

Decimals

Decimal Rounding

- 4 a** Write 0.769 correct to: **i** 1 decimal place **ii** 2 decimal places
- b** Write 0.07149 correct to:
i 1 decimal place **ii** 2 decimal places **iii** 4 decimal places
- 5** Find decimal approximations for:
- a** 8.7 to the nearest integer **b** 15.63 to the nearest tenth
- c** $0.\overline{63}$ to 2 decimal places **d** $0.\overline{46}$ to 3 decimal places
- e** $0.\overline{7}$ to 4 decimal places **f** $0.\overline{8}$ to 5 decimal places
- 6** Use a calculator to evaluate correct to the number of decimal places shown in the square brackets:
- a** $\frac{37}{7}$ [1] **b** 2.4×3.79 [1] **c** $(0.8)^2$ [1]
- d** $(0.72)^2$ [2] **e** $\frac{8}{23}$ [2] **f** $0.3 \div 1.7$ [2]
- g** $(0.043)^2$ [3] **h** $\frac{2.3}{0.6}$ [3] **i** $\frac{14}{13}$ [3]
- 7** Darren's batting average is calculated as 53.6853. Round this to one decimal place.
- 8** Romandy Gold makes an annual profit of \$136.748 million. Round this figure to one decimal place.
- 9** Jordan shoots 32.587 points per basketball game. Round this to the nearest integer.
- 10** Tye calculates her interest due on a savings account to be \$78.1983. Round this to the nearest cent.
- 1** Round these numbers correct to 1 decimal place:
a 1.34 **b** 2.67 **c** 5.25 **d** 0.19 **e** 2.346 **f** 0.038
- 2** Round these numbers to 2 decimal places:
a 2.346 **b** 5.256 **c** 4.024 **d** 0.0258 **e** 52.3198 **f** 0.0178
- 3** Round these numbers correct to 3 decimal places:
a 1.5467 **b** 3.4981 **c** 0.01654 **d** 19.4567 **e** 2.34 **f** 0.19999

DISPLAY MODES ON A CALCULATOR

Most calculators have a FIX mode which allows you to choose the number of decimal places that appear on the screen. In effect, this rounds off numbers correct to the chosen number of decimal places.


To activate the FIX mode, press **MODE**, select the FIX option and specify the number of decimal places required.

Example 16

Round off 6.2579 to:

- a** 2 decimal places **b** the nearest whole number.

- a** Activate FIX mode and specify two decimal places.

Key in 6.2579 press  The answer is 6.26

- b** Activate FIX mode and specify 0 decimal places.

Key in 6.2579 press  The answer is 6

Note: You will need to check whether your calculator uses the same processes as shown in the example. If not, work out the keys which give you the correct answer.

EXERCISE 6E.2

- 1** Use your calculator to round to the number of decimal places in brackets:

- | | | | | | | | | |
|----------|---------|-----|----------|---------|-----|----------|---------|-----|
| a | 4.6517 | [2] | b | 15.1387 | [3] | c | 8.6604 | [2] |
| d | 98.99 | [1] | e | 15.9962 | [2] | f | 21.019 | [1] |
| g | 1.78496 | [4] | h | 17.499 | [0] | i | 0.00652 | [1] |

Multiplying decimals

The method

Step 1: For 0.3×0.07 , ignore the decimal point and find 3×7 . We get 21.

Step 2: Look at the original numbers and count the number of digits after the decimal point and **add** these numbers.

$$\begin{array}{c} 0.3 \times 0.07 \\ \underbrace{\quad} \quad \underbrace{\quad} \\ 1 \quad \quad 2 \end{array} \quad \text{and} \quad 1 + 2 = 3$$

Step 3: The answer has the same number of digits after the decimal point as the total for the question.

So, 21. becomes 0.021 and $\therefore 0.3 \times 0.07 = 0.021$

This can be written as

$$\begin{array}{r} 0.3 \quad 1 \text{ dp} \\ \times 0.07 \quad 2 \text{ dp} \\ \hline 0.021 \quad 3 \text{ dp} \end{array}$$

Example 17

Find the value of: **a** 3.6×0.7 **b** 0.4×0.005

| | | | |
|--|--|--|--|
| <p>a</p> $\begin{array}{r} 3.6 \quad 1 \text{ dp} \\ \times 0.7 \quad 1 \text{ dp} \\ \hline 2.52 \quad 2 \text{ dp} \end{array}$ | <p>Working</p> $\begin{array}{r} 36 \\ \times 7 \\ \hline 252 \end{array}$ | <p>b</p> $\begin{array}{r} 0.4 \quad 1 \text{ dp} \\ \times 0.005 \quad 3 \text{ dp} \\ \hline 0.0020 \quad 4 \text{ dp} \end{array}$ | <p>Working</p> $\begin{array}{r} 4 \\ \times 5 \\ \hline 20 \end{array}$ |
|--|--|--|--|

