NS8-53: Percents

A **percent** is a ratio that compares a number to 100. The term "percent" means "out of 100" or "for every 100." For instance, 84% on a test means 84 out of 100.

You can think of percent as a short form for a fraction with 100 in the denominator:

Example: $45\% = \frac{45}{100}$

1. Write the following percents as fractions:

   a) 17% b) 34% c) 10% d) 29%

   e) 45% f) 100% g) 1% h) 80%

2. Write the following fractions as percents:

   a) $\frac{50}{100}$ b) $\frac{46}{100}$ c) $\frac{62}{100}$ d) $\frac{100}{100}$

   e) $\frac{25}{100}$ f) $\frac{99}{100}$ g) $\frac{90}{100}$ h) $\frac{1}{100}$

3. Write the following decimals as percents, by first turning them into fractions. The first one has been done for you:

   a) $.72 = \frac{72}{100} = 72\%$ b) .54 c) .09

4. Write the fraction as a percent by changing it to a fraction over 100. The first one has been done for you:

   a) $\frac{3 \times 20}{5 \times 20} = \frac{60}{100} = 60\%$ b) $\frac{4}{5}$

   c) $\frac{5}{5}$ d) $\frac{9}{10}$

   e) $\frac{3}{4}$ f) $\frac{1}{2}$

   g) $\frac{1}{10}$ h) $\frac{3}{20}$

   i) $\frac{13}{20}$ j) $\frac{8}{25}$

   k) $\frac{18}{25}$ l) $\frac{24}{25}$

   m) $\frac{37}{50}$ n) $\frac{43}{50}$

5. Write the following decimals as percents. The first one has been done for you:

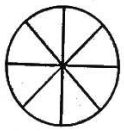
a) $.2 = \frac{2}{10} \times \frac{10}{10} = \frac{20}{100} = 20\%$

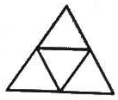
b) .3

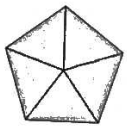
c) .4

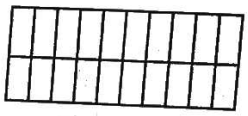
d) .8

6. What percent of the figure is shaded?

a) 

b) 

c) 

d) 

7. Change the following fractions to percents by first reducing them to lowest terms:

a) $\frac{9}{15} \div \frac{3}{3} = \frac{3}{5} = \frac{3}{5} \times \frac{20}{20} = \frac{60}{100} = 60\%$

b) $\frac{3}{15}$

c) $\frac{9}{18}$

d) $\frac{6}{24}$

e) $\frac{24}{32}$

f) $\frac{36}{45}$

g) $\frac{24}{60}$

h) $\frac{22}{40}$

i) $\frac{32}{80}$

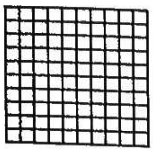
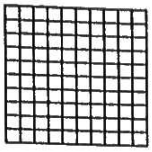
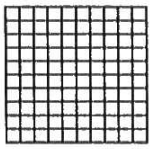
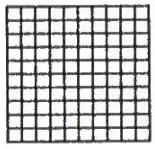
j) $\frac{28}{56}$

k) $\frac{75}{150}$

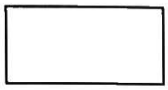
l) $\frac{60}{75}$

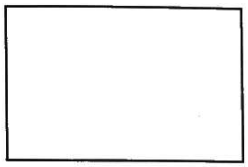
NS8-54: Visual Representations of Percents

1. Fill in the chart below. The first one has been done for you:

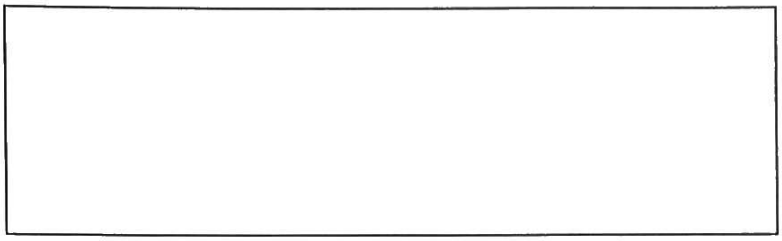
Drawing				
Fraction	$\frac{23}{100}$	$\frac{\quad}{100}$	$\frac{35}{100}$	$\frac{\quad}{100}$
Decimal	0.23	0.__	0.__	0.39
Percent	23%	74%	____ %	____ %

