

Dividing with no remainders



Example $3269 \div 7$

$3269 \div 7$ is about $3500 \div 7 = 500$

To estimate the answer round to the nearest number you can divide easily by 7.

In $3269 \div 7 = 467$
7 is the **divisor**.
3269 is the **dividend**.
467 is the **quotient**.



$$\begin{array}{r} 7 \overline{)3269} \\ - 2800 \\ \hline 469 \\ - 420 \\ \hline 49 \\ - 49 \\ \hline 0 \end{array}$$

7×400 ($7 \times 4 = 28$)
 7×60 ($7 \times 6 = 42$)
 7×7

$3269 \div 7 = 467$

OR

$$\begin{array}{r} 7 \overline{)3269} \\ 3 \text{ thousands} \div 7 \\ = 0 \text{ thousands with } 3 \text{ thousands remainder} \\ 32 \text{ hundreds} \div 7 \\ = 4 \text{ hundreds with } 4 \text{ hundreds remainder} \\ 46 \text{ tens} \div 7 = 6 \text{ tens with } 4 \text{ tens remainder} \\ 467 \text{ ones} \div 7 = 7 \text{ ones} \end{array}$$

Example Tim buys a 756 cm length of wood to make 21 shelf ends.
How much wood does Tim use for each?

$756 \div 21$

Estimate first. $756 \div 21$ is approximately $800 \div 20 = 40$.

$$\begin{array}{r} 21 \overline{)756} \\ - 630 \\ \hline 126 \\ - 126 \\ \hline 0 \end{array}$$

21×30 ($21 \times 3 = 63$)
 21×6 ($7 \times 6 = 42$)

$756 \div 21 = 36$

OR

$$\begin{array}{r} 21 \overline{)756} \\ 7 \text{ hundreds} \div 21 \\ = 0 \text{ hundreds with } 7 \text{ hundreds remainder} \\ 75 \text{ tens} \div 21 \\ = 3 \text{ tens with } 12 \text{ tens remainder} \\ 126 \text{ ones} \div 21 = 6 \text{ ones} \end{array}$$

$$\begin{array}{r} 36 \\ 21 \overline{)756} \end{array}$$

$126 \text{ ones} \div 21 = 6 \text{ ones}$

Tim uses **36 cm** for each shelf end.

Activity

Estimate the answers, then calculate.

- 1 **a** $312 \div 4$ **b** $295 \div 5$ **c** $234 \div 6$ **d** $486 \div 9$ **e** $1715 \div 7$
f $1707 \div 3$ **g** $2008 \div 8$ **h** $1832 \div 4$ **i** $3378 \div 6$ **j** $5094 \div 9$

2 Find the answers.

- a** $156 \div 12$ **b** $325 \div 25$ **c** $672 \div 21$ **d** $624 \div 26$ **e** $418 \div 22$
f $722 \div 38$ **g** $648 \div 36$ **h** $832 \div 52$ **i** $432 \div 18$ **j** $483 \div 21$
k $966 \div 23$ **l** $756 \div 36$ **m** $720 \div 24$ **n** $780 \div 39$ **o** $494 \div 26$
p $851 \div 23$ **q** $675 \div 25$ **r** $513 \div 19$ **s** $544 \div 32$ **t** $882 \div 98$
u $756 \div 36$ **v** $504 \div 42$ **w** $777 \div 37$ **x** $490 \div 14$ **y** $374 \div 17$

Multiplying decimals by whole numbers

Multiplying decimals follows the same process as multiplying whole numbers.

Example

$$0.6 \times 184$$

Estimate first.

0.6 is about $\frac{1}{2}$ and 184 is about 180 .

$$\frac{1}{2} \text{ of } 180 = 90$$

$$0.6 \times 184 = 184 \times 0.6$$

$$0.6 \times 184 = 110.4$$

$$\begin{array}{r} 52 \\ 184 \\ \times 6 \\ \hline 1104 \end{array}$$

← Multiply without the decimal point.

The estimate shows that the answer is 110.4 rather than 11.04 or 1104 .

Example

$$0.78 \times 628$$

Estimate first.

0.78 is about $\frac{3}{4}$ and 628 is about 600 .

$$\frac{1}{4} \text{ of } 600 = 150 \text{ so } \frac{3}{4} \text{ of } 600 = 450$$

$$0.78 \times 628 = 489.84$$

$$\begin{array}{r} 628 \\ \times 78 \\ \hline 5024 \\ +43960 \\ \hline 48984 \end{array} \quad \begin{array}{l} 8 \times 628 \\ 70 \times 628 \end{array}$$

The estimate shows that the answer is 489.84 rather than 4898.4 or 48.984 .

