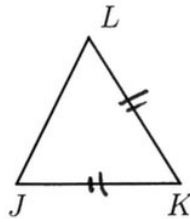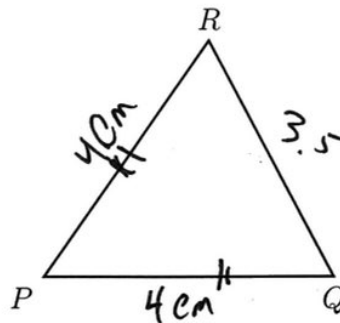## 1.5 Classwork: Equilateral and isosceles triangles, perimeter

1. Given $\triangle JKL$ with $\overline{JK} \cong \overline{KL}$. On the diagram mark the congruent line segments with tick marks.
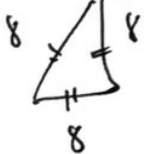

2. Measure and mark the sides of $\triangle PQR$ in centimeters. Is the triangle scalene, isosceles, or equilateral?
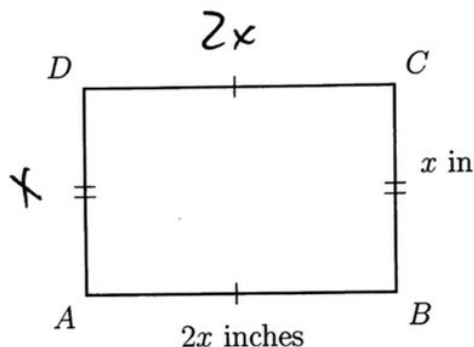

Isosceles

3. Each of the sides of an equilateral triangle are 8 centimeters long. What is its perimeter?

$$P = 3(8) = 24 \text{ cm}$$

4. The perimeter of rectangle $ABCD$ is 30 inches and its length is twice its width. Fill in the blanks, solve for x, and find the rectangle's dimensions.

2x

x in

2x inches

$P = 2x + x + \underline{2x} + \underline{x} = 30$

$6x = 30$
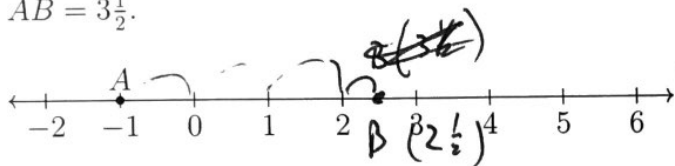
$x = 5$

$2x = 10$

5 inches by 10 inches

$P = 2(5) + 2(10) = 30 ✓$

5. Given point $A(-1)$ as shown below. Locate point, $B > 0$, on the number line such that $AB = 3\frac{1}{2}$.
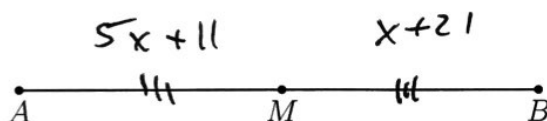

(a) Mark and label B.

(b) State the value of B, writing an equation to support your work.

$$B = -1 + 3\frac{1}{2} = 2\frac{1}{2}$$

6. Given M is the midpoint of $\overline{AB}$, $AM = 5x + 11$, $MB = x + 21$.

(a) Mark the diagram with the values and tick marks

(b) Write an equation and solve for x
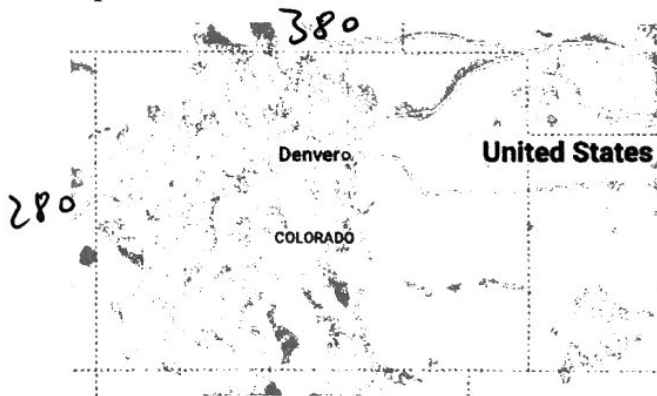
(c) Check your result

