125$$

$$9r - 10 = 125$$

$$9r = 135$$

$$r = 15$$



$$m\angle OZP = 4(15) + 2$$

$$= 62$$

$$m\angle PZQ = 5(15) - 12$$

$$= 63$$

Given \overrightarrow{QS} bisects $\angle PQR$. Solve for x and find $m\angle PQR$. Draw a picture and solve for x .

12. $m\angle PQS = 3x$; $m\angle SQR = 5x - 20$

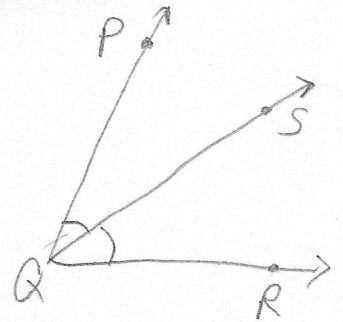
$$3x = 5x - 20$$

$$20 = 2x$$

$$x = 10$$

$$m\angle PQS = 3(10) = 30$$

$$m\angle PQR = 2(30) = 60$$



13. $m\angle PQS = 2x + 1$; $m\angle RQS = 4x - 15$

$$2x + 1 = 4x - 15$$

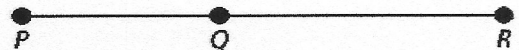
$$16 = 2x$$

$$x = 8$$

$$m\angle PQS = 2(8) + 1 = 17$$

$$m\angle PQR = 2(17) = 34$$

For Exercises 14–16, use the figure at the right.



14. If $PQ = 7$ and $QR = 10$, then $PR = \boxed{17}$.

15. If $PQ = 20$ and $QR = 22$, then $PR = \boxed{42}$.

16. If $PR = 25$ and $PQ = 12$, then $QR = \boxed{13}$.

17. Point E is between points D and F . If $DE = x - 4$, $EF = 2x + 5$, and $DF = 4x - 8$, find x .

$$DE + EF = DF; (x - 4) + (2x + 5) = 4x - 8;$$

$$3x + 1 = 4x - 8; 9 = x$$

18. Y is the midpoint of \overline{XZ} . If $XZ = 8x - 2$ and $YZ = 2x + 1$, find x .

$$(2x + 1) + (2x + 1) = 8x - 2;$$

$$4x + 2 = 8x - 2; 4 = 4x; 1 = x$$

19. \overrightarrow{SV} is an angle bisector of $\angle RST$. If $m\angle RSV = (3x + 5)^\circ$ and $m\angle RST = (8x - 14)^\circ$, find x .

$$(3x + 5) + (3x + 5) = 8x - 14; 6x + 10 = 8x - 14; 24 = 2x; 12 = x$$

20. $\angle ABC$ and $\angle CBD$ are a linear pair. If $m\angle ABC = m\angle CBD = 3x - 6$, find x .

$$(3x - 6)^\circ + (3x - 6)^\circ = 180^\circ; 6x - 12 = 180; 6x = 192; x = 32$$