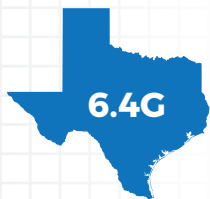


GENERATING EQUIVALENT RATIONAL NUMBERS



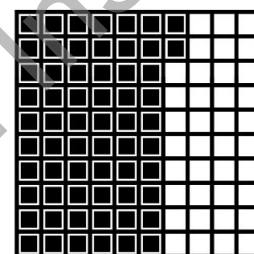
The student is expected to generate equivalent forms of fractions, decimals, and percents using real-world problems, including problems that involve money.



TELL ME MORE...

Rational numbers can be represented using three forms: a fraction, a decimal, or a percent. If these three forms all represent the same quantity, such as 0.62, then the forms are equivalent representations of the same number.

| | |
|--|---|
| | 62 out of 100 squares are shaded in the grid. The model represents the fraction $\frac{62}{100}$ or $\frac{31}{50}$. |
| | 62 out of 100 squares are shaded in the grid. The model represents the decimal 62 hundredths or 0.62. |
| | 62 out of 100 squares are shaded in the grid. The model represents the percent 62%. |



When solving problems, select the form that works best for you in the problem. **Proper fractions**, where the numerator is less than the denominator, are numbers less than 1. Numbers greater than 1 can also be represented using **improper fractions** or **mixed numbers**, decimals, and percents.

| From Fraction to Decimal | From Decimal to Fraction | From Percent to Fraction |
|---|--|---|
| Find an equivalent decimal fraction whose denominator is a power of 10, such as $\frac{7}{20} = \frac{35}{100}$. or Divide the numerator by the denominator. For example, $\frac{7}{20} = 7 \div 20 = 0.35$. | Write the fraction using the place value of the digits in the decimal. Then, simplify to lowest terms as applicable, such as: $0.35 = \frac{35}{100} = \frac{35 \div 5}{100 \div 5} = \frac{7}{20}$ | A percent is an amount out of 100. Use the percent as the numerator in a fraction out of 100. Then, simplify to lowest terms as applicable, such as: $35\% = \frac{35}{100} = \frac{35 \div 5}{100 \div 5} = \frac{7}{20}$ |
| From Fraction to Percent | From Decimal to Percent | From Percent to Decimal |
| Find an equivalent fraction using 100 as the denominator. Then record the numerator of the equivalent fraction as the percent amount. For example: $\frac{5}{8} = \frac{5 \times 50}{8 \times 50} = \frac{250}{400} = \frac{250 \div 4}{400 \div 4} = \frac{62.5}{100}$ $\frac{5}{8} = 62.5\%$ | Because a percent represents a part out of 100, multiply a decimal by 100 to find its equivalent percent. For example: $0.625 \times 100 = 62.5$, so $0.625 = 62.5\%$ | Because a percent represents a part out of 100, divide a percent by 100 to find its equivalent decimal. For example: $62.5 \div 100 = 0.625$, so $62.5\% = 0.625$ |



EXAMPLES

EXAMPLE 1: Mr. Kier planted new bushes in his yard in the spring. Because of a lack of rainfall and yard watering restrictions, only $\frac{19}{50}$ of the plants lived and began to grow by the fall. What percent of Mr. Kier's plants lived?

STEP 1 Write the value as portion out of 100.

$$\frac{19 \times 2}{50 \times 2} = \frac{38}{100}$$

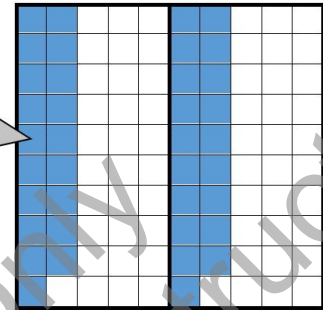
$$\frac{38}{100}$$

STEP 2 Write the percent equivalent to $\frac{38}{100}$.

- A percent is a number of parts out of 100.
- The percent equivalent to $\frac{38}{100}$ is 38%.

