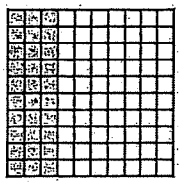
NS7-64 Percents

The words "per cent" mean "out of 100." A percent is a ratio that compares a number or amount to 100. The symbol for percent is %. Example: $45\% = 45 : 100 = \frac{45}{100}$

1. a) 30 out of 100 squares are shaded. The ratio of shaded squares to all squares is ____ : 100.

So, ____% of the grid is shaded.



b) 47 out of 100 letters are Bs. The ratio of Bs to all letters in the set is ____ : 100.

So, ____% of the letters are Bs.

ABBBCCBBAABBCABBBCCB
AAABBBCCBBAABAAABBBC
CBCABBBCCBBBCCBBAAAB
BAAABBABCBBAABCCBBAB
BCCBAABBAAAABBCCABAA

2. Write the ratio as a percent.

a) 20 : 100 = ____% b) 63 : 100 = ____% c) 5 : 100 = ____% d) 55 : 100 = ____%

3. Write the percent as a ratio.

a) 30% = ____ : *100* b) 12% = ____ : ____ c) 25% = ____ : ____ d) 34% = ____ : ____

4. Write the ratio as a fraction and as a percent.

a) $50 : 100 = \frac{\quad}{100} =$ ____% b) $10 : 100 = \frac{\quad}{100} =$ ____%

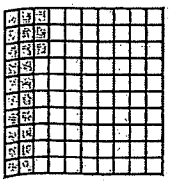
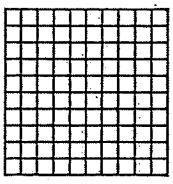
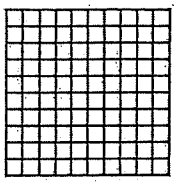
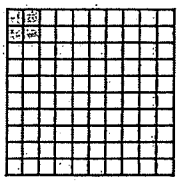
5. Write the fraction as a percent.

a) $\frac{40}{100} =$ ____% b) $\frac{28}{100} =$ ____% c) $\frac{43}{100} =$ d) $\frac{1}{100} =$ e) $\frac{10}{100} =$

6. Write the percent as a fraction.

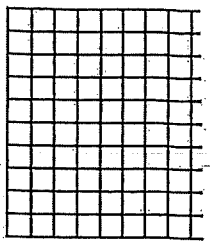
a) $11\% = \frac{\quad}{100}$ b) $89\% = \frac{\quad}{100}$ c) 9% = d) 75% = e) 100% =

7. Complete the chart.

Drawing				
Fraction	$\frac{23}{100}$	$\frac{\quad}{100}$	$\frac{45}{100}$	$\frac{\quad}{100}$
Percent	23%	63%	____%	____%

NS7-65 Adding and Subtracting Percents

1. There are 100 squares on the grid.



Colour 10 out of 100 squares red. The red area is ____% of the grid.

Colour 40 out of 100 squares blue. The blue area is ____% of the grid.

There are now 10 + 40 = ____ coloured squares on the grid.

So, ____% of the grid is coloured.

2. Write the percents as fractions. Add or subtract. Then write the sum or difference as a percent.

a) $30\% + 20\% = \frac{\quad}{100} + \frac{\quad}{100} = \frac{\quad}{100} = \_\_\_\_\%$

b) $10\% + 50\% = \frac{\quad}{100} + \frac{\quad}{100} = \frac{\quad}{100} = \_\_\_\_\%$

c) $50\% - 25\% = \frac{\quad}{100} - \frac{\quad}{100} = \frac{\quad}{100} = \_\_\_\_\%$

d) $70\% - 30\% = \frac{\quad}{100} - \frac{\quad}{100} = \frac{\quad}{100} = \_\_\_\_\%$

