Electro Critical Skills Resource Suite

Entry Level Literacy and Numeracy Assessment for the Electrotechnology Trades

Enrichment Resource

UNIT 2: Fractions – Parts of a Whole

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FRACTIONS

A great number of trade calculations require an electrician to perform operations involving fractions. For example, the reading of scales, or the use of ratios when working with transformers.

LEARNING OUTCOME

- Can accurately perform operations that involve fractions

PERFORMANCE CRITERIA

- Expresses parts of a whole as a fraction.
- Reduces fractions to their simplest form.
- Uses the calculator to convert fractions into decimals.
- Uses the calculator to solve worded problems involving fractions.

FRACTIONS – PARTS OF A WHOLE

A great number of trade calculations require an electrician to perform operations involving fractions. For example, the reading of scales, or the use of ratios when working with transformers.

SIMPLIFYING FRACTIONS

$\frac{4}{8}$ **or** $\frac{1}{2}$

To reduce a fraction to its simplest form we look for a number that will divide evenly into the top (numerator) and the bottom (denominator) of the fraction.

To simply $\frac{4}{8}$ Divide 4 into the top and the bottom

$$\therefore \frac{4}{8} = \frac{1}{2}$$

The same fraction can appear in many different ways eg.

$$\frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{8}{16} = \frac{105}{210} = \frac{406}{812}$$

EXERCISE 1

Reduce these fractions to their simplest form:

a) $\frac{6}{9}$ **b)** $\frac{3}{12}$

c) $\frac{2}{10}$ **d)** $\frac{2}{14}$

e) $\frac{15}{25}$ **f)** $\frac{48}{72}$

☑ **Use the answer sheet to check your work.**

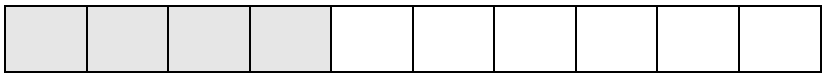
DECIMAL FRACTIONS

A fraction is a part of a whole e.g. 1/4

A decimal then is part of a whole and is often referred to as a DECIMAL FRACTION e.g. 1/4 = 0.25

A part or portion of a whole may be measured in either fractions or decimal fractions.

e.g.



The shaded area is $\frac{4}{10}$ but it is also $0.4 = 4 \div 10$

Converting Fractions to Decimals

Express $\frac{3}{4}$ as a decimal fraction.

$\frac{3}{4} = 3 \div 4 = 0.75$

Without a calculator:

Step 1. $4\overline{)3.00}$

Step 2. $\begin{array}{r} 0.00 \\ 4\overline{)3.00} \end{array}$ Divide 4 into 3. This won't go so, place a decimal point above the decimal.

Step 3. $\begin{array}{r} 0.70 \\ 4\overline{)3.00} \end{array}$ 4 goes into 30,7 times with 2 remainder.

Step 4. $\begin{array}{r} 0.75 \\ 4\overline{)3.00} \end{array}$ 4 goes into 20, 5 times.

EXERCISE 2

Convert the following fractions into decimals without using the calculator. Where possible, simplify the fractions before converting them.

a) $\frac{2}{5}$ =

b) $\frac{9}{10}$ =

c) $\frac{6}{8}$ =

d) $\frac{16}{20}$ =

e) $\frac{3}{8}$ =

Using the calculator

- **To convert a fraction to a decimal divide the dominator (bottom) into the numerator (top).**

Example **eg.** | **7** | | **÷** | | **8** | | **=** | **Answer 0.875**

- **Reciprocal Function (** $\frac{1}{x}$ **or** x^{-1} **)**

To take a reciprocal of a number means to divide that number into 1.

The reciprocal of 3 is 1/3

If your calculator has a reciprocal key ($\frac{1}{x}$ or x^{-1}) it can be used to convert fractions that have a numerator of 1 into decimals.

Depression of the reciprocal key causes the calculator to find the reciprocal of the number on the display. The reciprocal then appears on the display.

Example:

Express a $\frac{1}{4}$ as a decimal.