2. Shade 50% of each box:

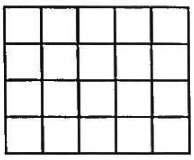
a) 

b) 

3. Colour 50% of the rectangle blue, 30% red, and 20% green:



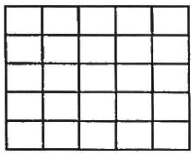
4. Write a fraction for each part shaded. Then write the fraction with a denominator of 100. Then write a decimal and a percent for each:

a) 

Fraction ____

Fraction with denominator 100 ____

decimal _____ percent _____

b) 

Fraction ____

Fraction with denominator 100 ____

decimal _____ percent _____

5. Extend each line segment to show 100%:

a) 50%

b) 20%

c) 20%

d) 75%

e) 0% 60%

f) 0% 80%

g) 0% 30%

h) 0% 50%

1. Write < or > or = between the following pairs of numbers. First change each pair of numbers to a pair of fractions with the same denominator. The first one is done for you:

a)

$\frac{1}{2}$	47%
$\frac{50 \times 1}{50 \times 2}$	$\frac{47}{100}$
$\frac{50}{100} > \frac{47}{100}$	

b)

$\frac{1}{2}$	49%

c)

$\frac{3}{5}$	66%

d)

.37	73%

e)

.02	20%

f)

$\frac{1}{10}$	10%

g)

$\frac{19}{20}$	98%

h)

$\frac{27}{50}$	54%

i)

.9	9%

j)

$\frac{17}{25}$	68%

k)

$\frac{13}{20}$	65%

l)

.42	42%

2. Complete the charts

Fraction	Decimal	Percent
$\frac{2}{5}$		
	.75	
$\frac{11}{20}$		
		70%

Fraction	Decimal	Percent
	.30	
$\frac{12}{16}$		
		25%
	.85	

3. In your notebook, write each set of numbers in order from least to greatest, by first changing each number to a fraction

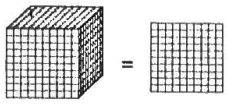
a) $\frac{1}{5}$, 22% , .15

b) $\frac{1}{4}$, .50 , 43%

c) $\frac{1}{10}$, .01 , 15%

d) $\frac{2}{3}$, 60% , .57

If you use a thousands cube to represent 1 whole, you can see that taking $\frac{1}{10}$ of a number is the same as dividing by 10 (the decimal shifts one place left):

$\frac{1}{10}$ of  =

$\frac{1}{10}$ of 1 = .1

$\frac{1}{10}$ of  =

$\frac{1}{10}$ of .1 = .01

$\frac{1}{10}$ of  =

$\frac{1}{10}$ of .01 = .001

---

1. Find $\frac{1}{10}$ of the following numbers by shifting the decimal. Write your answers in the boxes provided:

a) 7 b) 10 c) 35 d) 210 e) 6.4 f) 50.6

2. 10% is short for $\frac{10}{100}$ or $\frac{1}{10}$. Find 10% of the following numbers:

a) 1 b) 3.9 c) 4.05 d) 6.74 e) .09 f) 60.08

3. You can find percents that are multiples of 10 as follows:

Example: Finding 30% of 21 is the same as finding 10% of 21 and multiplying the result by 3:

Step 1 10% of 21 = 2.1

Step 2 3 × 2.1 = 6.3 So 30% of 21 = 6.3.

Find the percents using the method above:

a) 30% of 15

i) 10% of 15 = ☐

ii) 3 × ☐ = ____

b) 50% of 24

i) 10% of ____ = ☐

ii) ____ × ☐ = ____

c) 20% of 7.8

i) 10% of ____ = ☐

ii) ____ × ☐ = ____

d) 40% of 75

i) 10% of ____ = ☐

ii) ____ × ☐ = ____

e) 90% of 86

i) 10% of ____ = ☐

ii) ____ × ☐ = ____

f) 80% of .5

i) 10% of ____ = ☐

ii) ____ × ☐ = ____

NS8-57: Finding Percents (Advanced)

35% is short for $\frac{35}{100}$. To find 35% of 27, Sadie finds $\frac{35}{100}$ of 27.