3. Calculate.

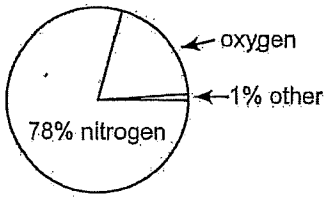
a) 12% + 20% = ____%

b) 33% + 44% = ____%

c) 56% − 23% + 8% = ____%

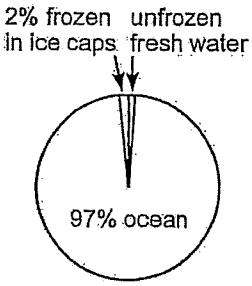
4. Determine the missing percent in the circle graph. The whole circle represents 100%.

a) **Gases in Earth's Atmosphere**



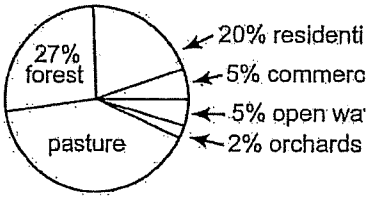
oxygen: _____%

b) **Composition of Earth's Water**



unfrozen fresh water: _____%

c) **Land Cover in North America**



pasture: _____%

5. a) The ratio of cents in a penny to cents in a dollar is 1 : 100, so a penny is ____% of a dollar.

The ratio of cents in a dime to cents in a dollar is ____ : 100, so a dime is ____% of a dollar.

A quarter is ____ cents out of 100, so a quarter is ____% of a dollar.

b) What percent of a dollar is 35 cents? _____%

What percent of a dollar is two pennies and two quarters? ____%

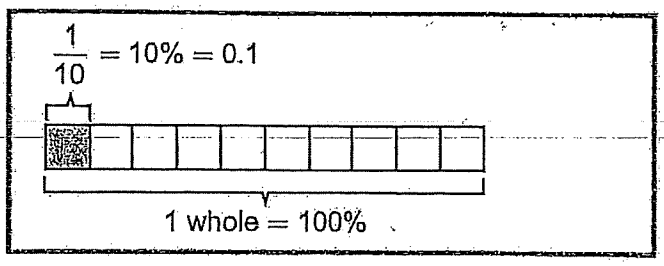
c) You have a dollar and you spend 26¢. What percent of the dollar do you have left? ____%

NS7-66 Tenths, Decimals, and Percents

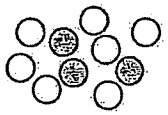
1. Shade the percent.

a) 50%

b) 30%

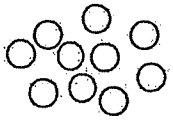


2. ____% of the 10 dots are white,
____% of the 10 dots are grey.



3. a) Shade 80% of the 10 dots.

b) What percent of the dots are not shaded? ____



4. 10% of 100 marbles are blue. How many of the marbles are not blue? ____

5. Write the percent as a fraction and then as a decimal.

a) $90\% = \frac{\_\_}{100} = 0.\_\_$ b) $35\% = \frac{\_\_}{100} = 0.\_\_$ c) $22\% = \frac{\_\_}{100} = 0.\_\_$ d) $6\% = \frac{\_\_}{100} = 0.\_\_$

e) 52% = ____ = ____ f) 2% = ____ = ____ g) 60% = ____ = ____ h) 100% = ____ = ____

6. Write the percent as a decimal.

a) 25% = 0.__ b) 75% = 0.__ c) 13% = ____ d) 40% = ____

e) 7% = ____ f) 9% = ____ g) 70% = ____ h) 1% = ____

7. Write the decimal as a percent.

a) $0.2 = \frac{2}{10} = \frac{\_\_}{100} = \_\_\_\_\%$ b) $0.3 = \frac{\_\_}{10} = \frac{\_\_}{100} = \_\_\_\_\%$ c) 0.7 =

d) $0.23 = \frac{\_\_}{100} = \_\_\_\_\%$ e) 0.57 = f) 0.08 =

8. Write the decimal as a percent by moving the decimal point two places to the right.

a) 0.4 = ____% b) 0.6 = ____% c) 0.3 = d) 0.1 = e) 0.8 =

f) 0.72 = ____% g) 0.20 = ____% h) 0.45 = i) 0.06 = j) 0.88 =

9. Approximately what percent does the decimal represent? Example: 0.1234 ≈ 0.12 =12%.
Hint: Remember to round to two decimal places.