38% of the plants lived.

19 out of each 50
is the same as
38 out of 100.



EXAMPLE 2: In a recent month, the town of Muleshoe received 105% of its normal rainfall. What decimal also represents this amount? Record your answer and fill in the bubbles. Be sure to use correct place value.

STEP 1 Divide the percent by 100 to write it as a decimal number.

- $105 \div 100 = 1.05$
- Check the quotient using multiplication:
 $1.05 \times 100 = 105$.

1.05

YOU TRY IT!

Ellen spent \$9 of the \$75 her dad gave her for her birthday on a new book.

What fraction in lowest terms represents the part of the money Ellen spent?

$$\frac{\text{Money Spent}}{\text{Total Amount}} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$$

What decimal value is $\square \overline{) 9.00}$ equivalent to this amount?

$$\begin{array}{r} \square \overline{) 9.00} \\ -75 \\ \hline \end{array}$$

What percent of the money has Ellen spent?

$$\begin{array}{r} \square 0 \\ - \square \\ \hline \end{array}$$

$$\underline{\quad} \times 100 = \underline{\quad} \% \\ \text{decimal}$$

EXAMPLE 3: One liter of dry air contains approximately 0.78 liter of nitrogen. What percent and fraction also represent the amount of nitrogen in one liter of dry air?

STEP 1 Write the decimal as a percent.

- A percent is an amount out of 100.
- Multiply the decimal by 100: $0.78 \times 100 = 78$

78% of the liter of air is nitrogen.

STEP 2 Write the decimal as a fraction then simplify to lowest terms if necessary.

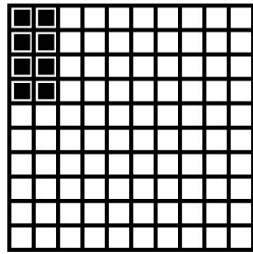
- The decimal is 78 hundredths or 78 out of 100.
- $\frac{78}{100} = \frac{78 \div 2}{100 \div 2} = \frac{39}{50}$

The liter of air is composed of $\frac{39}{50}$ nitrogen.



PRACTICE

Use the model below to answer questions 1 - 3.



1. What fraction does the shaded portion of the grid model?

2. What percent does the shaded portion of the grid model?

3. What decimal does the shaded portion of the grid model?

Use the model below to answer questions 4 - 6.
In this model, one bar is one whole.



4. What fraction does the shaded portion of the diagram model?

5. What decimal does the shaded portion of the diagram model?

6. What percent does the shaded portion of the diagram model?

7. Jana's Flower Shop is offering 15% off all bouquets in vases for a Mother's Day special. What fraction of the price will a customer pay for a bouquet in a vase?
8. Based on his income, Kyle will pay 22% of his gross income in taxes to the federal government annually. What decimal portion of Kyle's gross income is paid in taxes?
9. Lester bought some fabric to use for a project. The fabric piece is 2.75 yards long. What fraction is equivalent to the amount of fabric yards Lester purchased?
10. In a survey 0.52 of the students in a school indicated they preferred chocolate chip cookies over the other choices. What percent of the students preferred a cookie flavor that was NOT chocolate chip?
11. Maxine is buying a new car. She has saved $\frac{1}{3}$ of the price to use as the down payment. What percent of the car's price will she pay as the down payment?
12. Mrs. Hopper is buying lawn equipment. She has a coupon that will give her $\frac{1}{5}$ off the purchase price. What decimal amount represents the discount Mrs. Hopper receives from the coupon?
13. Dave loves the color blue. Of the shirts he owns, $\frac{5}{8}$ are blue. What percent of Dave's shirts are blue?
- A 58%
B 5.8%
C 62.5%
D 6.25%
14. Becca measured her window in order to buy new blinds to cover the window. The window measured 5.9375 feet. What fraction is equivalent to the window width in feet?
- F $5\frac{15}{16}$ ft.
G $5\frac{6}{25}$ ft.
H $5\frac{3}{80}$ ft.
J $5\frac{31}{25}$ ft.