

Problems on Equivalent Fractions and Random Samples

1. Fill the boxes to make equivalent fractions. Show your work.

$$\frac{3}{10} = \frac{\square}{50}$$

$$\frac{2}{10} = \frac{\square}{100}$$

$$\frac{24}{100} = \frac{6}{\square}$$

$$\frac{15}{100} = \frac{\square}{20}$$

2. There is a bag filled with 50 squares. Some of the squares are red, the rest are yellow. You reach into the bag and randomly pick out 10 squares. 3 of the 10 squares you picked are red. What is the best scientific guess about how many red squares are in the bag? Explain.
3. There are 100 light bulbs in a box at a factory. A factory worker tests 10 of the light bulbs to see if they work properly. 2 of the light bulbs of the 10 he tested do not work properly. What is the best scientific guess about how many light bulbs in the box do not work properly? Explain.
4. Fill the boxes to make equivalent fractions. Show your work.

$$\frac{6}{10} = \frac{\square}{40}$$

$$\frac{7}{10} = \frac{\square}{100}$$

$$\frac{25}{100} = \frac{1}{\square}$$

$$\frac{65}{100} = \frac{\square}{20}$$

5. There is a bag filled with 40 squares. Some of the squares are yellow, the rest are green. You reach into the bag and randomly pick out 10 squares. 6 of the 10 squares you picked are yellow. How many yellow squares are in the bag? Give your best scientific estimate. Explain your answer.
6. Fill the boxes to make equivalent fractions.

$$\frac{3}{10} = \frac{\square}{50}$$

$$\frac{9}{10} = \frac{\square}{100}$$

$$\frac{85}{100} = \frac{\square}{20}$$

$$\frac{75}{100} = \frac{3}{\square}$$

[The following hint was given to the students after they attempted the problems. Students were then allowed to work on the problems some more.] Remember that there are two ways to get equivalent fractions. We can either multiply the numerator and denominator by the same number or we can divide the numerator and denominator by the same number.

7. There is a bag filled with 50 squares. Some of the squares are yellow, the rest are green. You reach into the bag and randomly pick out 10 squares. 3 of the 10 squares you picked are yellow.
- (a) Give the best scientific estimate for the total number of yellow squares in the bag of 50 squares: _____
Show your work.
- (b) Does your best scientific estimate necessarily give you the exact correct number of yellow squares in the bag? Explain why or why not.

[The following hints were given to the students after they attempted the problems. Students were then allowed to work on the problems some more.]

- (a) Since 3 out of 10 squares picked were yellow, $\frac{3}{10}$ of the squares picked were yellow. Our best scientific guess is that in the whole bag, an equivalent fraction of the 50 squares should be yellow. What fraction with denominator 50 is equivalent to $\frac{3}{10}$?
- (b) If we picked another 10 squares from the bag would we necessarily get 3 yellow squares again?