Step 1 She multiplies 27 by 35.

2	3		
	2	7	
x	3	5	
1	3	5	
8	1	0	
9	4	5	

Step 2 She divides the result by 100.

945 ÷ 100 = 9.45

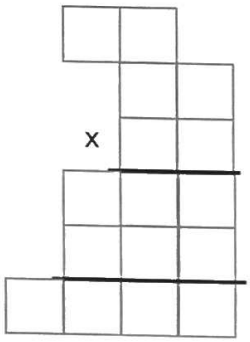
So 35% of 27 is 9.45.

---

1. Find the following percents using Sadie's method:

   a) **25% of 44**

   Step 1:



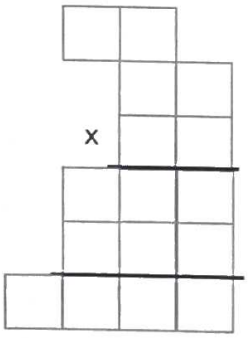
   Step 2:

   _____ ÷ 100 =

   So _____ of _____ is _____.

   b) **18% of 92**

   Step 1:



   Step 2:

   _____ ÷ 100 =

   So _____ of _____ is _____.

Answer the following questions in your notebook.

2. Find the following percents using Sadie's method:

   a) 23% of 23 b) 15% of 26 c) 26% of 15 d) 64% of 58

   e) 58% of 64 f) 50% of 81 g) 81% of 50 h) 92% of 11

3. 25% is equal to $\frac{1}{4}$ and 75% is equal to $\frac{3}{4}$. Find:

   a) 25% of 80 b) 25% of 28 c) 25% of 156 d) 75% of 60 e) 75% of 244

2. 3 is what percent of 20? You can find out by writing a ratio. Write a ratio to answer the following questions:
HINT: You will have to reduce some ratios.

The part goes here → $\frac{3}{20} = \frac{?}{100} \Rightarrow \frac{3}{20} = \frac{15}{100}$ ← *The whole goes here*

So 3 is 15% of 20.

a) 5 is what percent of 25?
b) 17 is what percent of 20?
c) 4 is what percent of 5?
d) 7 is what percent of 14?
e) 16 is what percent of 48?
f) What percent of 20 is 13?

3. Students in a class were asked to choose one sport to participate in for a sports day:

a) Complete the chart.

b) How many students are in the class?

Sport	Fraction of Class that chose the sport	Percent	Decimal	Number of Students that chose the sport
Soccer	$\frac{1}{5}$			4
Swimming		40 %		
Baseball				
Gymnastics			.15	

4. Find each amount by using a ratio or decimal multiplication:

a) What is 22% of 70?
b) What is15% of 9?
c) What percent of 50 is 10?
d) What percent of 20 is 9?
e) What percent of 25 is 6?
f) What is 18% of 42%?

5. Grasslands make up 2.5% of the habitat of birds in North America; 2.5% is short for $\frac{2.5}{100}$.

If you multiply the numerator and denominator by 10, you get a proper fraction: $\frac{2.5 \times 10}{100 \times 10} = \frac{25}{1000} = \frac{1}{40}$

Express each percent as a proper fraction and reduce to lowest terms:

a) 17.5%
b) .7%
c) 6.4%
d) .04%

6. a) Change the following decimals to percents:

i) $.235 = \frac{235}{1000} = \frac{235}{1000} \overset{\div 10}{\underset{\div 10}{}} = \frac{23.5}{100} = 23.5\%$
ii) .273
iii) .848
iv) .369

b) Change the following fractions to decimals by long division. Express your answers as percents:

i) $\frac{7}{20}$
ii) $\frac{11}{20}$
iii) $\frac{3}{8}$
iv) $\frac{5}{8}$

7. After a 10% discount, a book costs $27.00. How much does the book cost without the discount?