

COMPACTED MATHEMATICS

CHAPTER 7B

RATIOS, PROPORTIONS, AND PERCENTAGES

TOPICS COVERED:

- Percentage basics
- Rational numbers
- Fraction, decimal, and percent conversions

So what is a percent anyway? It is simply a fraction! Decimals are fractions whose denominators are powers of ten (tenths, hundredths, etc.). Percents are an even smaller set of fractions that have denominators of 100. Think of other words that have the root “cent” that mean 100. Century, centimeter, centennial, centigrade, and even 100 cents make a dollar! Businesses use percents to determine profits, costs, and loses. Bankers use percents to compute interest. Taxes are all determined using percents. In basketball you have a free throw percents, in football quarterbacks complete a certain percent of their passes. Big sales (50% off!) are in percents and even your math grade on your report card is a percent! Percent comes from Latin “per centum.” Per means out of and centum means one hundred. Thus, percent means out of one hundred.

$\frac{23}{100}$ is a fraction that represents 23 out of 100.

0.23 is a decimal that represents 23 out of 100.

23% is a percent that represents 23 out of 100. $\frac{23}{100} = 0.23 = 23\%$

Shade in the indicated amount. Then write the fraction as a decimal and a percent.

$\frac{12}{100} = \underline{\hspace{1cm}} = \underline{\hspace{1cm}}\%$

$\frac{7}{100} = \underline{\hspace{1cm}} = \underline{\hspace{1cm}}\%$

$\frac{35}{100} = \underline{\hspace{1cm}} = \underline{\hspace{1cm}}\%$

Shade in the indicated factors. Then write a fraction in lowest terms, a decimal, and a percent.

Numbers that have 2 as a factor

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Numbers that have 3 as a factor

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

$\frac{\hspace{1cm}}{100} = \underline{\hspace{1cm}} = \underline{\hspace{1cm}}\%$

$\frac{\hspace{1cm}}{100} = \underline{\hspace{1cm}} = \underline{\hspace{1cm}}\%$

Activity 7-18	Steps for fraction, decimal, percentage conversions	NAME:
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Percent to Decimal	Decimal to Percent
Percent to Fraction	Fraction to Percent
Decimal to Fraction	Fraction to Decimal

Converting percentages to fractions

Percent to a fraction	Write the percent number over 100 and simplify
	<p><i>Example 1:</i> $78\% = \frac{78}{100} = \frac{39}{50}$</p> <p><i>Example 2:</i> $6.2\% = \frac{6.2}{100} \cdot \frac{10}{10} = \frac{62}{1000} = \frac{31}{500}$</p>

Convert the following percents to fractions in simplest form.

1.	84%		2.	35%		3.	7%	
4.	80%		5.	10%		6.	99%	
7.	75%		8.	95%		9.	64%	
10.	50%		11.	4%		12.	28%	
13.	51%		14.	91%		15.	57%	
16.	33%		17.	48%		18.	18%	
19.	1.8%		20.	15.75%		21.	0.05%	
22.	12.5%		23.	1.3%		24.	23.46%	



Convert the following percents to fractions in simplest form.

25.	Mr. Underwood made 72% of his free throws. What fraction did he make?	
26.	Mr. Mangham ate 58% of the Little Debbies in his classroom. What fraction did he eat?	
27.	George W. Bush has a 73% approval rating from the American public. What fraction approve of President Bush?	
28.	64% of Carroll ISD students like french fries. What fraction of students do NOT like french fries?	
29.	99.8% of all DVD's players have no malfunctions in their first year. What fraction have no malfunctions in their first year?	

Activity 7-20	Percentages <-> Decimals	NAME:
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Converting percentages to decimals and decimals to percentages

When converting between percents and decimals, the Dr. Pepper Method serves as a reminder of which way to move the decimal.

<p>Decimal to a percentage</p>	<p><i>The Dr. Pepper (DP) Method</i></p>  <p>When converting a decimal to a percent, move the decimal point two places to the right.</p> <p>Ex. $3.427 = 342.7\%$</p>
<p>Percentage to a decimal</p>	<p><i>The Dr. Pepper (DP) Method</i></p>  <p>When converting a percent to a decimal, move the decimal point two places to the left.</p> <p>Ex. $2.4\% = 0.024$</p>

Convert between the following decimals and percentages.

