

EXTENDED RATIOS

- A comparison of three (or more) quantities.
- Extended ratios are written as $a:b:c$.

Using Ratios to find Angles and Sides:

1. The ratio of the measures for the angles in a triangle is 4:7:9. Find the measures of the angles.

$$4x + 7x + 9x = 180^\circ$$

$$\frac{20x = 180}{20 \quad 20}$$

$$x = 9$$

$$4(9) = \boxed{36^\circ}, \quad 7(9) = \boxed{63^\circ}, \quad 9(9) = \boxed{81^\circ}$$

2. The ratio of the measures of the vertex angle to the base angle of an isocles triangle is 8:5. Find the measure of the angles.

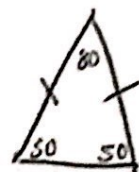
$$8:5:5$$

$$8x + 5x + 5x = 180$$

$$\frac{18x = 180}{18 \quad 18}$$

$$x = 10$$

$$8(10) = 80^\circ \quad 5(10) = 50^\circ$$



3. The ratio of the measures of the sides of a triangle is 2:8:9. If the perimeter of the triangle is 76 inches, find the length of each side.

$$2x + 8x + 9x = 76 \text{ in}$$

$$\frac{19x = 76}{19 \quad 19}$$

$$x = 4$$

$$2(4) = \boxed{8 \text{ inch}}, \quad 8(4) = \boxed{32 \text{ inch}}, \quad 9(4) = \boxed{36 \text{ in}}$$

4. The ratio of the measures of the sides of a triangle is 10:15:6. If the perimeter of the triangle is 217 inches, find the length of the shortest side.

$$10x + 15x + 6x = 217$$

$$31x = 217$$

$$x = 7$$

$$6(7) = \boxed{42 \text{ inches}}$$

5. The ratio of the $m\angle G$ to $m\angle E$ is 7:8. Find the $m\angle E$.

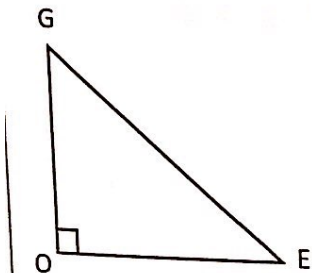
$$90 + 7x + 8x = 180$$

$$15x + 90 = 180$$

$$15x = 90$$

$$x = 6$$

$$8(6) = \boxed{48^\circ}$$



6. The ratio of the sides of a triangle is $\frac{1}{6}:\frac{1}{3}:\frac{1}{4}$. If the perimeter of the triangle is 13.5 inches. Find the length of the longest side.

$$\frac{1}{6}x + \frac{1}{3}x + \frac{1}{4}x = 13.5$$

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$$\frac{2}{12}x + \frac{4}{12}x + \frac{3}{12}x = 13.5$$

$$\frac{4}{3} \left(\frac{3}{4} \frac{9}{12} x \right) = (13.5) \frac{4}{3}$$

$$x = 18$$

$$\frac{1}{4}(18) = \boxed{4.5 \text{ inches}}$$