

Important Concepts . . .

Preview Review



Mathematics Grade 8 TEACHER KEY

W1 - Review:

Important Concepts of Grade 8 Mathematics

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W1 - Lesson 2	Working with Ratios and Rates
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Materials Required

Protractor
Ruler
Calculator

**No Textbook
Required**

**This is a stand-
alone course.**

Mathematics Grade 8

Version 6

Preview/Review W1 - Review

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Preview/Review Concepts for Grade Eight Mathematics

Teacher Key



W1 - Review

W1 - Review:

Materials required:

- Paper, Pencil, Calculator, and Grid Paper

Part 1: Perfect Squares and Square Roots

Perfect square: a number that has a whole number as its square root. They are called perfect squares because they form a square when they are laid out using algebra tiles.

Square root: a number that when multiplied by itself results in a specific number. When asked to find the square root of a given number, ask yourself “What number do I multiply by itself to result in a product of the given number?”

Or press the $\sqrt{\quad}$ on your calculator and then type in the number

Practice Questions

1. Calculate the square of the following numbers.

- a. 10

$$10^2 = 100$$

- b. 13

$$13^2 = 169$$

- c. 15

$$15^2 = 225$$

2. Calculate the square root of the following numbers.

a. $\sqrt{81}$

$$\sqrt{81} = 9$$

b. $\sqrt{161}$

$$\sqrt{161} \approx 12.69$$

c. $\sqrt{200}$

$$\sqrt{200} \approx 14.14$$

Part 2: Ratios and Rates

Ratio: a comparison of two or more values using the same units.

Part-to-part ratio: a ratio that compares one part of a collection to another part of a collection.

Part-to-whole ratio: a ratio that compares a part of a collection to the entire collection.

Rate: a comparison of amounts or measurements using different units.

Unit Rate: a rate with the second term being 1.

Practice Questions

1. Simplify the following ratios.

a. 6 : 18

$$\mathbf{6 : 18}$$

$$\frac{\mathbf{6}}{\mathbf{6}} : \frac{\mathbf{18}}{\mathbf{6}}$$

$$\mathbf{1 : 3}$$

b. 9 to 24

$$\mathbf{9 : 24}$$

$$\frac{\mathbf{9}}{\mathbf{3}} : \frac{\mathbf{24}}{\mathbf{3}}$$

$$\mathbf{3 : 8}$$

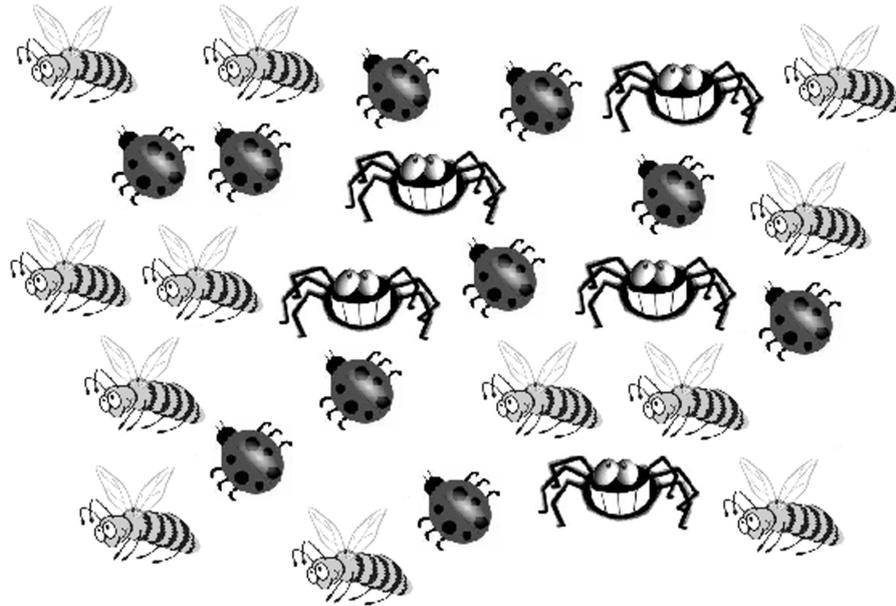
c. 63 : 42 : 7

$$\mathbf{63 : 42 : 7}$$

$$\frac{\mathbf{63}}{\mathbf{7}} : \frac{\mathbf{42}}{\mathbf{7}} : \frac{\mathbf{7}}{\mathbf{7}}$$

