Given: \( \angle 1 = (x + 7)° \)
\( \angle 2 = (2x - 3)° \)
\( \angle ABC = (x^2)° \)
\( \angle D = (5x - 4)° \)
Show that \( \angle ABC \equiv \angle D \)
Page 35 #21

a. Find the value of $x$.

![Diagram showing points P, Q, and R with expressions for distances and line segment PR.

b. Is Q the midpoint of PR?

Page 35 #22

22.

Find $m \angle ROS$.

Page 35 #24

24.

The measures of two angles are in the ratio 5:3. The measure of the larger angle is 30 greater than half the difference of the angles. Find the measure of each angle.
1. Draw and label plane \( N \) containing two lines that intersect at \( B \).

Use the figure to name each of the following.

2. four noncoplanar points

3. line containing \( B \) and \( E \)

4. The coordinate of \( A \) is \(-3\), and the coordinate of \( B \) is \(0.5\). Find \( AB \).

5. \( E \), \( F \), and \( G \) represent mile markers along a straight highway. Find \( EF \).

6. \( J \) is the midpoint of \( HK \). Find \( HJ \), \( JK \), and \( HK \).

Classify each angle by its measure.

7. \( m\angle LMP = 70^\circ \)

8. \( m\angle QMN = 90^\circ \)

9. \( m\angle PMN = 125^\circ \)

10. \( TV \) bisects \( \angle RTS \). If the \( m\angle RTV = (16x - 6)^\circ \) and \( m\angle VTS = (13x + 9)^\circ \), what is the \( m\angle RTV \)?

11. An angle’s measure is 5 degrees less than 3 times the measure of its supplement. Find the measure of the angle and its supplement.
Worked Out Answers
McDougal

#21
\[ 2x + 5y = 180° \]
\[ 3x + 3y = 90° \]
\[ \Rightarrow 6x + 15y = 540 \]
\[ -6x + 6y = 180 \]
\[ 9y = 360 \]
\[ \Rightarrow y = 40 \]
\[ \Rightarrow x = -10 \]

#14
\[ 90 < 5y + 45 < 180 \]
\[ 45 < 5y < 135 \]
\[ 9 < y < 27 \]

#15
\[ x^2 = x + 7 + 2x - 3 \]
\[ x^2 = 3x + 4 \]
\[ x^2 - 3x - 4 = 0 \]
\[ (x - 4)(x + 1) = 0 \]
\[ x = 4 \text{ or } x = -1 \]

If \( x = -1 \), then \( m\angle 2 = -5° \). An \( \angle \) cannot have a measurement < 0.

\[ m\angle ABC = (4)^2 = 16° \]
\[ m\angle D = 5(4) - 4 = 16° \]

\[ \therefore \angle ABC \cong \angle D \]
#21

a. Find the value of $x$.

\[ x^2 + 3 + 4 + 2x = 15 \]

\[ \Rightarrow x^2 + 2x - 8 = 0 \]

\[ \Rightarrow (x + 4)(x - 2) = 0 \]

\[ \Rightarrow x = -4, \text{ and/or } x = 2 \]

But, $x$ cannot = -4 since QR would be -4 and a segment cannot have a length < 0!

b. Is $Q$ the midpoint of $\overline{PR}$?

\[ PQ = (2y)^2 + 3 = 7 \]

\[ QR = 4 + 2(2) = 8 \]

\[ \therefore Q \text{ is NOT the midpoint of } \overline{PR}!! \]

#22

\[ x - y = y - 10 \quad 3x - 4y = x - y \]

\[ \Rightarrow x = 2y - 10 \quad \Rightarrow 2x = 3y \]

\[ 2(2y - 10) = 3y \]

\[ \Rightarrow 4y - 20 = 3y \]

\[ \Rightarrow y = 20 \]

\[ \therefore m\angle ROS = 20 - 10 = 10^\circ \]

#24

\[ 5x = \frac{1}{2} (5x - 3x) + 30 \]

\[ \Rightarrow 10x = 2x + 60 \]

\[ \Rightarrow x = \frac{15}{2} = 7.5^\circ \]

\[ \Rightarrow \text{the } \angle \text{s measure } 5\left(\frac{15}{2}\right) = \frac{75}{2} = 37.5^\circ \text{ & } 3\left(\frac{15}{2}\right) = \frac{45}{2} = 22.5^\circ \]

\[ 5x = \frac{1}{2} (3x - 5x) + 30 \]

\[ \Rightarrow 10x = -2x + 60 \]

\[ \Rightarrow x = 5^\circ \]

\[ \Rightarrow \text{the } \angle \text{s measure } 6(5) = 25^\circ \text{ & } 3(5) = 15^\circ \]
1. 

2. Possible answer: D, E, C, A

3. Possible answer: \( \overrightarrow{BE} \)

4. \( AB = \left| 0.5 - (-3) \right| \\
\quad = |3.5| = 3.5 \)

5. **Step 1** Find \( x \).
   Use Seg. Add. Post.
   \[
   EF + FG = EG \\
   6x - 4 + 3x = 5x + 8 \\
   4x = 12 \]
   \[
   x = 3 \]

   **Step 2** Find \( EF \).
   \[
   EF = 6x - 4 \\
   = 6(3) - 4 = 14 \]

6. **Step 1** Find \( x \).
   \[
   HJ = JK \\
   3x + 5 = 9x - 3 \\
   8 = 6x \]
   \[
   x = \frac{4}{3} \]

   **Step 2** Find \( HJ, JK, \) and \( HK \).
   \[
   HJ = 3x + 5 \\
   = 3\left(\frac{4}{3}\right) + 5 = 9 \\
   JK = HJ = 9 \\
   HK = HJ + JK \\
   = 9 + 9 = 18 \]

7. acute

8. rt.

9. obtuse

10. **Step 1** Find \( x \).
    \[
    m\angle RTV = m\angle VTS \\
    16x - 6 = 13x + 9 \\
    3x = 15 \]
    \[
    x = 5 \]

    **Step 2** Find \( m\angle RTV \).
    \[
    m\angle RTV = 16x - 6 \\
    = 16(5) - 6 = 74^\circ \]

11. \[
    m\angle = 3(180 - m\angle) - 5 \\
    m\angle = 540 - 3m\angle - 5 \\
    4m\angle = 535 \\
    m\angle = 133.75^\circ \\
    m(supp. of \angle) = 180 - m\angle \\
    = 180 - 133.75 = 46.25^\circ \]