EXERCISE 6F

1 Find the value of:

- | | | |
|----------------------------|--------------------------------|--------------------------------------|
| a 0.3×0.2 | b 0.5×0.07 | c 0.02×0.4 |
| d $(0.4)^2$ | e $(0.06)^2$ | f 0.03×0.004 |
| g 0.004×40 | h 60×0.8 | i 600×0.07 |
| j 4000×0.6 | k $0.04 \times 40\,000$ | l $0.2 \times 0.3 \times 0.4$ |

2 Given that $27 \times 36 = 972$, evaluate the following:

- | | | |
|-----------------------------|-------------------------------|------------------------------|
| a 27×3.6 | b 2.7×3.6 | c 27×0.036 |
| d 0.27×3.6 | e 0.027×36 | f 0.27×0.36 |
| g 0.027×3.6 | h 0.027×0.036 | i 270×0.0036 |

| | | | | | |
|----------|----------------------|----------|--------------------------|----------|--------------------|
| g | 0.8×0.05 | h | 0.05×0.4 | i | $(0.2)^2$ |
| j | $(2.5)^2$ | k | 0.14×0.5 | l | $(0.03)^2$ |
| m | $(0.2)^3$ | n | $(0.3)^3$ | o | 25×0.0004 |
| p | $1 + 0.2 \times 0.3$ | q | $0.08 - 0.08 \times 0.2$ | r | $(0.3 - 1)^2$ |
| s | 6.2×1.3 | t | 5.6×0.04 | u | 9.13×4.6 |
| v | 5.16×0.7 | w | 10.4×0.34 | x | $(0.11)^3$ |

Remember to use BEDMAS where necessary.



- 5**
- Find the cost of 72 books at \$5.75 each.
 - Find the cost of 8.6 m of plastic sheeting at \$4.62 per metre.
 - I wish to buy 180 kg of flour at \$0.84 per kg and 25 kg of sugar at \$1.17 per kg. How much money do I require?
 - I pack 450 bags of salt, each of mass 0.15 kg. Find the total mass of all bags.
 - House bricks have a mass of 4.3 kg each and I buy 2500 of them.
 - Find the total mass of the bricks.
 - If my truck can carry only 2 tonne at a time, how many truck loads are necessary to transport the bricks?



Dividing Decimals

Example 18

Find: **a** $32.5 \div 5$ **b** $0.417 \div 3$

$$\begin{array}{r} \text{a} \quad \quad \quad 6.5 \\ 5 \overline{) 32.25} \end{array}$$

Answer: 6.5

$$\begin{array}{r} \text{b} \quad \quad \quad 0.139 \\ 3 \overline{) 0.41127} \end{array}$$

Answer: 0.139

In your working make sure you put the decimal points under one another.



In decimal division we *do not* worry about remainders. We overcome the problem by adding zeros as shown and use rounding if the answer does not become an exact number.

Examples:

• $6.3 \div 2 = 3.15$ as
$$\begin{array}{r} 3.15 \\ 2 \overline{) 6.30} \end{array} \leftarrow \text{add zero}$$

• $5.3 \div 3 \div 1.77$ (to 2 dp) as
$$\begin{array}{r} 1.766 \\ 3 \overline{) 5.2320} \end{array} \leftarrow \text{add zeros}$$

As a general rule we write our answers to *one more* place than in the question.



We notice that if we continue adding zeros we will not get an exact answer. So we round our answer to 2 decimal places to get 1.77

EXERCISE 6G

1 Evaluate:

a $8.4 \div 2$

b $15.6 \div 3$

c $20.4 \div 4$

d $0.15 \div 5$

e $0.126 \div 9$

f $1.61 \div 7$

g $49.8 \div 6$

h $3.04 \div 4$

i $0.616 \div 11$

j $0.0405 \div 3$

k $3.92 \div 8$

l $0.392 \div 7$

m $3.7 \div 2$

n $6.3 \div 5$

o $3.25 \div 7$

p $9.4 \div 3$

Example 19

Find:

a $18 \div 0.06$

b $0.021 \div 1.4$

$$\begin{aligned} \mathbf{a} \quad & 18 \div 0.06 \\ &= \frac{18 \times 100}{0.06 \times 100} \\ &= \frac{1800}{6} \\ &= 300 \end{aligned}$$

$$\begin{aligned} \mathbf{b} \quad & 0.021 \div 1.4 \\ &= \frac{0.021 \times 10}{1.4 \times 10} \\ &= \frac{0.21}{14} \\ &= 0.015 \end{aligned}$$

$$\begin{array}{r} 14 \overline{) 0.0210} \\ \underline{14 } \\ 70 \\ \underline{70} \\ - - \end{array}$$