$$5x + 11 = x + 21$$
$$4x = 10$$
$$x = 2\frac{1}{2}$$

check: $5(2\frac{1}{2}) + 11 \stackrel{?}{=} (2\frac{1}{2}) + 21$

$12\frac{1}{2} + 11 = 23\frac{1}{2}$

$23\frac{1}{2} = 23\frac{1}{2}$ ✓

7. The state of Colorado is rectangular in shape. In the north-south direction it runs 280 miles, and east to west 380 miles. Find its perimeter.

$$P = 380 + 280 + 380 + 280$$
$$= 1320 \text{ miles}$$

Source: Google Maps

1.5 Homework: Polygons, perimeter

1. Line segments that have the same length are ___*Congruent*___.

2. Given isosceles $\triangle XYZ$ with $\overline{XY} \cong \overline{YZ}$. On the diagram mark the congruent line segments with tick marks.
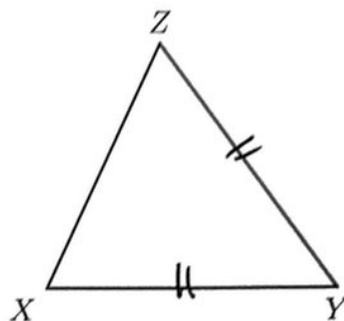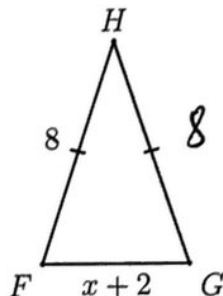

3. Given the rectangle $ABCD$ shown below.

   (a) Measure and mark the length and width of the rectangle in centimeters.

   (b) Calculate its perimeter P. (show your work as an equation)
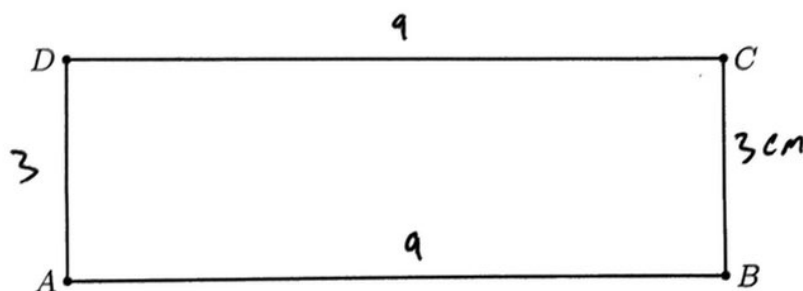
$$P = 2(9) + 2(3)$$
$$= 24 \text{ cm}$$

4. The perimeter of the isosceles $\triangle FGH$ is 21 with $\overline{FH} \cong \overline{GH}$, $FG = x + 2$, $FH = 8$. Fill in the blanks then solve for x.
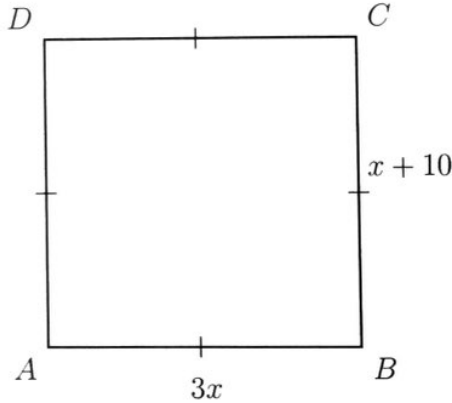
$$P = 8 + \underline{\ 8\ } + (x+2) = \underline{\ 21\ }$$
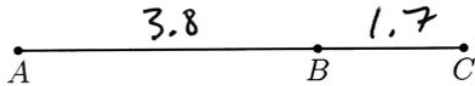$$x + 18 = 21$$
$$x = 3$$

$$= (3) + 2 = 5 \qquad P = 2(8) + 5 = 21 \checkmark$$

5. A square has four sides of equal length. Given $ABCD$ with $AB = 3x$ and $BC = x + 10$. Find the square's perimeter. (hint: first find x)
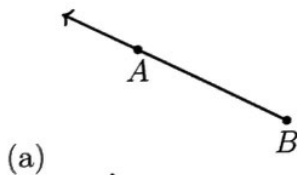
D ——+—— C

