

CHAPTER 4

The Decimal Notation For Fractions

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In this chapter you will do more work with fractions written in decimal notation. When fractions are written in the decimal notation, calculations can be done in the same way than for whole numbers. It is important to always keep in mind that the common fraction form, the decimal form and the percentage form are just different ways to represent exactly the same number. These numbers are called the rational numbers.

1 EQUIVALENT FORMS

Decimal fractions and common fractions are simply different ways of expressing the same number. They are different **notations** showing the same value.

Note

Notation means a set of symbols to show a special thing.

Note

To write a decimal fraction as a common fraction:

Write the decimal with a denominator that is a power of ten (10,100,1000,ect.) and then simplify it if possible.

e.g. $0,35 = \frac{35}{100} = \frac{7}{20} \times \frac{5}{5} = \frac{7}{20}$

To write a common fraction as a decimal fraction:

Change the common fraction to an equivalent fraction with a power of ten as a denominator.

e.g. $\frac{3}{4} = \frac{3}{4} \times \frac{25}{25} = \frac{75}{100} = 0.75$

If you are permitted to use your calculator, simply type in $3 \div 4$ and the answer will be given as 0,75. On some calculators you will need to press an additional button to convert the exact fraction to a decimal.

1.1 Common fractions, decimal fractions and percentages

2 CALCULATIONS WITH DECIMALS

Note

When you **add** and **subtract** decimal fractions:

Add tenths to tenths.

Subtract tenths from tenths.

Add hundredths to hundredths.

Subtract hundreds from hundredths.

And so on!

When you **multiply** decimal fractions, you change the decimals to whole numbers, do the calculation and last, change them back to decimal fractions.

For example: To calculate $13,1 \times 1,01$, you first calculate 131×101 (which equals 13 231). Then, since you have multiplied the 13,1 by 10, and the 1,01 by 100 in order to turn them into whole numbers, you need to divide this answer by 10×100 (i.e. 1 000). Thus, the final answer is 13,231

Note

When you **divide** decimal fractions, you can use equivalent fractions to help you.

For example: $21,7 \div 0,7 = \frac{21,7}{0,7} = \frac{21,7}{0,7} \times \frac{10}{10} = \frac{217}{7} = 31$

Notice how you multiply both the numerator and denominator of the fraction by the same number (in this case, 10). Always multiply by the smallest power of ten that will convert both values to whole numbers.

3 EXERCISES

3.1 Exercise 1

1. Write the following decimal fractions as common fractions in their simplest form:

1.1 0,56

1.2 3,87

1.3 1,9

1.4 5,205

2. Write the following common fractions as decimal fractions:

2.1 $\frac{9}{20}$

2.2 $\frac{7}{5}$

2.3 $\frac{24}{25}$

2.4 $2\frac{3}{8}$

3. Write the following percentages as common fractions in their simplest form:

3.1 70%

3.2 5%

3.3 12,5%

4. Write the following decimal fractions as percentages:

4.1 0,6

4.2 0,43

4.3 0,08

4.4 0,265

4.5 0,005

5. Write the following common fractions as percentages:

5.1 $\frac{7}{10}$

5.2 $\frac{3}{4}$

5.3 $\frac{33}{50}$

5.4 $\frac{60}{60}$

5.5 $\frac{2}{25}$

5.6 $\frac{29}{50}$

6. Jane and Devi are in different schools. At Jane's school, the year mark for Mathematics was out of 80, and Jane got 60 out of 80. At Devi's school, the year mark was out of 50 and Devi got 40 out of 50.

