

## Decimals, Fractions, and Percents

### I. Decimals

#### A. Converting Decimals into Fractions

1. Put the entire number into the numerator of the fraction with the decimal removed.
2. Count the number of digits after the decimal point and place a 1 followed by that many zeros in the denominator in the fraction.
3. Reduce the fraction if possible (see our Fractions handout for additional help in reducing fractions).

a) Example 1: Convert 8.453 into a fraction.

$$8.453 = \frac{8453}{1000}$$

b) Example 2: Convert 0.04 into a fraction.

$$0.04 = \frac{4}{100}$$

Reduce to  $\frac{1}{25}$

#### B. Converting Decimals into Percents

1. Move the decimal point two places to the right.

a) Example 3: Convert 1.3 into a percent.

$$1.\overset{\curvearrowright}{3}\overset{\curvearrowright}{0} = 130\%$$

b) Example 4: Convert 0.04 into a percent.

$$0.\overset{\curvearrowright}{0}\overset{\curvearrowright}{4} = 4\%$$

## II. Fractions

### A. Converting Fractions into Decimals

1. Divide the numerator of the fraction by the denominator.
2. If you get a remainder, write a zero next to the remainder and continue dividing. Remember to include the decimal place both under the division sign in the numerator and above the division sign in your answer.
3. Continue dividing until you get a repeating decimal or until the division ends (you have no remainder).

a) Example 5: Convert  $\frac{5}{8}$  into a decimal.

$$\begin{array}{r}
 0.625\dots \\
 8 \overline{)5.000} \\
 \underline{-48} \phantom{00} \\
 20 \phantom{00} \\
 \underline{-16} \phantom{00} \\
 40 \phantom{00} \\
 \underline{-40} \phantom{00} \\
 0
 \end{array}$$

b) Example 6: Convert  $\frac{2}{9}$  into a decimal.

$$\begin{array}{r}
 0.222\dots \\
 9 \overline{)2.000} \\
 \underline{-18} \phantom{00} \\
 20 \phantom{00} \\
 \underline{-18} \phantom{00} \\
 20 \phantom{00} \\
 \underline{-18} \phantom{00} \\
 \vdots
 \end{array}$$

Therefore:  $\frac{2}{9} = 0.\overline{2}$

B. Converting Fractions into Percents

1. There are two ways to do this.

1. One way is to first convert the fraction into a decimal, and then convert that decimal into a percent.

(1) Example 7: Convert  $\frac{2}{3}$  into a percent.

$$\begin{array}{r} .666\dots \\ 3 \overline{)2.000} \\ \underline{-18} \\ 20 \\ \underline{-18} \\ 20 \\ \underline{-18} \\ \vdots \end{array} \quad 0.\overset{\curvearrowright}{6}\overset{\curvearrowright}{6}\overset{\curvearrowright}{6} = 66.6\%$$

2. The other way is to set up a proportion with the fraction set equal to x over 100. To solve a proportion, you cross multiply and set the two results equal to each other. Then solve the equation.

(1) Example 8: Convert  $\frac{2}{3}$  into a percent.

$$\begin{aligned} \frac{2}{3} &= \frac{x}{100} \\ 2 \times 100 &= 3x \\ 200 &= 3x \\ \frac{200}{3} &= x \quad \text{or} \quad x = 66.\overline{6}\% \end{aligned}$$

III. Percents

A. Converting Percents into Decimals

1. Move the decimal point two places to the left.

a) Example 9: Convert 48.3% into a decimal

$$48.\overset{\curvearrowright}{3} = 0.483$$

b) Example 10: Convert 7% into a decimal

$$07.\overset{\curvearrowright}{\phantom{0}} = 0.07$$

## B. Converting Percents into Fractions

1. There are two ways to convert a percent into a fraction.

- a) One way is to first convert the percent into a decimal. Then convert that decimal into a fraction. Once you have your fraction, reduce the fraction if possible (if you need help reducing fractions, see our Fractions handout).

(1) Example 11: Convert 15% into a fraction

$$15\% = 0.15$$

↖ ↗

$$\frac{15}{100} = \frac{3}{20}$$

- b) Another way is to put the percent over 100. If there is a decimal in the percent, add an extra zero to 100 for each number after the decimal point. Then reduce.

(1) Example 11: Convert 34% into a fraction.

$$34\% = \frac{34}{100} = \frac{17}{50}$$

(2) Example 12: Convert 2.35% into a fraction.

$$2.35\% = \frac{2.35}{100} = \frac{235}{10000} = \frac{47}{2000}$$

## Sample Problems

Convert each decimal into a fraction.

- |         |          |          |
|---------|----------|----------|
| 1. 0.57 | 3. 1.2   | 5. 15.75 |
| 2. 0.06 | 4. 0.036 | 6. 8.16  |

Convert each decimal into a percent.

- |          |             |          |
|----------|-------------|----------|
| 7. 0.67  | 9. 0.000007 | 11. 0.04 |
| 8. 1.009 | 10. 0.952   | 12. 1    |

Convert each fraction into a decimal.

- |                     |                     |                     |
|---------------------|---------------------|---------------------|
| 13. $\frac{3}{4}$   | 15. $\frac{25}{9}$  | 17. $\frac{11}{24}$ |
| 14. $\frac{99}{15}$ | 16. $\frac{51}{16}$ | 18. $\frac{1}{3}$   |

Convert each fraction into a percent.

- |                    |                    |                    |
|--------------------|--------------------|--------------------|
| 19. $\frac{7}{8}$  | 21. $\frac{1}{8}$  | 23. $\frac{5}{64}$ |
| 20. $\frac{15}{2}$ | 22. $\frac{7}{16}$ | 24. $\frac{1}{3}$  |

Convert each percent into a decimal.

- |           |          |                    |
|-----------|----------|--------------------|
| 25. 51%   | 27. 6%   | 29. 0.17%          |
| 26. 31.2% | 28. 410% | 30. $23.\bar{3}\%$ |

Convert each percent into a fraction.

- |         |          |           |
|---------|----------|-----------|
| 31. 31% | 33. 0.5% | 35. 7.75% |
| 32. 65% | 34. 220% | 36. 100%  |

## Answers

Convert each decimal into a fraction.

1.  $\frac{57}{100}$

3.  $\frac{6}{5}$

5.  $\frac{63}{4}$

2.  $\frac{3}{50}$

4.  $\frac{9}{250}$

6.  $\frac{204}{25}$

Convert each decimal into a percent.

7.  $67\%$

9.  $0.0007\%$

11.  $4\%$

8.  $100.9\%$

10.  $95.2\%$

12.  $100\%$

Convert each fraction into a decimal.

13.  $0.75$

15.  $2.\bar{7}$

17.  $0.458\bar{3}$

14.  $6.6$

16.  $3.1875$

18.  $0.\bar{3}$

Convert each fraction into a percent.

19.  $87.5\%$

21.  $12.5\%$

23.  $7.8125\%$

20.  $750\%$

22.  $43.75\%$

24.  $33.\bar{3}\%$

Convert each percent into a decimal.

25.  $0.51$

27.  $0.06$

29.  $0.0017$

26.  $0.312$

28.  $4.10$

30.  $0.2\bar{3}$

Convert each percent into a fraction.

31.  $\frac{31}{100}$

33.  $\frac{1}{200}$

35.  $\frac{31}{400}$

32.  $\frac{13}{20}$

34.  $\frac{11}{5}$

36.  $1$