

# Subtracting vertically

## Example

$$754 - 238 = ?$$

### Vertical

$$\begin{array}{r} \overset{4}{7}\overset{1}{5}4 \\ - 238 \\ \hline \end{array}$$

8 cannot be taken from 4.  
Rename 50 as 40 + 10.  
So 5 tens becomes 4 tens.  
4 becomes 10 + 4 = 14

$$\begin{array}{r} \overset{4}{7}\overset{1}{5}4 \\ - 238 \\ \hline 6 \end{array}$$

$$14 - 8 = 6$$

$$\begin{array}{r} \overset{4}{7}\overset{1}{5}4 \\ - 238 \\ \hline 516 \end{array}$$

Subtract the tens  
and hundreds  
4 tens - 3 tens = 1 ten  
7 hundreds - 2 hundreds  
= 5 hundreds

### Horizontal

$$\begin{aligned} 754 - 238 &= (700 + 50 + 4) - (200 + 30 + 8) \\ &= (700 - 200) + (50 - 30) + (4 - 8) \\ &= (4 - 8) + (50 - 30) + (700 - 200) \\ &= (14 - 8) + (40 - 30) + (700 + 200) \\ &= 6 + (40 - 30) + (700 - 200) \\ &= 6 + 10 + 500 \\ &= 516 \end{aligned}$$

8 cannot be taken from 4.  
Rename 50 as 40 + 10  
10 + 4 = 14

Subtract the ones, then tens, then hundreds



## Activity



- 1 For **parts a and b** discuss why Tara rewrote the numbers as she did. Find the answers using a horizontal method.

- a Tara wanted to subtract \$128 from \$342 to find the sale price of a mobile phone.

She renamed \$342 as  $300 + 30 + 12$

- b Tara wanted to subtract \$164 from \$348 to find the sale price of another phone.

She renamed \$348 as  $200 + 140 + 8$

- c To find the cost of a third phone, Tara wanted to find the answer to \$453 - \$176. How could she rename \$453 so that there would be enough hundreds, tens and ones to do the subtraction?



- 2 Tara started to work out the answer to \$586 - \$153 like this. Would she need to rename \$586 any further? Explain.

$$\begin{array}{r} 500 + 80 + 6 \\ - (100 + 50 + 3) \\ \hline \end{array}$$

## Dividing by a one-digit number

### Example

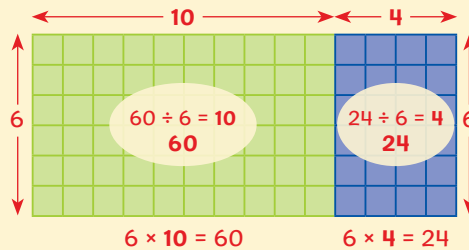
The Anaru family spent \$84 on 6 ride tickets for the school fair. How much did each ticket cost?

The equation for this problem is  $84 \div 6 = ?$

Split 84 into numbers that divide easily by 6.

$$\begin{aligned} 84 &= 60 + 24 \\ 84 \div 6 &= (60 \div 6) + (24 \div 6) \\ &= 10 + 4 \\ &= 14 \end{aligned}$$

$$\begin{aligned} 84 &= 80 + 4 \\ &= 70 + 14 \\ &= 60 + 24 \end{aligned}$$



### Activity 1

1 Split the numbers being divided so that you can use your basic facts to help you find the answer.

a  $64 \div 4$

b  $42 \div 3$

c  $65 \div 5$

d  $72 \div 6$

e  $99 \div 9$

f  $76 \div 4$

g  $84 \div 6$

h  $81 \div 3$

i  $115 \div 5$

j  $114 \div 3$

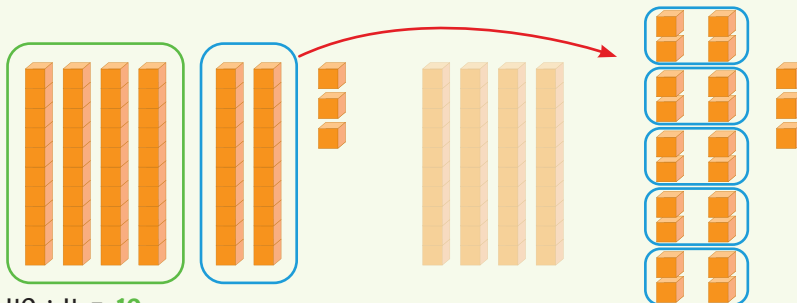
k  $136 \div 4$

l  $126 \div 9$

### Practical

#### Dividing with place value blocks

Scott used place value blocks to work out  $63 \div 4$



$40 \div 4 = 10$

$23 \div 4 = 5$  with 3 left over

$$\begin{aligned} 63 \div 4 &= 10 + 5 \text{ with } 3 \text{ left over} \\ &= 15 \text{ r } 3 \end{aligned}$$

I have to change 2 of the tens blocks into ones.