a) 0.382 ≈ ____% b) 0.925 ≈ ____% c) 0.3779 ≈ d) 0.1036 ≈

10. Kay bought 6 jazz CDs and 4 rock CDs. What fraction of the CDs are jazz?
What percent are rock?

7-67 Fractions and Percents

1. Write the fraction as a percent by changing it to a fraction over 100.

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

c) $\frac{3}{20}$ d) $\frac{8}{25}$

2. Two out of five friends, or $\frac{2}{5}$, ordered pizza. What percent ordered pizza? ____

3. Change the fraction to a percent. Reduce the fraction to lowest terms if necessary.

a) $\frac{9}{15}=\frac{3}{5}=\frac{60}{100}=60\%$ b) $\frac{3}{15}=$

c) $\frac{9}{18}=$ d) $\frac{6}{24}=$

e) $\frac{3}{4}$ f) $\frac{1}{2}$ g) $\frac{4}{10}$ h) $\frac{18}{25}$ i) $\frac{28}{40}$

4. Divide to change the fraction to a decimal. Then write the decimal as a percent.

a) $\frac{3}{4}=3\div 4=0.\_\_\_=\_\_\_\%$ b) $\frac{4}{5}$ c) $\frac{3}{15}$ d) $\frac{15}{25}$ e) $\frac{65}{500}$

5. Write the percent as a decimal, then as a fraction, then in lowest terms.

a) 40% b) 75% c) 65% d) 5% e) 80%

6. Is the fraction closest to 10%, 25%, 50%, 75%, or 100%?

a) $\frac{4}{5}$ b) $\frac{2}{10}$ c) $\frac{2}{5}$ d) $\frac{9}{10}$ e) $\frac{11}{20}$ f) $\frac{16}{20}$ g) $\frac{4}{25}$

7. Estimate what percent the fraction is. Say what fraction you used to make your estimate. Then divide to change the fraction to a decimal. Was your estimate close?

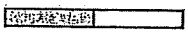
a) $\frac{11}{40}$ b) $\frac{23}{49}$ c) $\frac{60}{84}$ d) $\frac{14}{24}$ e) $\frac{4}{42}$ f) $\frac{21}{31}$

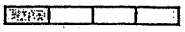
8. Write the fraction as a decimal. Round to two decimal places. Write the approximate percent.

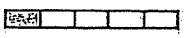
a) $\frac{5}{12}=5\div 12=0.4\overline{16}\approx 0.42=$ ____% b) $\frac{1}{3}$ c) $\frac{2}{3}$ d) $\frac{2}{9}$ e) $\frac{5}{6}$ f) $\frac{1}{7}$

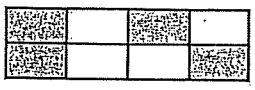
NS7-68 Visual Representations of Percents

1. What percent of the figure is shaded?

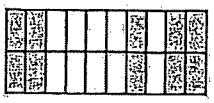
a)  ____%

b)  ____%

c)  ____%

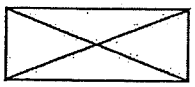
d)  ____%

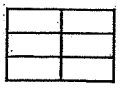
e)  ____%

f)  ____%

g)  ____%

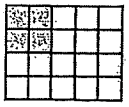
2. Shade 50% of the rectangle.

a) 

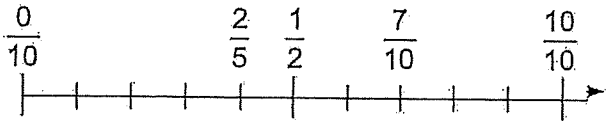
b) 

3. Write different expressions for the shaded area.

$\frac{\quad}{20} = \frac{\quad}{100} = 0.\_\_\_ = \_\_\_\%$

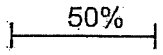


4. Write the percents that are equivalent to the fractions.

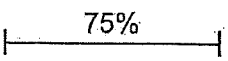


____% ____% ____% ____% ____%

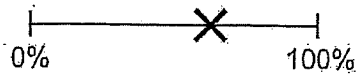
5. Measure the line segment. Extend the segment to show 100%.

a) 

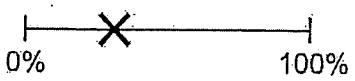
b) 

c) 

6. Estimate the percent of the line segment to the left of the mark.

a) 

about ____%

b) 

about ____%

7. 20 m^2 of a 50 m^2 field is used for growing potatoes. What fraction and percent of the field is this?

