Ratios and Triangles

1. The angles of a triangle have a ratio of 2:3:4. Find the measures of all the angles.

\[ 2x + 3x + 4x = 180 \]
\[ 9x = 180 \]
\[ x = 20 \]
\[ 40^\circ, 60^\circ, 80^\circ \]

2. The angles of a triangle have a ratio of 1:1:6. Find the measures of all the angles.

\[ x + x + 6x = 180 \]
\[ 8x = 180 \]
\[ x = 22.5^\circ \]
\[ 22.5^\circ, 22.5^\circ, 135^\circ \]

3. The angles of a triangle have a ratio of 2:5:5. Find the measures of all the angles.

\[ 2x + 5x + 5x = 180 \]
\[ 12x = 180 \]
\[ x = 15 \]
\[ 30^\circ, 75^\circ, 75^\circ \]
4. The perimeter of a triangle is 200 cm. The sides of the triangle have a ratio of 2:3:5. Find the side lengths of the triangle.

\[ 2x + 3x + 5x = 200 \]
\[ 10x = 200 \]
\[ x = 20 \]
\[ 40\text{ cm}, 60\text{ cm}, 100\text{ cm} \]

5. The perimeter of a triangle is 15 feet. The sides of the triangle have a ratio of 1:2:3. Find the side lengths of the triangle.

\[ x + 2x + 3x = 15 \]
\[ 6x = 15 \]
\[ x = 2.5 \]
\[ 2.5\text{ ft}, 5\text{ ft}, 7.5\text{ ft} \]

BONUS

6. A “Golden Rectangle” is a rectangle that is considered most aesthetically pleasing (in other words... it's a really, really nice rectangle). The rectangle whose sides have a ratio of \( \phi \) (the Greek letter phi) where \( \phi \approx 1.618 \).

Find the approximate side lengths of the Golden Rectangle whose perimeter is 100 cm.

\[ 1.618x + x + 1.618x + x = 100 \]
\[ 5.236x = 100 \]
\[ x \approx 19\text{ cm} \]

Now plot your rectangle on a piece of graph paper (1 box = 1 cm)... does it seem aesthetically pleasing?