Discussion

When you multiply a number by a number less than one, is the answer smaller or greater than the number being multiplied? Explain.

Activity

1 Find the answers to these.

a 0.2×52

b 0.5×126

c 0.7×84

d 0.4×126

e 0.2×121

f 0.7×528

g 0.6×413

h 0.3×752

i 0.26×104

j 0.51×394

k 0.76×412

l 0.81×516

m 0.61×324

n 0.98×631

o 0.18×465

p 0.07×816

Estimate first. You could use benchmarks such as $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ etc.

2 Tiffany is going on holiday to Europe. She wants to convert NZ\$850 to Euros. The exchange rate is NZ\$1 = 0.55 Euros. How many Euros will she get?

3 A map had a scale of $0.6\text{cm} = 1\text{km}$. A journey in real life was 16km . How many cm on the map would this be?

4 Jamie got 76% of the possible 820 marks in her end of year exams.

a Will her total be more or less than 820? Explain.

b Use decimal multiplication to work out Jamie's mark.

Change the percentages to decimals first.

5 Kahu was driving from Wellington to Auckland, a distance of 643km . He had travelled 58% of the journey when he got a puncture. How far had he travelled?

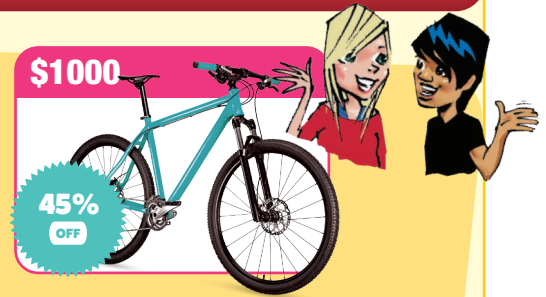
Working with percentages

Discussion

Carly worked out the sale price of this bike like this.

$$\begin{aligned} 45\% \text{ of } \$1000 &= 0.45 \times \$1000 \\ &= \$450 \\ \$1000 - \$450 &= \mathbf{\$550} \end{aligned}$$

Hemi worked out the sale price by finding 55% of \$1000.
He got the same answer as Carly. Explain.



To find a discount of 30%.

- find 30% of the amount and subtract it from the amount.
- or – find 70% of the amount.

$$100\% - 30\% = 70\%$$



Example

Marita bought a car for \$4800.
When she sold it she made a 15% loss.
How much did she sell the car for?

$$\begin{aligned} 15\% \text{ of } \$4800 &= (10\% + 5\%) \text{ of } \$4800 \\ &= \$480 + \$240 \\ &= \$720 \\ \$4800 - \$720 &= \mathbf{\$4080} \end{aligned}$$

I worked out 15% of 4800
by $0.15 \times 4800 = 720$



$$\begin{aligned} \text{or } 100\% - 15\% &= 85\% \\ 85\% \text{ of } \$4800 &= (8 \times 10\% + 5\%) \text{ of } \$4800 \\ &= (8 \times \$480) + \$240 \\ &= \$3640 + \$240 \\ &= \mathbf{\$4080} \end{aligned}$$



I multiplied 0.85 by
4800 to get **4080**.

Activity

1 Work out the sale price of these.

a

10% OFF!
Was \$420
NOW ?



b

20% OFF!
Was \$180
NOW ?



c

40% OFF!
Was \$260
NOW ?