8. David has run 4 km of a 20 km cross-country race. What fraction and percent of the race has he completed? What percent of the race is left to run?

When would you use the measurement to describe the amount, and when would you use the percent (if ever)? Write a sentence using each expression.

a) 3 h of the school day or 50% of the school day

b) 12 kg of berries or 40% of the berries

NS7-6: Comparing Fractions, Decimals, and Percents

1. Complete the chart.

Fraction	$\frac{1}{4}$		$\frac{3}{20}$			$\frac{6}{15}$	$\frac{23}{25}$		
Decimal		0.35			0.60				0.55
Percent				40%				75%	

2. Write $<$ or $>$ or $=$ between each pair of numbers. First change the numbers to a pair of decimal fractions with the same denominator.

a) $\frac{1}{2}$ 47% b) $\frac{1}{2}$ 53% c) $\frac{1}{4}$ 23% d) $\frac{3}{4}$ 70%

$\frac{1\times50}{2\times50}$ $\frac{47}{100}$

$\frac{50}{100}$ $>$ $\frac{47}{100}$ ☐ ☐ ☐

e) $\frac{2}{5}$ 32% f) 0.27 62% g) 0.02 11% h) $\frac{1}{10}$ 10%

☐ ☐ ☐ ☐

i) $\frac{19}{25}$ 93% j) $\frac{23}{50}$ 46% k) 0.9 10% l) $\frac{11}{20}$ 19%

☐ ☐ ☐ ☐

3. Change the numbers in each set to decimals. Then order the decimals from least to greatest.

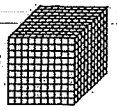
a) $\frac{3}{5}$, 42%, 0.73 b) $\frac{1}{2}$, 0.73, 80% c) $\frac{1}{4}$, 0.09, 15%

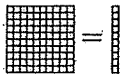
4. a) In Abeed's school, $\frac{3}{5}$ of students like gym and 65% like drama. Which class is more popular?

b) In Rachel's class, 0.45 of the students like pepperoni pizza best, 35% like cheese, and $\frac{1}{5}$ like vegetarian. Which type of pizza do the most students like best?

NS7-70 Finding Percents

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  =

$\frac{1}{10}$ of  = ▫

$\frac{1}{10}$ of 1 = 0.1

$\frac{1}{10}$ of 0.1 = 0.01

$\frac{1}{10}$ of 0.01 = 0.001

1. Find $\frac{1}{10}$ of each number 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 each number.

a) 1 ☐ b) 3.9 ☐ c) 4.05 ☐ d) 6.74 ☐ e) 0.09 ☐ f) 60.08 ☐

How to Find Percents That Are Multiples of 10

Step 1: Find 10% of the number.

Step 2: Multiply the result by the number of tens in the percent.

Example: Find 30% of 21.

10% of 21 = 2.1

There are 3 tens in 30 (30 = 3 × 10).

3 × 2.1 = 6.3

So 30% of 21 = 6.3.

3. Find the percent using the method above.

a) 30% of 15

10% of 15 = ☐

3 × ☐ = ___

b) 50% of 24

10% of ___ = ☐

___ × ☐ = ___

c) 20% of 7.8

10% of ___ = ☐

___ × ☐ = ___

d) 40% of 75

10% of ___ = ☐

___ × ☐ = ___

e) 90% of 86

10% of ___ = ☐

___ × ☐ = ___

f) 80% of 0.5

10% of ___ = ☐

___ × ☐ = ___

4. If you know 10% of a number n, then 5% of n is 10% divided by 2. Complete the chart.

5%	3			
10%	6	20	42	1
100%	60			

Use these steps to find 1% of a number:

Step 1: Change the percent to a decimal and replace "of" with "×."