Use place value blocks and split them up if needed to find the answers to these.

a  $57 \div 5$

b  $71 \div 4$

c  $53 \div 3$

d  $84 \div 6$

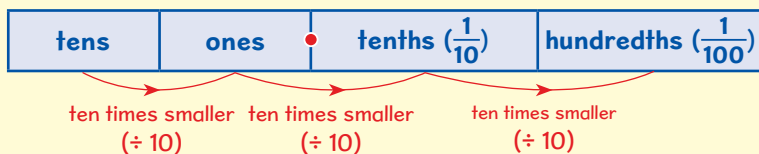
# Converting decimals to fractions

It is helpful to know these facts.

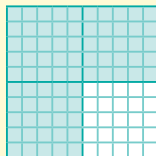
$$0.25 = \frac{1}{4}$$

$$0.5 = \frac{1}{2}$$

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



**Example**  $0.75 = \frac{7}{10} + \frac{5}{100}$   
 $= \frac{75}{100}$   
 $= \frac{3}{4}$



$$\frac{75}{100} = \frac{3}{4}$$

ones	•	tenths	hundredths
0	•	7	5

## Discussion

What is 0.25 as a fraction with 100 as the denominator?  
 What is this in its simplest form?



## Examples

Write **a** 0.27      **b** 1.63      as fractions.

**a**  $0.27 = \frac{27}{100}$

tens	ones	•	tenths	hundredths
	0	•	2	7

$$\frac{2}{10} + \frac{7}{100} = \frac{27}{100}$$

**b**  $1.63 = 1\frac{63}{100}$

tens	ones	•	tenths	hundredths
	1	•	6	3

$$1 + \frac{6}{10} + \frac{3}{100} = 1\frac{63}{100}$$

## Activity

1 Write these as a fraction with a denominator of 100.

**a**

tens	ones	•	tenths	hundredths
	0	•	5	7

$$\frac{5}{10} + \frac{7}{100}$$

**b**

tens	ones	•	tenths	hundredths
	0	•	8	3

$$\frac{8}{10} + \frac{3}{100}$$

**c**

tens	ones	•	tenths	hundredths
	1	•	2	7

$$1 + \frac{2}{10} + \frac{7}{100}$$

**d**

tens	ones	•	tenths	hundredths
	2	•	0	4

$$2 + \frac{0}{10} + \frac{4}{100}$$

**e**  $\frac{8}{10} + \frac{5}{100}$

**f**  $\frac{6}{10} + \frac{7}{100}$

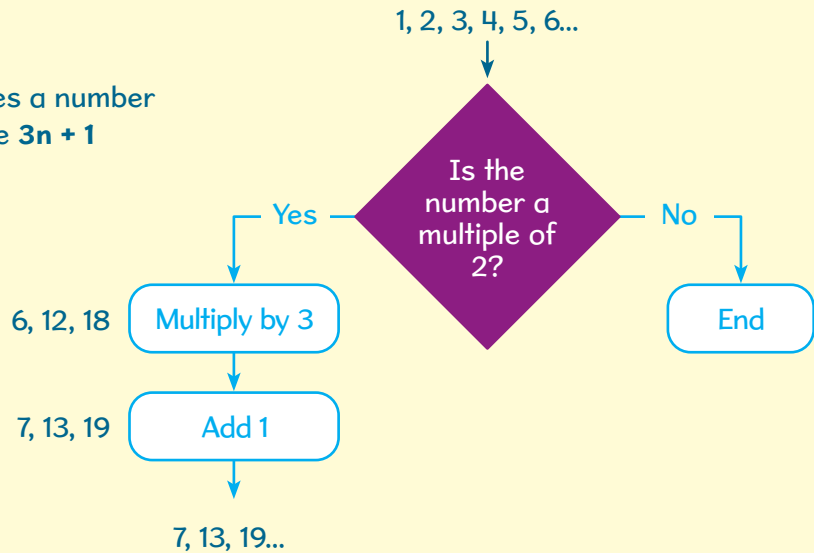
**g**  $\frac{4}{10} + \frac{3}{100}$

# Algorithms

An **algorithm**, or **flowchart**, can be made to show a sequence of events needed to complete a task.

