

The Bridge

The Golden Gate Bridge in California is approximately $1\frac{7}{10}$ mi long and crosses the Golden Gate Strait.

How long would $2\frac{1}{2}$ times the length of the Golden Gate Bridge be?

$$1\frac{7}{10} \times 2\frac{1}{2}$$

$$\frac{17}{10} \times \frac{5}{2}$$

Write the mixed numbers as improper fractions. Simplify if possible.

$$\frac{17}{2} \times \frac{1}{2} = \frac{17}{4} = 4\frac{1}{4}$$

Multiply. Write the product as a mixed number.

The bridge would be $4\frac{1}{4}$ mi long.

- If you rode your bike halfway across the Golden Gate Bridge, how far would you have ridden?

- If a man jogged from one end of the Golden Gate Bridge and back, how many miles would he have jogged?

- Suppose the first $\frac{5}{8}$ of the Golden Gate Bridge was repainted. How many miles of the bridge were repainted?

- Suppose a different bridge in California were $\frac{1}{3}$ the length of the Golden Gate Bridge. Write an algebraic expression for the length of this other bridge. Let d equal the length of the Golden Gate Bridge.

- If the Golden Gate Bridge were divided into 5 equal sections, how long would each section be?

- How long would 5 times the length of the Golden Gate Bridge be?

PROBLEM-SOLVING APPLICATION

Black Walnut Tree

The Institute of Agriculture and Natural Resources at the University of Nebraska published a study of the black walnut tree. The information in the published report is used by farmers and forestry experts to monitor and improve the growth of the black walnut tree in the Nebraska area.

Part of the study examined the growth of 10 different black walnut trees on 2 different sites. Site 1 was a shallow, hilly area that had some clay in the soil. Site 2 was a deep, well-drained area.

Tree 1 on Site 1 grew at a rate of about $1\frac{3}{4}$ ft per year.

1. At this rate, how tall would the tree be after $\frac{1}{3}$ year?

2. At this rate, how tall would the tree be after 6 years? After 8 years?

Suppose the black walnut tree's growth changes every $3\frac{5}{12}$ years. As a result, the researchers make records of the tree's growth every $3\frac{5}{12}$ years. For the study, the researchers called every $3\frac{5}{12}$ years a "period." At a growth rate of $1\frac{3}{4}$ ft per year, the black walnut tree would grow about $5\frac{19}{20}$ ft every period of $3\frac{5}{12}$ years.

3. To find an estimate for how much the tree would grow in 3 periods, first round $5\frac{19}{20}$ to a compatible whole number. Then multiply your answer by 3 to get the estimate.

4. Now find exactly how much the tree would grow in 3 periods, based on the data given.

5. How much would the tree grow in 12 periods?

6. Suppose researchers found that Tree 7 on Site 2 grew $2\frac{1}{7}$ ft per year. How much would Tree 7 grow in 1 period of $3\frac{5}{12}$ years?

7. How much would Tree 7 grow in 4 periods?