Step 2: Multiply by 0.01 by shifting the decimal two places left.

5. Fill in the blanks.

a) 1% of 300 = *0.01* × *300* = ____

b) 1% of 2000 = ____ × ____ = ____

c) 1% of 15 = ____ × ____ = ____

d) 1% of 60 = ____ × ____ = ____

6. Find 1% of 200 and use your answer to calculate each percent.

a) 2% of 200 = _____

b) 3% of 200 = _____

c) 12% of 200 = _____

7. Use the method of Question 6 to calculate...

a) 4% of 800 b) 2% of 50 c) 11% of 60 d) 2% of 4 e) 7% of 45

8. Fill in the missing numbers. (Hint: 8% = 4% + 4%.)

2%	4%	8%	10%	20%	50%	25%	100%
	20						
	30						
					60		
			50				

9. a) If 45% is 9, what is 90%?

b) If 3% is 12, what is 1%?

c) If 40% is 64, what is 100%?

d) If 20% is 13, what is 100%?

10. Arti wants to leave a 15% tip on a meal that cost $60. How much tip should she leave? (Hint: 15% = 10% + 5%.)

11. a) A shirt that usually costs $40 is on sale for 25% off. What is 25% of $40? What is $40 – (25% of $40)? What is the sale price of the shirt?

b) How would you estimate the price if a shirt that usually costs $32.99 is on sale for 25% off?

NS7-71 Further Percents

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	
×	3	5	
1	3	5	
8	1	0	
9	4	5	

Step 2: She divides the result by 100.

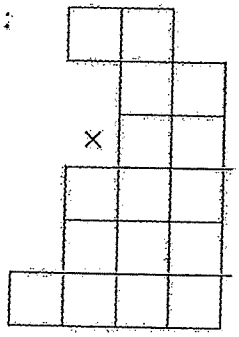
$945 \div 100 = 9.45$

So 35% of 27 is 9.45.

1. Find the percent using Sadie's method.

a) 25% of 44

Step 1:

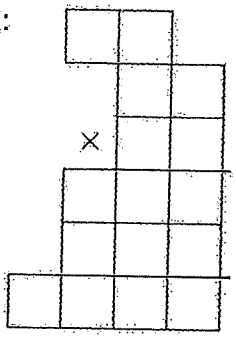


Step 2: _____ ÷ 100 = _____

So _____ of _____ is _____.

b) 18% of 92

Step 1:



Step 2: _____ ÷ 100 = _____

So _____ of _____ is _____.

2. Find the percent 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. a) Find 35% of 40 in two ways. Do you get the same answer both ways?

i) Use Sadie's method.

ii) Use 35% = 25% + 10%.

b) 35% is less than 50% = $\frac{1}{2}$. Is your answer to part a) less than half of 40?

c) Is 35% closer to 0 or $\frac{1}{2}$? _____

Was your answer to part a) closer to 0 or to half of 40? _____

Is your answer to part a) reasonable? Explain.

4. Find 30% of 50 and 50% of 30. What do you notice? Why is this the case?

Find the % of the following numbers.

(1) 25% of 80

(2) 30% of 40.

(3) 40% of 16

(4) 10% of 80

(5) 50% of 19

(6) 30% of 50

(7) 60% of 90

(8) 40% of 82

(9) 25% of 75

(10) 90% of 14.

NS7-74 Percent Problems

1. Calculate.

   a) $90\% - 75\% + 34\% =$ _____ b) $39\% +$ _____ $= 100\%$ c) $86\% -$ _____ $= 14\%$

2. What is the sales tax where you live? _____

   Calculate the amount of tax you would pay on each price.

   a) \$20 _____ b) \$35 _____ c) \$82.75 _____ d) \$93.24 _____

3. In the school elections, $\frac{3}{5}$ of the students voted for Laura and 12% voted for Zamir. The rest voted for Shaw-Han. What percent voted for Shaw-Han?