1.	65%		2.	70%		3.	5%		4.	9%	
5.	15.7%		6.	3.4%		7.	0.5%		8.	220%	
9.	0.05		10.	0.3		11.	2		12.	0.025	
13.	0.525		14.	0.005		15.	0.09		16.	0.6	
17.	3.5		18.	1.515		19.	.25		20.	0.00625	
21.	42%		22.	18%		23.	77%		24.	4.2%	
25.	1.8%		26.	9%		27.	2%		28.	5%	
29.	20%		30.	50%		31.	0.38		32.	0.94	
33.	0.75		34.	0.094		35.	0.075		36.	0.04	
37.	0.08		38.	55		39.	0.8		40.	4.1	

Activity 7-21	Decimals -> Fractions	NAME:
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Decimal to a fraction	Simply read the decimal the correct way and simplify
	Ex. .318 = three hundred eighteen thousandths = $\frac{318}{1000}$
	$\frac{318}{1000} = \frac{159}{500}$

Write each decimal as a fraction or mixed number in simplest form.

1.	0.2		2.	0.28		3.	0.05	
4.	0.3		5.	0.06		6.	4.75	
7.	9.8		8.	0.625		9.	0.45	
10.	3.15		11.	7.6		12.	0.004	
13.	0.6		14.	1.25		15.	0.74	
16.	0.29		17.	0.635		18.	0.8	
19.	6.16		20.	0.95		21.	0.645	
22.	0.782		23.	0.493		24.	0.758	
25.	0.33		26.	0.47		27.	0.04	
28.	0.002		29.	0.65		30.	0.16	

Activity 7-22	Fractions -> Decimals	NAME:
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Converting fractions to decimals

Fraction to a decimal	Divide!
	<i>Example 1:</i> $\frac{3}{5} = 3 \div 5 = .6$
	If the decimal keeps repeating use bar notation.
	<i>Example 2:</i> $\frac{2}{3} = 2 \div 3 = \overline{.6}$

Write each repeating decimal using bar notation.

1.	0.22222...		2.	0.41666...		3.	0.54545...	
4.	0.6363...		5.	0.2727...		6.	0.428572428...	

Express each fraction or mixed number as a decimal. Use bar notation to show a repeating decimal.

7.	$\frac{4}{9}$		8.	$1\frac{7}{18}$		9.	$\frac{5}{7}$	
10.	$2\frac{3}{16}$		11.	$6\frac{1}{12}$		12.	$\frac{8}{11}$	
13.	$9\frac{2}{5}$		14.	$7\frac{1}{18}$		15.	$3\frac{24}{25}$	
16.	$4\frac{1}{6}$		17.	$\frac{6}{7}$		18.	$5\frac{8}{9}$	
19.	$8\frac{2}{3}$		20.	$\frac{5}{16}$		21.	$\frac{9}{11}$	
22.	$10\frac{17}{20}$		23.	$2\frac{11}{18}$		24.	$6\frac{2}{7}$	
25.	$14\frac{5}{8}$		26.	$\frac{3}{13}$		27.	$7\frac{9}{10}$	
28.	$\frac{7}{12}$		29.	$\frac{11}{16}$		30.	$1\frac{5}{9}$	

Activity 7-23	Fractions -> Percentages	NAME:
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Fraction to a percentage	Convert the fraction to a decimal and then the decimal to a percent.
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Convert each fraction as a percent.

1.	$\frac{1}{2}$		2.	$\frac{1}{4}$		3.	$\frac{3}{4}$	
4.	$\frac{1}{5}$		5.	$\frac{2}{5}$		6.	$\frac{3}{5}$	
7.	$\frac{4}{5}$		8.	$\frac{1}{10}$		9.	$\frac{3}{10}$	
10.	$\frac{7}{10}$		11.	$\frac{9}{10}$		12.	$\frac{1}{8}$	
13.	$\frac{3}{8}$		14.	$\frac{5}{8}$		15.	$\frac{7}{8}$	
16.	$\frac{1}{3}$		17.	$\frac{2}{3}$		18.	$\frac{1}{100}$	
19.	1		20.	$\frac{19}{20}$		21.	$3\frac{23}{50}$	
22.	$\frac{19}{25}$		23.	$3\frac{8}{9}$		24.	$\frac{24}{40}$	

Write <, >, or = to make each sentence true.