A ——+—— B

$x + 10$

$3x$

$3x = x + 10$
$2x = 10$
$x = 5$
$3(5) = (5 + 10 = 15$
$P = 4(15) = 60$

6. Given $\overline{ABC}$, $AB = 3.8$, and $BC = 1.7$. Find AC.
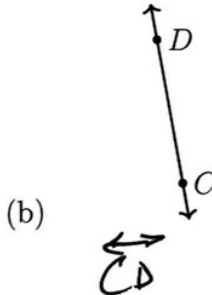
A —— 3.8 —— B — 1.7 — C

$AC = 3.8 + 1.7 = 5.5$

7. Use symbols to write the name of each geometric figure.

(a)
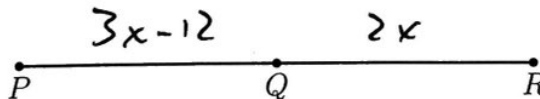
A
B

$\cancel{AF}$
$\overrightarrow{BA}$

(b)

D
C

$\overleftrightarrow{CD}$

(c)

F
E
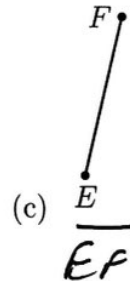
$\overline{EF}$

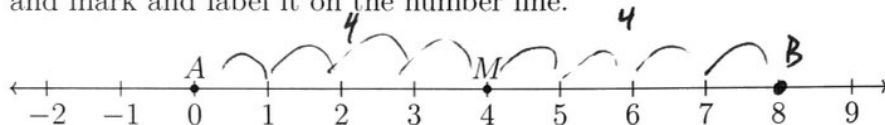8. Given Q bisects $\overline{PR}$, with $PQ = 3x - 12$, $QR = 2x$. Find PR.

$3x - 12$ $2x$

P   Q   R

$3x - 12 = 2x$
$x = 12$
$3(12) - 12 = 2(12)$?
$24 = 24$ ✓
$PR = 2(24) = 48$

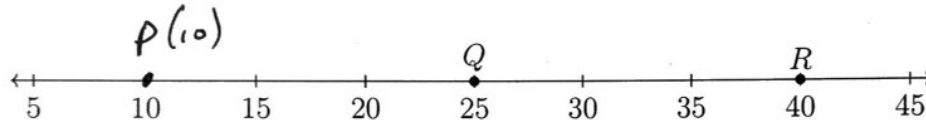## 1.5 Extension: Find an endpoint given the midpoint

1. Given M is the midpoint of $\overline{AB}$, with $A = 0$ and $M = 4$. Find the value of point B and mark and label it on the number line.
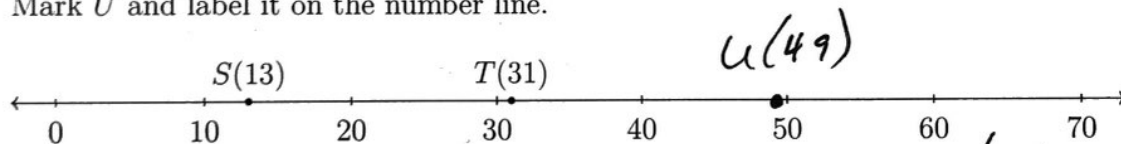

$AM = 4 - 0 = 4$

$B = M + 4 = 8$

2. Given collinear points with Q the bisector of $\overline{PR}$, $Q(25)$ and $R(40)$. Find P, marking it and labeling it on the number line.