2 Calculate:

a $0.9 \div 0.3$

b $4.9 \div 0.7$

c $15 \div 0.5$

d $0.36 \div 0.6$

e $0.8 \div 0.16$

f $0.25 \div 0.05$

g $3.2 \div 0.08$

h $2.7 \div 0.003$

i $0.84 \div 0.12$

j $10.71 \div 0.17$

k $0.52 \div 0.013$

l $12.88 \div 0.023$

3 Evaluate:

a $0.36 \div 4$

b $3 \div 5$

c $13.2 \div 1.1$

d $0.08 \div 4$

e $0.08 \div 0.4$

f $0.08 \div 0.004$

g $1.2 \div 5$

h $1.2 \div 500$

i $1.2 \div 0.05$

j $0.12 \div 5000$

k $0.12 \div 50$

l $0.12 \div 0.5$

m $0.012 \div 0.0005$

n $19 \div 4$

o $3 \div 8$

p $3.5 \div 25$

q $0.035 \div 2.5$

r $0.049 \div 0.07$

- 1 The following table gives the menu at a local takeaway bar with the prices for each item. Use this menu to answer the problems below:

| | |
|------------------------------------|--------|
| SAUSAGE | \$1.20 |
| MEAT PATTIE | \$1.50 |
| FISH | \$1.20 |
| HOT DOG | \$1.30 |
| CHIPS (SCOOP) | \$1.25 |
| CHICKEN NUGGET | \$0.50 |
| SPRING ROLL | \$1.80 |
| PRAWN CRACKERS | \$3.50 |
| WANTONS ($\frac{1}{2}$ DOZ) | \$3.50 |

- a Jenny ordered four fish, three hot dogs and two scoops of chips. How much did it cost her?
- b How much change from a \$20 note would Liam get if he ordered two spring rolls, prawn crackers, eight chicken nuggets and three scoops of chips?
- c How many wantons could Anton buy for \$21?
- d Hemi ordered a family pack that included the following:
10 fish, 6 meat patties, 5 sausages, 5 scoops of chips, 20 chicken nuggets, 2 dozen wantons, 6 hot dogs and 2 lots of prawn crackers. If there were 10 people in the family and each person paid an equal share of the cost, how much did each person pay?

- 2 Fred needed 100 m of timber costing \$1.45 per m, 3 kg of nails at \$4.50 per kg, 6 bags of cement at \$25.50 per bag and 6 cubic metres of shingle at \$18.50 per cubic metre. How much did these items cost him in total?

- 3 Kim had a 5 m length of ribbon which she cut into shorter ribbons with the following lengths: 1.3 m, 0.35 m, 2.05 m, 0.4 m and 0.24 m. After doing this she still had some ribbon left. How long was this left over ribbon?



- 4 Kym had \$15 in her pocket. How many \$0.40 stamps could she buy with this money?

- 6 a The school record for running the 100 m was 10.06 seconds. Jeremy broke the record by 0.09 seconds. What is the new record? (Very fast indeed!)
- b At the same athletics meet the 4 by 100 m relay team ran the four legs in the following times: 11.2 sec, 12.34 sec, 10.45 sec and 10.15 sec. The record for this race stood at 43.97 sec. Did the team break the record? Find the difference between their time and the record.



- 7 a Hemi earns \$7.50 an hour working for his uncle. Last week he worked for 15 hours. How much money did he earn?
- b This week Hemi earned \$150. How many hours did he work this week?
- 8 I weighed 72 kg before Christmas. After Christmas I weighed one tenth as much again. How much did I weigh after Christmas?

Recurring decimals repeat the same sequence of numbers without stopping. Recurring decimals result when the denominator of a fraction has one or more prime factors other than 2 or 5.

For example, $\frac{3}{14} = 0.2142857142857142857\dots$

We indicate a recurring decimal by writing the full sequence once with a line over the repeated section, or with a dot on the first and last digits of the repeating sequence.

for example, $\frac{1}{3} = 0.\overline{3}$ or $0.\dot{3}$ and $\frac{3}{14} = 0.2\overline{142857} = 0.2\dot{1}4285\dot{7}$.

4 Write as recurring decimals:

a $\frac{1}{3}$

b $\frac{5}{9}$

c $\frac{5}{6}$

d $\frac{7}{11}$

5 Use your calculator to write as recurring decimals:

a $\frac{2}{15}$

b $\frac{9}{14}$

c $\frac{23}{45}$

d $\frac{23}{54}$

Some decimals take a long time to recur e.g.,
 $\frac{1}{17} = 0.0588235294117647$



6 Write as decimals using any method you prefer.
 (Try *not* to use your calculator.)

a $\frac{3}{10}$

b $\frac{2}{5}$

c $\frac{13}{20}$

d $\frac{4}{25}$

e $\frac{2}{3}$

f $\frac{11}{50}$

g $\frac{17}{80}$

h $\frac{4}{7}$

i $\frac{13}{125}$

j $\frac{81}{500}$

k $\frac{4}{9}$

l $\frac{471}{1000}$