25.	$\frac{1}{4}$	$\frac{9}{40}$	26.	$11\frac{13}{40}$	$11\frac{3}{8}$
27.	$1\frac{3}{8}$	1.375	28.	$\frac{2}{25}$	$\frac{22}{250}$
29.	2.78	$2\frac{39}{50}$	30.	$\frac{3}{10}$	$\frac{29}{100}$



Convert between fractions, decimals, and percentages to complete the table below.

	Fraction (simplified)	Decimal	Percent
1./2.			Taco Bells has 2.2% of the fast food market.
3./4.			McDonalds has 7.8% of the fast food market.
5./6.			Dairy Queen has 1.2% of the fast food market.
7./8.			1.5%
9./10.			150%
11./12.		Dominoes has 0.011 of the fast food market.	
13./14.		Subway has 0.013 of the fast food market.	
15./16.		KFC has 0.018 of the fast food market.	
17./18.		Burger King has 0.034 of the fast food market.	
19./20.		1.25	
21./22.	Pizza Hut has $\frac{1}{40}$ of the fast food market.		
23./24.	Hardees has $\frac{3}{200}$ of the fast food market.		
25./26.	Wendys has $\frac{1}{50}$ of the fast food market.		
27./28.	$\frac{24}{25}$		
29./30.	$\frac{16}{25}$		

On a separate sheet of paper, place the following numbers in order from greatest to least.

31.	$0.875, \frac{9}{10}, \frac{15}{16}, 0.98, 100\%, 9\%$	32.	$75\%, 0.55, \frac{13}{20}, 45\%, \frac{17}{20}$
33.	$1\%, 0.001, \frac{1}{99}, \frac{1}{101}, 0.1$	34.	$0.9, 85\%, \frac{9}{10}\%, \frac{1}{2}$
35.	On your separate paper rank the top 9 fast food restaurants listed above in order of market share (greatest to least).		

Activity	Fractions, Decimals, Percents	NAME:
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Fraction, Decimal, Percentage Conversions	
Percent to a fraction	<p>Write the percent number over 100 and simplify</p> <p>Ex. $78\% = \frac{78}{100} = \frac{39}{50}$</p>
Decimal to a percentage	<p><i>The Dr. Pepper (DP) Method</i></p> <p></p> <p>When converting a decimal to a percent, move the decimal point two places to the right.</p> <p>Ex. $3.427 = 342.7\%$</p>
Percentage to a decimal	<p><i>The Dr. Pepper (DP) Method</i></p> <p></p> <p>When converting a percent to a decimal, move the decimal point two places to the left.</p> <p>Ex. $0.024 = 2.4\%$</p>
Decimal to a fraction	<p>Simply read the decimal the correct way and simplify</p> <p>Ex. $.318 = \text{three hundred eighteen thousandths} = \frac{318}{1000}$</p> <p>$\frac{318}{1000} = \frac{159}{500}$</p>
Fraction to a decimal	<p>Divide!</p> <p>Ex. $\frac{3}{5} = 3 \div 5 = .6$</p> <p>If the decimal keeps repeating use bar notation.</p> <p>Ex. $\frac{2}{3} = 2 \div 3 = .\overline{6}$</p>
Fraction to a percentage	<p>Convert the fraction to a decimal and then the decimal to a percent OR set up a proportion.</p> <p>Ex. $\frac{3}{5}$ so, $\frac{3}{5} = \frac{x}{100}$, $x = 60\%$</p>

Activity 7-25: **Pizza Proportions**

Name: _____

Pizza Restaurant Name	
Owner of the restaurant	
Cook	
Cashier	
Trash person	
Hours of operation	
Number of pizzas made in 2 hours	
Special pizza sale	
Amount of trash	

Proportion to solve the number of pizzas made each day:

Proportion to solve the cost of the birthday pizzas:

Proportion to solve the total amount of trash:

A scale gives the relationship between the measurements on the scale drawing or model and the measurements of the real object.

Example: A map shows a scale of 0.5 inches = 6 miles. The distance between Southlake and Ft. Worth on the map is 3.5 inches. What is the actual distance?

$$\frac{0.5}{6} = \frac{3.5}{x}$$

$$0.5x = 6 \cdot 3.5$$

$$\frac{0.5x}{0.5} = \frac{21}{0.5}$$

$$x = 42 \text{ miles}$$

On a set of architectural drawings for an office building, the scale is 0.25 inches = 5 feet. Find the actual length of each room.