$QR = 40 - 25 = 15$

$P = 25 - 15 = 10$

3. Given points $S(13)$ and $T(31)$, find the value of U such that T is the midpoint of $\overline{SU}$. Mark U and label it on the number line.
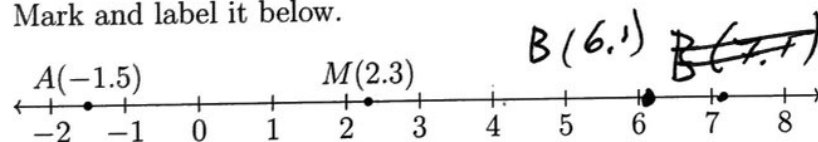

$ST = 31 - 13 = 18$

$U = T + 18 = 49$
  (31)

check
$SU = 49 - 13 = 36$

$18 = \frac{1}{2}(36)$ ✓

4. The point $M(2.3)$ is the midpoint of segment $\overline{AB}$. Given $A(-1.5)$, find the value of B. Mark and label it below.
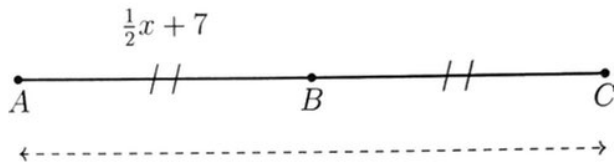

$AM = 2.3 - (-1.5) = 3.8$

$B = 2.3 + 3.8 = 6.1$

check 6.1
$AB = 6.1 - (-1.5)$
$= 7.6$
$3.8 = \frac{1}{2}(7.6)$ ✓

5. Point B bisects segment $\overline{AC}$, $AB = \frac{1}{2}x + 7$ and $AC = 26$. Find x.

$$\frac{1}{2}x + 7$$

$$\overset{A}{\bullet} \quad \overset{||}{} \quad \overset{B}{\bullet} \quad \overset{||}{} \quad \overset{C}{\circ}$$

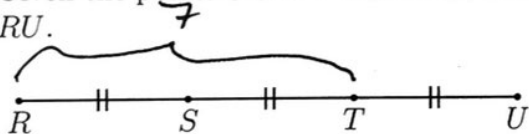$$\overset{26}{\longleftarrow \text{-----------------} \longrightarrow}$$

$$\frac{1}{2}(x) + 7 = \frac{1}{2}(26) = 13$$

$$\frac{1}{2}x = 6$$

$$x = 12$$

check $\quad AB = \frac{1}{2}(12) + 7 = 13 \qquad 13 = \frac{1}{2}(26) \checkmark$

6. Given the points S and T trisect the line segment $\overline{RU}$, as shown below. If $RT = 7$, find RU.

$$\overset{7}{\overbrace{\qquad\qquad}}$$

$$\overset{R}{\bullet} \quad \overset{||}{} \quad \overset{S}{\bullet} \quad \overset{||}{} \quad \overset{T}{\bullet} \quad \overset{||}{} \quad \overset{U}{\bullet}$$
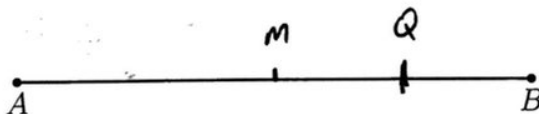
$$RS = \frac{1}{2}RT = \frac{1}{2}(7)$$

$$RU = 3\,RS = 3\left(\frac{1}{2}(7)\right) = \frac{21}{2} = 10\frac{1}{2}$$

check: $\quad TU = \frac{1}{3}\left(\frac{21}{2}\right) = \frac{7}{2} \checkmark$

$$RU = 7 + \frac{7}{2} = 10\frac{1}{2} \checkmark$$

7. The point Q lies on $\overline{AB}$ three quarters of the way from A to B. Given $AB = 28$.

   (a) Mark and label the location of Q. (measure)

   (b) Find AQ. State an equation for full credit.

$$\overset{A}{\bullet} \quad\quad \overset{M}{|} \quad\quad \overset{Q}{+} \quad\quad \overset{B}{\bullet}$$

$$AQ = \frac{3}{4}(28) = 21$$