- 4 → $\frac{1}{x}$ **Answer : 0.25**

or

- 4 → x^{-1} **Answer : 0.25**

The reciprocal of 4 is $\frac{1}{4}$

Steps on some calculators may differ. Refer to your calculator guide

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EXERCISE 3

Convert the following fractions into decimals using the calculator (Give answers correct to 3 decimal places where appropriate).

a) $\frac{4}{7}$ =

b) $\frac{1}{12}$ =

c) $\frac{5}{8}$ =

d) $\frac{7}{11}$ =

e) $\frac{4}{26}$ =

f) $3\frac{3}{4}$ =

g) $6\frac{5}{8}$ =

h) $\frac{1}{5} + \frac{1}{9}$

5	$\frac{1}{x}$	+	9	$\frac{1}{x}$	=

Answer

EXERCISE 4

It is helpful to memorize the decimal equivalents of the most used fractions.

Complete the table below by converting the fractions to decimals.

FRACTIONS	DECIMALS (Correct to 2 dec. places)
$\frac{1}{2}$	
$\frac{1}{3}$	
$\frac{2}{3}$	
$\frac{1}{4}$	
$\frac{3}{4}$	
$\frac{1}{5}$	
$\frac{1}{6}$	
$\frac{1}{8}$	
$\frac{1}{12}$	

EXERCISE 5

a) **You need to order conduit to run along two walls. One wall measures 3 $\frac{1}{4}$ m and the other measures 6 $\frac{1}{2}$ m.**

How much conduit do you need?

(Note: Conduit is plastic casing used to protect cables)

b) **You have 15 x $\frac{1}{8}$ watt resistors.**

What is the total power rating in watts of these resistors?

Express your answer in decimals.

c) **How many lengths of cable 2 $\frac{1}{4}$ m can be cut from a piece of cable 18m long?**

d) **On a job an electrician uses $\frac{2}{3}$ of an 85m length of cable. How much cable is left?**

☑ **Use the answer sheet to check your work.**

ANSWERS:

EXERCISE 1

a) $\frac{6}{9} = \frac{6 \div 3}{9 \div 3} = \frac{2}{3}$

b) $\frac{3}{12} = \frac{1}{4}$

c) $\frac{2}{10} = \frac{1}{5}$

d) $\frac{2}{14} = \frac{1}{7}$

e) $\frac{15}{25} = \frac{3}{5}$

f) $\frac{48}{72} = \frac{48 \div 12}{72 \div 12} = \frac{4}{6} = \frac{2}{3}$

EXERCISE 2

a) $\frac{2}{5} = 5\overline{)2.0}\,0.4 = 0.4$

b) $\frac{9}{10} = 0.9$

c) $\frac{6}{8} = \frac{6 \div 2}{8 \div 2} = \frac{3}{4} = 4\overline{)3.00}\,0.75 = 0.75$

d) $\frac{16}{20} = 0.8$

e) $\frac{3}{8} = 8\overline{)3.000}\,0.375 = 0.375$

EXERCISE 3

a) $\frac{4}{7}$ = 0.571

b) $\frac{1}{12}$ = 0.083

c) $\frac{5}{8}$ = 0.625

d) $\frac{7}{11}$ = 0.64

e) $\frac{4}{26}$ = 0.154

f) $3\,3/4$ = 3.75

g) $6\frac{5}{8}$ = 6.625

h) $1/5$ + $1/9$ = 0.31 or 0.31

EXERCISE 4

Fractions	Decimals
$\frac{1}{2}$	0.5
$\frac{1}{3}$	0.33
$\frac{2}{3}$	0.67
$\frac{1}{4}$	0.25
$\frac{9}{4}$	0.75
$\frac{1}{5}$	0.2
$\frac{1}{6}$	0.17
$\frac{1}{8}$	0.13
$\frac{1}{12}$	0.08

EXERCISE 5

a) $3\frac{1}{4}$ + $6\frac{1}{2}$ = 3.25 + 6.5 = 9.75

b) 15 x $\frac{1}{8}$ = 15 x 0.125 = 1.875 watts

c) 18 + $2\frac{1}{4}$ = 18 + 2.25 = 8

Answer: 8 pieces of cable

d) $\frac{1}{3}$ x 85m = 28.33 metres or $28\frac{1}{3}$