## Example

This flowchart creates a number pattern using the rule  $3n + 1$  and multiples of 2.



## Activity

- What are the next 3 terms in the number pattern given in the example?
  - What would the 10th term be?

The 10th term is found by starting with the 10th multiple of 2.

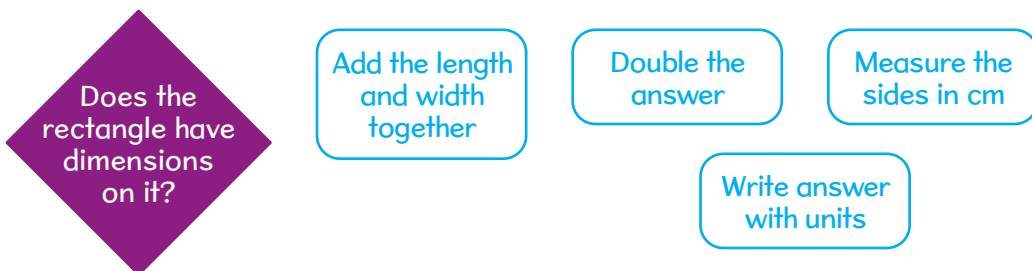


- Use the flowchart in the example to find the first 10 terms if you used the multiples of these.

**a** 5    **b** 10    **c** 6    **d** 9    **e** 7

- Create a flowchart of your own using the rule  $\frac{n}{2} - 1$  for the multiples of 4. List the first 10 terms.

- Put these boxes together to make a flow chart for finding the perimeter of a rectangle.



- Make up your own rule and flowchart. Check that it works. Ask your partner to list the first 5 terms of your flowchart.

# ANSWERS

## NC5-1 Factors

### Discussion

- Yes, 6 for Jack and 6 for 1 other person.
- Yes, 4 for Jack and 4 for each of 2 others.
- Yes, 3 for Jack and 3 for each of 3 others.
- 1, 2, 3, 4, 6.

### Activity

- 1 **b** 1 and 18, 2 and 9, 3 and 6.  
**c** 1 and 12, 2 and 6, 3 and 4.  
**d** 1 and 14, 2 and 7.  
**e** 1 and 15, 3 and 5.  
**f** 1 and 16, 2 and 8, 4 and 4.

## NC5-2 Factors cont.

- 2 **a** 1, 5, 25    **b** 1, 2, 4, 8, 16, 32, 64  
**c** 1, 2, 3, 4, 6, 8, 12, 16, 32, 48, 96  
**d** 1, 2, 5, 10, 13, 26, 65, 130  
**e** 1, 2, 3, 4, 6, 8, 11, 12, 22, 24, 33, 44, 66, 88, 132, 264  
**f** 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 18, 20, 24, 30, 36, 45, 54, 60, 72, 90, 108, 120, 135, 180, 216, 270, 360, 540, 1080.
- 3 **a** 6    **b** 12 and 18    **c** 4
- 4 **a** 1 and 72, 2 and 36, 3 and 24, 4 and 18, 12 and 6, 8 and 9.  
**b** 2, 3 and 12; 2, 4 and 9; 4 and 18; 6, 3 and 4; 3, 3 and 8.
- 5 **a** 6  
**b** 12

## NC5-3 Rounding to the nearest whole number and one decimal place

### Activity 1

- 1 **a** 63 m    **b** 8 cm    **c** 165 m    **d** 52 L  
**e** \$2    **f** \$11    **c** \$9    **d** \$7  
**e** \$6    **f** 21    **g** \$37    **h** \$16
- 3 **a** 5 kg    **b** 8 m    **c** 16 cm    **d** 19 kg  
**e** 30 kg    **f** 154 L    **g** 128 ml    **h** 386 g  
**i** 1828 km    **j** 5863 cm
- 4 **a** 33    **b** 47    **c** 87    **d** 127  
**e** 327    **f** 853    **g** 831    **h** 763  
**i** 181    **j** 100
- 5 45 kg  
6 16 cm  
7 6 km  
8 0, 1, 2, 3, 4