6.1 What fraction of the total marks, in its simplest form, did Devi obtain at her school?

6.2 What percentage did Devi and Jane get for Mathematics?

6.3 Who performed better. Jane or Devi?

7. During a basketball game, Lebo tried to score 12 times. Only four of her attempts were successful.

7.1 What fraction of her attempts were successful?

7.2 What percentage of her attempts were not successful?

3.2 Exercise 2

1. Calculate the value of each of the following:

1.1 $3,3 + 4,83$

1.2 $0,6 + 18,3 + 4,4$

1.3 $9,3 + 7,6 - 1,23$

1.4 $(16,0 - 7,6) - 0,6$

1.5 $9,43 - (3,61 + 1,14)$

1.6 $1,21 + 2,5 - (2,3 - 0,23)$

2. Calculate the value of each of the following:

2.1 $4 \times 0,5$

2.2 $15 \times 0,02$

2.3 $0,8 \times 0,04$

2.4 $0,02 \times 0,15$

2.5 $1,07 \times 0,2$

2.6 $0,016 \times 0,02$

3. Calculate the value of each of the following:

3.1 $7,2 \div 3$

3.2 $12 \div 0,3$

3.3 $0,15 \div 0,5$

3.4 $10 \div 0,002$

3.5 $0,3 \div 0,006$

3.6 $0,024 \div 0,08$

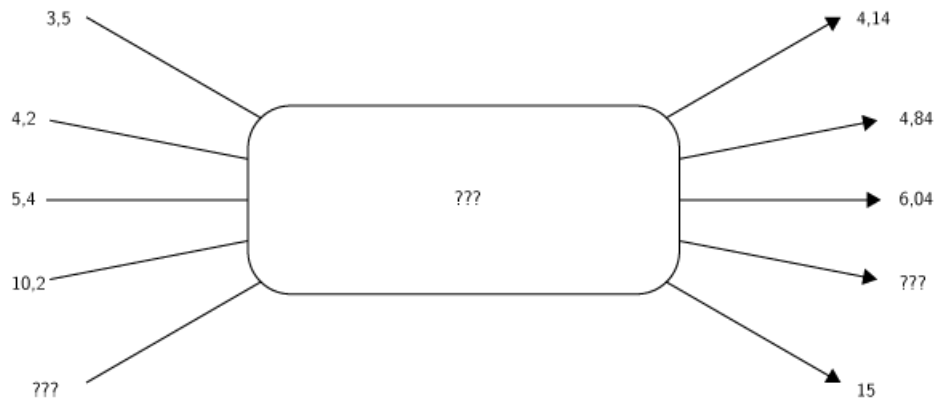
4. Select the value that is equal to or closest to the answer to each calculation:

4.1 $3 \times 0,5$

4.2 $4,4 \div 0,2$

4.3 $56 \times 1,675$

5. Copy the diagram. Determine the operator and the unknown numbers and fill them in:



6. Calculate each of the following:

6.1 $(0,1)^2$

6.2 $(0,03)^2$

6.3 $(2,5)^2$

6.4 $\sqrt{0,04}$

6.5 $\sqrt{0,16}$

6.6 $\sqrt{0,49}$

6.7 $(0,2)^3$

6.8 $(0,4)^3$

6.9 $(0,3)^3$

6.10 $\sqrt[3]{0,064}$

6.11 $\sqrt[3]{0,125}$

6.12 $\sqrt[3]{0,216}$

7. Calculate each of the following:

7.1 $2,5 \times 2 \div 10$

7.2 $4,2 - 5 \times 1,2$

7.3 $\frac{5,4+7,35}{0,05}$

7.4 $4,2 \div 0,21 + 0,45 \times 0,3$

3.3 Exercise 3

1. Do not use a calculator. Answer the following: Is $6,54 \times 0,81 = 0,654 \times 8,1$? Explain your answer

2. You are given that $45 \times 24 = 1\ 080$. use this result to determine the following without the use of a calculator:

2.1 $4,5 \times 2,4$

2.2 $4,5 \times 24$

2.3 $4,5 \times 0,24$

2.4 $0,045 \times 24$

2.5 $0,045 \times 0,024$

2.6 $45 \times 0,024$

3. Without actually dividing, choose which answer in brackets is the correct answer, or the closest to the correct answer.

3.1 $14 \div 0,5$

3.2 $0,58 \div 0,7$

3.3 $2,1 \div 0,023$

4. John is asked to calculate $6,5 \div 0,02$. He does the following:

Step 1: $6,5 \div 2 = 3,25$ **Step 2:** $3,25 \times 100 = 325$

4.1 Is John's method correct? Why? Explain without the use of the calculator.

4.2 Use John's method to calculate the following without the use of a calculator: $4,8 \div 0,3$

4.3 Use John's method to calculate the following without the use of a calculator: $21 \div 0,003$

5. Given: $0,174 \div 0,3 = 0,58$. Using this fact, write down the answers for the following without the use of a calculator:

5.1 $0,3 \times 0,58$

5.2 $1,74 \div 3$

5.3 $17,4 \div 30$

5.4 $174 \div 300$

5.5 $0,0174 \div 0,03$

5.6 $0,3 \times 5,8$

3.4 Exercise 4

1. Calculate the following, rounding off all answers correct to two decimal places:

1.1 $8,567 + 3,0456$

1.2 $2,781 - 6,0049$

1.3 $1,234 \times 4,056$

1.4 $\frac{5,678+3,245}{1,294-0,994}$

2. What is the difference between 0,890 and 0,581?

3. If a rectangle is 12,34 cm wide and 31,67 cm long:

3.1 What is the perimeter of the rectangle?

3.2 What is the area of the rectangle? Round off your answer to two decimal places.

4. Alison buys a cooldrink for R 5,95, a chocolate for R 3,25 and a packet of chips for R 4,60. She pays with a R 20 note.