$$\mathbf{9 : 6 : 1}$$

2. Determine the following ratios using the given diagram.



a. Ladybugs to spiders

$$10 : 5$$

$$\frac{10}{5} : \frac{5}{5}$$

$$2 : 1$$

b. Spiders to all the other bugs

$$5 : 22$$

c. Bees to total number of bugs

$$12 : 27$$

$$\frac{12}{3} : \frac{27}{3}$$

$$4 : 9$$

3. Calculate the following unit rates.

a. Typing 175 words in 5 minutes

$$\begin{aligned}\frac{\text{words}}{\text{minutes}} &= \frac{175}{5} \\ &= \frac{35}{1} \\ &= 35 \text{ words/min}\end{aligned}$$

b. Running 110 metres in 10 seconds

$$\begin{aligned}\frac{\text{metres}}{\text{seconds}} &= \frac{110}{10} \\ &= \frac{11}{1} \\ &= 11 \text{ m/s}\end{aligned}$$

c. Paying \$13.20 for 600 grams of gourmet jelly beans (Hint: Express the unit rate per 100 grams)

$$\begin{aligned}\frac{\text{dollars}}{\text{grams}} &= \frac{13.20}{600} \\ &= \frac{2.20}{100} \\ &= \$2.20/100 \text{ g}\end{aligned}$$

Part 3: Multiplying and Dividing Fractions

Multiplying Fractions

When multiplying fractions, remember these steps:

Step 1: Convert any mixed numbers into improper fractions.

Step 2: Simplify the numerators and denominators. To do this, divide the numerators and denominators by a common factor.

Step 3: Multiply the numerators.

Step 4: Multiply the denominators.

Step 5: If an improper fraction results, change it into a mixed number.

Dividing Fractions

When dividing fractions, remember these steps:

Step 1: Convert any mixed numbers into improper fractions.

Step 2: Multiply the first term by the reciprocal of the second term. The reciprocal is the “flip” of the fraction or number.

Step 3: Multiply the numerators.

Step 4: Multiply the denominators.

Step 5: If an improper fraction results, change it into a mixed number.

Practice Questions

1. $\frac{4}{5} \times \frac{5}{8} =$

$$\begin{aligned} \frac{4}{5} \times \frac{5}{8} &= \frac{\cancel{4}^1}{\cancel{5}_1} \times \frac{\cancel{5}^1}{\cancel{8}_2} \\ &= \frac{1 \times 1}{1 \times 2} \\ &= \frac{1}{2} \end{aligned}$$

$$2. \quad \frac{9}{10} \div \frac{1}{2} =$$

$$\begin{aligned} \frac{9}{10} \div \frac{1}{2} &= \frac{9}{\cancel{10}} \times \frac{2^1}{1} \\ &= \frac{9 \times 1}{5 \times 1} \\ &= \frac{9}{5} \\ &= 1\frac{4}{5} \end{aligned}$$

$$3. \quad 3\frac{2}{5} \div \frac{3}{5} =$$

$$\begin{aligned} 3\frac{2}{5} \div \frac{3}{5} &= \frac{17}{5} \times \frac{5}{3} \\ &= \frac{17}{\cancel{5}} \times \frac{5^1}{3} \\ &= \frac{17 \times 1}{1 \times 3} \\ &= \frac{17}{3} \\ &= 5\frac{2}{3} \end{aligned}$$

$$4. \quad \frac{4}{9} \times 2\frac{1}{13} =$$

$$\begin{aligned} \frac{4}{9} \times 2\frac{1}{13} &= \frac{4}{9} \times \frac{27}{13} \\ &= \frac{4}{\cancel{9}} \times \frac{27^1}{13} \\ &= \frac{4 \times 3}{1 \times 13} \\ &= \frac{12}{13} \end{aligned}$$