4. A painter spent \$500.00 on art supplies. Complete the chart.

Item	Money spent		
	Fraction	Percent	\$ Amount
Brushes			\$125.00
Paint	$\frac{3}{10}$		
Canvas		45%	

5. A student hopes to raise \$200 for his favourite charity. He has already raised \$60 by having a garage sale. What percent of the \$200 does he still need to raise?

6. Complete the chart.

Item	Regular Price	Discount (percent)	Discount (\$ amount)	Sale Price
Sweater	\$52.00	10%	\$5.20	\$52.00 – \$5.20 = \$46.80
Boots	\$38.96	25%		
Book	\$9.80	30%		

7. Simone bought a bass guitar at a 20% discount. She paid \$600. How many dollars did she save by buying the guitar at a discount?

8. Stephen spent \$670 on furniture. He spent 25% on a chair, \$234.50 on a table, and the rest on a sofa. What fraction and what percent of the \$670 did he spend on each item?

9. A lake has about 1 200 fish, 12% of them sturgeon. As part of a conservation program, 200 more sturgeon are released into the lake. How many sturgeon are now in the lake? What percent and what fraction of the fish in the lake are sturgeon?

NS7-75 Relating Fractions, Ratios, and Percents

1. Write the number of boys (b), girls (g), and children (c) in each class.

   a) There are 8 boys and 5 girls in a class. b _____ g _____ c _____

   b) There are 4 boys and 7 girls in a class. b _____ g _____ c _____

   c) There are 12 boys and 15 girls in a class. b _____ g _____ c _____

   d) There are 9 girls in a class of 20 children. b _____ g _____ c _____

2. Write the number of boys, girls, and children in each class. Then write the fraction of children who are boys and the fraction who are girls in the boxes provided.

   a) There are 5 boys and 6 girls in a class. b ___ ☐ g ___ ☐ c ___

   b) There are 15 children in the class and 8 are boys. b ___ ☐ g ___ ☐ c ___

3. Fill in the missing numbers for each classroom.

	Ratio of boys to girls	Fraction of boys	Fraction of girls	Percentage of boys	Percentage of girls
a)	3 : 2	$\frac{3}{5}$	$\frac{2}{5}$	$\frac{3}{5}=\frac{60}{100}=60\%$	40%
b)	1 : 4				
c)		$\frac{3}{4}$			
d)				20%	
e)		$\frac{27}{50}$			
f)	9 : 16				
g)			$\frac{11}{20}$		
h)					35%
i)				44%	

4. Fill in the missing numbers for each classroom.

	Number of students	Fraction of boys	Fraction of girls	Number of boys	Number of girls
a)	20	$\frac{4}{5}$	$\frac{1}{5}$	$\frac{4}{5} \times 20 = 16$	4
b)	30	$\frac{1}{3}$			
c)	28		$\frac{3}{4}$		
d)	26	$\frac{7}{13}$			

5. Determine the number of girls and boys in each class.

a) There are 20 children and $\frac{2}{5}$ are boys.

b) There are 42 children and $\frac{3}{7}$ are girls.

c) There are 15 children.
The ratio of girls to boys is 3 : 2.

d) There are 24 children.
The ratio of girls to boys is 3 : 5.

e) There are 25 children and 60% are girls.

f) There are 28 children and 25% are boys.

6. For each question, say which classroom has more girls.

a) In classroom A, there are 40 children and 60% are girls.
In classroom B, there are 36 children. The ratio of boys to girls is 5 : 4.

b) In classroom A, there are 28 children. The ratio of boys to girls is 5 : 2.
In classroom B, there are 30 children and $\frac{3}{5}$ of the children are boys.

7. Ron and Ella shared $35 in the ratio 4 : 3. What fraction of the money did each person receive? What amount of money did each person receive?

8. Indra spent 1 hour doing homework. The chart shows the time she spent on each subject. Complete the chart. How did you find the amount of time Indra spent on math?

Subject	Time			
	Fraction of an hour	Percent	Decimal (hours)	Minutes
English	$\frac{1}{4}$		.25	15
Science		5%		
Math				
French			.20	