4.1 How much did she spend?

4.2 How much change did she get?

5. A tractor uses 11,25 ℓ of fuel in 0,75 hours. How many litres does it use in one hour?

6. Mrs Ruka received her municipal bill.

6.1 Her water consumption charge for one month is R 32,65. The first 5,326 kℓ are free, then she pays R 5,83 per kilolitre thereafter. How much water did the Ruka household use?

6.2 The electricity charge for Mrs Ruka was R 417,59. The first 10 kWh are free. For the next 100 kWh, the charge is R 1,13 per kWh, and thereafter for each kWh the charge is R 1,42. How much electricity did the Ruka household use?

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7. A roll of material is 25 m long. To make one dress, you need 1,35 m of material. How many dresses can be made out of a roll of material and how much material is left over?
 8. If one litre of petrol weighs 0,679 kg, what will 28,6 ℓ of petrol weigh?
 9. The reading on a water meter at the beginning of the month is 321,573 kl. At the end of the month, the reading is 332,523 kl. How much water (in ℓ) was used during this month?

3.5 Exercise 5

1. Simplify the following:

1.1 $\sqrt{0,09^{36}}$

1.2 $7,2x^3 - 10,4x^3$

1.3 $(2,4x^2y^3)(10y^3x)$

1.4 $11,75x^2 - 1,2x \times 5x$

1.5 $\frac{3,4x-1,2x}{1,1x \times 4}$

1.6 $\sqrt[3]{0,008x^{12}} + \sqrt{0,16x^8}$

1.7 $3x^2 + 0,1x^2 - 45,6 + 3,9$

1.8 $\frac{0,4y+1,2y}{0,6x-3x}$

2. Simplify the following:

2.1 $\frac{0,5x^9}{0,02x^3}$

2.2 $\frac{0,325}{x^2} - \frac{1,675}{x^2}$

2.3 $\frac{3,6x}{1,5y^3} \times \frac{5y}{0,6x}$

2.4 $\frac{9,5x^2}{1,2y^2} \div \frac{0,05x}{0,04y^8}$

3. Solve the following equations:

3.1 $0,24 + x = 0,31$

3.2 $x + 5,61 = 7,23$

3.3 $x - 3,14 = 9,87$

3.4 $4,21 - x = 2,74$

3.5 $0,96x = 0,48$

3.6 $x \div 0,03 = 1,5$

3.6 Exercise 6

1. Copy and complete the table without the use of a calculator.

Percentage	Common fraction	Decimal fraction
2,5%		
	$\frac{15}{250}$	
		0,009

2. Calculate each of the following without the use of a calculator:

2.1 $6,78 - 4,92$

2.2 $1,7 \times 0,05$

2.3 $7,2 \div 0,36$

2.4 $4,2 - 0,4 \times 1,2 + 7,37$

2.5 $(0,12)^2$

2.6 $\frac{3\sqrt{0,04}}{\sqrt[3]{0,027}}$

3. $36 \times 19 = 684$. Use this result to determine the following without the use of a calculator:

3.1 $3,6 \times 1,9$

3.2 $0,036 \times 0,19$

3.3 $68,4 \div 0,19$

4. Simplify:

4.1 $(4,95x - 1,2) - (3,65x + 3,1)$

4.2 $\frac{2,75x^{50}}{0,005x^{25}}$

5. Mulalo went to the shop and purchased two tubes of toothpaste for R 6,98 each; three cans of coldrink for R 6,48 each, and five tins of baked beans for R 7,95 each. If he pays with a R 100 note, how much change should he get?