1.	Lobby	1.6 in		2.	CEO Office	1.35 in	
3.	Copy Room	0.55 in		4.	Secretary Office	0.6 in	
5.	VP Office	0.9 in		6.	Library	1.525 in	
7.	Storage Area	2.1125 in		8.	Manager Office	0.625 in	
9.	Conference Room	2.62 in		10.	Cafeteria	2.3 in	
11.	Kitchen	2 in		12.	Mail Room	2.2625 in	

On a set of architectural drawings for a new school building, the scale is $\frac{1}{4}$ inch = 2 feet (or 0.25 inches = 2 feet).

Find the missing lengths in the table.

13.	Principal's Office	1.25 in	
14.	Library		16 ft
15.	School Room	3 in	
16.	Science Lab	1.5 in	
17.	Cafeteria		48 ft
18.	Music Room	4 in	
19.	Gym		56 ft
20.	Teacher's Lounge	1.75 in	

Genetic traits are characteristics that are passed from the parents to their children. Children receive half of their traits from their mother and half from their father. Some traits have a wide variety (eye color, hair color), while others have only two possible forms. In this activity you will identify some common genetic traits and find the percent of students in our class that possess each.

Complete the table below with your partner.

Trait	Description	You	Class Total	
Handedness	(A) Left or (B) Right			
Hairline	(A) Straight or (B) Peaked			
Dimples	(A) Yes or (B) No			
Freckles	(A) Yes or (B) No			
Hair Whorl	(A) Clockwise or (B) Counterclockwise			
Ear Lobe	(A) Free or (B) Attached			
Tongue	(A) Roller or (B) Non-roller			

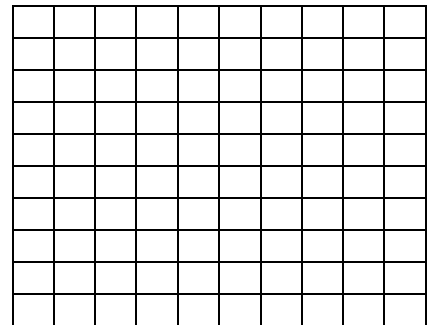
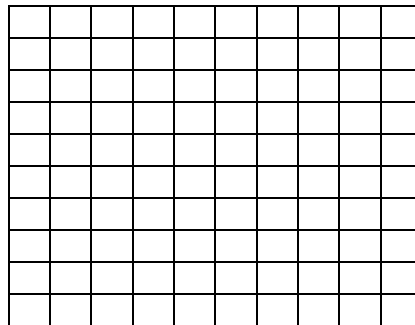
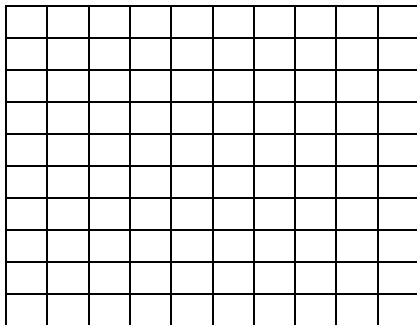
Find the percent of each trait in the class and complete the table below. Round to the nearest tenth.

Trait	Class Percent			
Handedness	Left		Right	
Hairline	Straight		Peaked	
Dimples	Yes		No	
Freckles	Yes		No	
Hair Whorl	Clockwise		Counterclockwise	
Ear Lobe	Free		Attached	
Tongue	Roller		Non-roller	

1.	Do the traits add up to 100%? Explain why or why not?	
2.	What is the most common trait in our class?	
3.	Do we have any traits evenly distributed throughout our class?	

For each grid select from below a different combination of numbers whose sum is 100%. An item may be only used once in a combination, but may be used again in a different combination. Write your selection on the line below each grid. Shade the squares in the grid with a different color for each number selected.

68%	$\frac{1}{2}$	60%	$\frac{1}{20}$	1%	0.9	0.04	$\frac{13}{20}$
$\frac{1}{7}$	16%	55%	0.02	$\frac{3}{25}$	0.15	$\frac{1}{9}$	24%
0.44	0.06	$\frac{1}{8}$	29%	0.037	$\frac{1}{6}$	19%	$\frac{1}{4}$
$\frac{1}{3}$	$\frac{17}{50}$						



You are helping with a bike race. There are three statements about the bike race below. Draw a picture to represent each statement. Use one of each of the three models for fractions: area, group, and length.

Statement 1: The bike race is $\frac{3}{8}$ of a mile.

Statement 2: 52% of the bike riders are women.

Statement 3: This is the first bike race for three out of every eight people in the bike race.