$$5. \quad 5\frac{1}{2} \div 3 =$$

$$\begin{aligned} 5\frac{1}{2} \div 3 &= \frac{11}{2} \times \frac{1}{3} \\ &= \frac{11 \times 1}{2 \times 3} \\ &= \frac{11}{6} \\ &= 1\frac{5}{6} \end{aligned}$$

$$6. \quad 4 \div \frac{1}{8} =$$

$$\begin{aligned} 4 \div \frac{1}{8} &= \frac{4}{1} \times \frac{8}{1} \\ &= \frac{32}{1} \\ &= 32 \end{aligned}$$

$$7. \quad \left(\frac{4}{9} + 2\frac{1}{6}\right) - \frac{7}{12} \times \frac{16}{21} =$$

$$\begin{aligned} &= \left(\frac{4}{9} + 2\frac{1}{6}\right) - \frac{7}{12} \times \frac{16}{21} \\ &= \left(\frac{4}{9} + \frac{13}{6}\right) - \frac{7}{12} \times \frac{16}{21} \\ &= \left(\frac{8}{18} + \frac{39}{18}\right) - \frac{7}{12} \times \frac{16}{21} \\ &= \frac{47}{18} - \frac{7}{12} \times \frac{16}{21} \\ &= \frac{47}{18} - \frac{112}{252} \\ &= \frac{658}{252} - \frac{112}{252} \\ &= \frac{546}{252} \\ &= 2\frac{1}{6} \end{aligned}$$

Part 4: Multiplying and Dividing Integers

Multiplying integers

Multiplying integers involves a similar process as multiplying whole numbers. Apply the following sign rules when multiplying integers:

- If there is an **even** number of negative signs, then the answer will be **positive**
- If there is an **odd** number of negative signs, then the answer will be **negative**

Dividing integers

Dividing integers involves a similar process as dividing whole numbers. Apply the following sign rules when dividing integers:

- If there is an **even** number of negative signs, then the answer will be **positive**
- If there is an **odd** number of negative signs, then the answer will be **negative**

Practice Questions

1. $(-7) \times (-10) =$

$$(-7) \times (-10) = +70$$

2. $(+36) \div (-12) =$

$$(+36) \div (-12) = -3$$

3. $(-15) \times (+4) =$

$$(-15) \times (+4) = -60$$

4. $(-6) \times (+7) =$

$$(-6) \times (+7) = -42$$

5. $(-75) \div (+5) =$

$$(-75) \div (+5) = -15$$

$$6. \quad (-64) \div (-4) =$$

$$\quad \quad \quad (-64) \div (-4) = +16$$

$$7. \quad ((-6) + 6 \times (-5)) \div 3^2 =$$

$$= \underline{((-6) + 6 \times (-5))} \div 3^2$$

$$= \underline{((-6) - 30)} \div 3^2$$

$$= \underline{(-36)} \div \underline{3^2}$$

$$= \underline{(-36)} \div \underline{9}$$

$$= -4$$

Part 5: Working with Percents

A percent can also be expressed as a decimal number and in fraction form.

- To express a percent as a decimal, remove the percent symbol, and move the decimal point in the percentage two places to the left.
- To express a percent as a fraction, place the percent over 100 and drop the percent symbol. Then simplify the resulting fraction.

A decimal can also be expressed as a percent and in fraction form.

- To express a decimal as a percent, move the decimal point two places to the right and add a percent symbol at the end of the number.
- To express a decimal as a fraction, place the decimal number over a denominator that is equal to the last place value in the decimal number and remove the decimal point. Then simplify the resulting fraction.

A fraction can also be expressed as a percent and as a decimal number.

- To express a fraction as a decimal, divide the numerator by the denominator. Mixed numbers can also be expressed as decimals by applying the same rules.
- To express a fraction as a percent, divide the numerator by the denominator, and move the decimal point two places to the right. Then add a percent symbol behind the resulting number. Mixed numbers can also be expressed as percentages by applying the same rules.

Practice Questions

1. Complete the following table. Express the following percents as a decimal number and in fraction form.

Percentage	Decimal Number	Fraction Form
63%	0.63	$\frac{63}{100}$
2.4%	0.024	$\frac{3}{125}$
15%	0.15	$\frac{3}{20}$