4 ANSWERS TO EXERCISES

4.1 Exercise 1

1.1 $\frac{14}{25}$

1.2 $\frac{387}{100}$

1.3 $\frac{19}{10}$

1.4 $\frac{1041}{200}$

2.1 0,45

2.2 1,4

2.3 0,96

2.4 2,375

3.1 $\frac{7}{10}$

3.2 $\frac{1}{20}$

3.3 $\frac{1}{8}$

4.1 60%

4.2 43%

4.3 8%

4.4 26,5%

4.5 0,5%

5.1 70%

5.2 75%

5.3 66%

5.4 100%

5.5 8%

5.6 58%

6.1 $\frac{4}{5}$

6.2 Devi: 80%
Jane: 75%

6.3 Devi performed better.

7.1 $\frac{1}{3}$

7.2 66,67%

4.2 Exercise 2

1.1 8,13

1.2 23,3

1.3 15,67

1.4 7,8

1.5 4,68

1.6 1,64

2.1 2,0

2.2 0,3

2.3 0,032

2.4 0,003

2.5 0,214

2.6 0,00032

3.1 2,4

3.2 40

3.3 0,3

3.4 5000

3.5 50

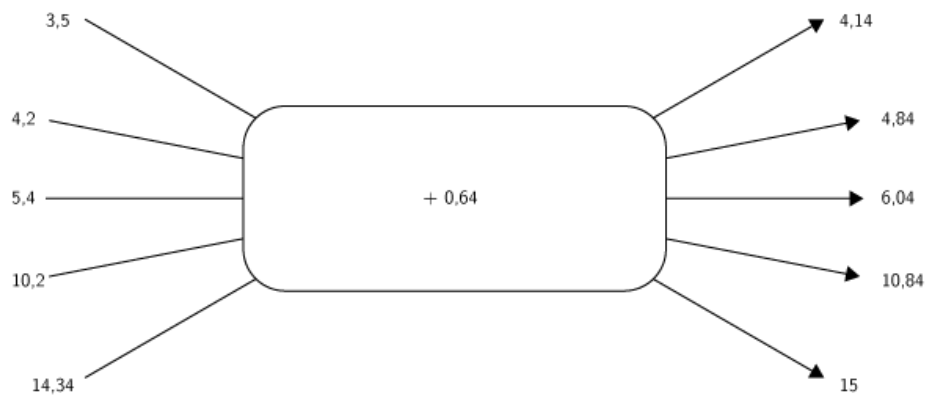
3.6 0,3

4.1 1,5

4.2 22

4.3 more than 84

5.



6.1 0,01

6.2 0,0009

6.3 6,25

6.4 0,2

6.5 0,4

6.6 0,7

6.7 0,008

6.8 0,064

6.9 0,027

6.10 0,4

6.11 0,5

6.12 0,6

7.1 0,5

7.2 -1,8

7.3 255

7.4 20,135

4.3 Exercise 3

1. Yes. Both sides are equal.

2.1 10,8

2.2 108

2.3 1,08

2.4 1,08

2.5 0,00108

2.6 1,08

3.1 28

3.2 0,8

3.3 The Answer is closest to 100

4.1 Yes, he is correct. He multiplied the divisor by 100 in step 1. Therefore, he must then multiply the dividend by 100 too.

4.2 16

4.3 7000

5.1 0,174

5.2 0,58

5.3 0,58

5.4 0,58

5.5 0,58

5.6 1,74

4.4 Exercise 4

1.1 11,61

1.2 $-3,22$

1.3 5,01

1.4 29,74

2. 0,309

3.1 88,02 cm

3.2 $390,81 \text{ cm}^2$

4.1 R 13,80

4.2 R 6,20

5. 15ℓ

6.1 $10,926 \text{ k}\ell$

6.2 $324,5 \text{ kWh}$

7. 18 dresses can be made. $0,7 \text{ m}$ left over.

8. $19,42 \text{ kg}$

9. $10\ 950 \ell$

4.5 Exercise 5

1.1 $0,3x^{18}$

1.2 $-3,2x^3$

1.3 $24x^3y^6$

1.4 $5,75x^2$

1.5 $\frac{1}{2}$

1.6 $0,6x^4$

1.7 $3,1x^2 - 41,7$

1.8 $-\frac{2y}{3x}$

2.1 $25x^6$

2.2 $-\frac{1,35}{x^2}$

2.3 $\frac{20}{y^2}$

2.4 $6\frac{xy^6}{3}$

3.1 $x = 0,07$

3.2 $1,62$

3.3 $x = 13,01$

3.4 $x = 1,47$

3.5 $x = 0,5$

3.6 $x = 0,045$

4.6 Exercise 6

1.

Percentage	Common fraction	Decimal fraction
2,5%	$\frac{1}{40}$	0,025
6%	$\frac{15}{250}$	0,06
0,9%	$\frac{9}{1000}$	0,009

2.1 $1,86$

2.2 0,085

2.3 20

2.4 11,09

2.5 0,0144

2.6 2

3.1 6,84

3.2 0,00684

3.3 360

4.1 $1,3x - 4,3$

4.2 $550x^{25}$

5. R 26,85