## NC5-4 Rounding to the nearest whole number and one decimal place cont.

### Discussion

- 1 **a** Possible answers are: \$660 or \$700  
**b** Possible answers are: \$990 or \$1000  
**c** 3 L
- 2 To show that he has rounded to the nearest whole number, he writes his answer as 9. If he rounded to the nearest tenth, he would write his answer as 9.0.

### Activity 2

- 1 **a** 6.4    **b** 15.8    **c** 1.0    **d** 27.7  
**e** 4.1    **f** 0.01
- 2 **a** 64.4 m    **b** 3.9 L    **c** 0.9 km    **d** 7.7 m  
**e** 120.6 km    **f** 500.1 m    **g** 17.1 kg    **h** 0.8 L  
**i** 0.1 km    **j** 2.0 m
- 3 **a** 8.6    **b** 3.3    **c** 16.7    **d** 24.8  
**e** 30.8    **f** 36.7    **g** 91.9    **h** 86.1  
**i** 18.0    **j** 3.0
- 4 **a** 568 kg    **b** 568.5 kg

- 5 **a** 3.9 kg because rounding to the nearest kg is not accurate enough for a baby.  
**b** \$387 or \$390 because either of these roundings are accurate enough for spending.  
**c** 59km or 60km because rounding to the nearest 100km would not be accurate enough.  
**d** 6 hours because rounding to the nearest 10 hours would not be accurate enough.

## NC5-5 Estimating the answers to calculations

### Discussion

\$128 is about \$130. \$119 is about \$120. \$120 + \$130 = \$250. \$137 is not close to the estimate of \$250, so Jack is wrong.

## NC5-6 Estimating the answers to calculations cont.

### Activity

- 1 **a** Fred    **b** Will    **c** Will    **d** Fred    **e** Will  
**f** Wiremu    **g** Wiremu    **h** Fred    **i** Will    **j** Fred
- 2 **a** C    **b** C    **c** B    **d** A
- 3 Possible answers are:  
**a** 80    **b** 20    **c** 30    **d** 120    **e** 40  
**f** 1000    **g** 400    **h** 5000 or 4700    **i** 1600  
**j** 6400    **k** 1200    **l** 80    **m** 100    **n** 3600
- 4 **a**  $32 \times 17$     **b** about 600  
5 **a**  $46 \times 23$     **b** about 1000  
6 **a**  $24 \times 96$     **b** about 2400 ( $24 \times 100$ ) or 2000 ( $20 \times 100$ )  
7 Simon Reid travels about 4500 km, Adrian Willis travels about 3500 km and Malcolm Tom travels about 15 000 km.

## NC5-7 Checking if answers are reasonable

### Discussion

- Not reasonable. A normal walking pace is about 5 km per hour. Liam would expect to walk about  $4\frac{1}{2}$  to 5 km in 1 hour.
- Not reasonable. A day pack would weigh less than 10kg.
- Not reasonable. A 10 year old needs about 10 hours sleep a night. In 2 weeks, Chen would expect to sleep about  $10 \text{ hours} \times 14 \text{ days} = 140 \text{ hours}$ .
- Reasonable. 84 is about 80, which is about half of 160.

### Activity

- 1 No. It is far too much water and would be too much to carry.  
2 No. This is far too expensive.  
3 No. Two lots of \$2.55 would be just over \$5.  
4 No. Six times 15 seconds is much less than 9 minutes.  
5 No. Each amount is less than \$10, so the answer must be less than \$40.

## NC5-8 Checking if answers are reasonable cont.

- 6 No. \$3.90 is less than \$4. So 9 pens would cost less than \$36.  
7 **a** Reasonable. 74 is about 75.  $97$  is about 100.  
 $\frac{75}{100} = \frac{3}{4}$   
**b** Not reasonable. 86 is about half 180, not  $\frac{1}{3}$ .  
**c** Reasonable. 1.6 mg is about half 3 mg.  
8 **a** double    **b** half    **c** quarter  
**d** three quarters    **e** quarter