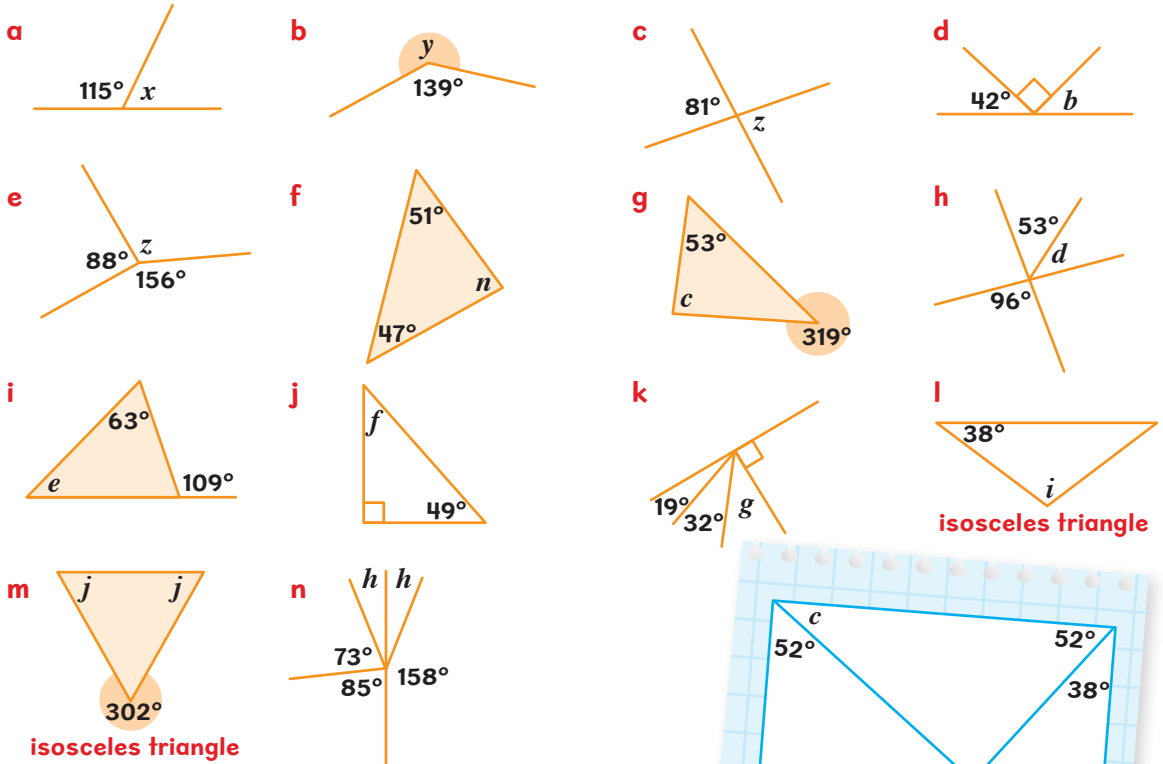


2 Samuel bought a model aeroplane for \$30.
He painted and repaired it and sold it for a profit of 40%.
How much did he sell it for?

More angles practice

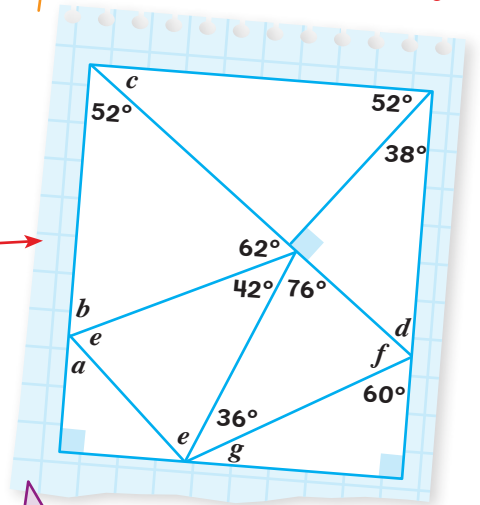
Activity

1 Calculate the value of the angles marked with letters.

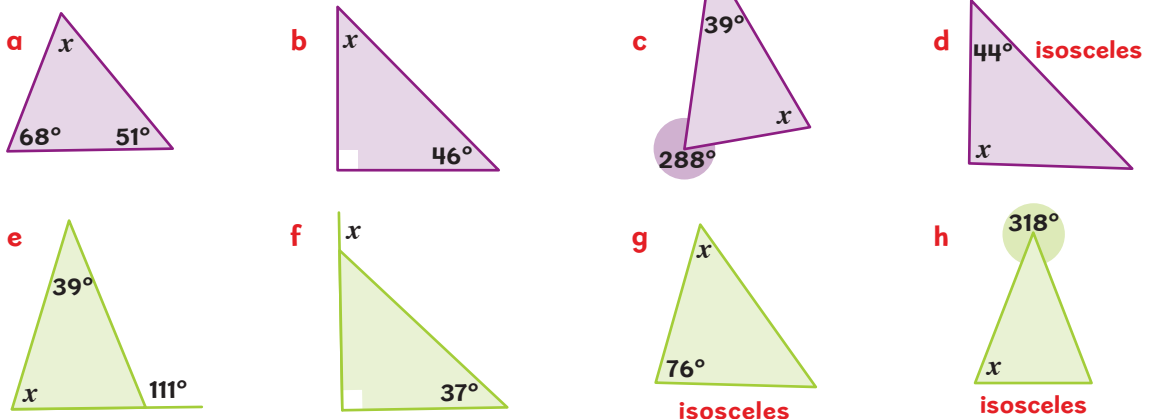


2 Use a copy of this.

- Find the value of each unknown on the diagram.
- If the value of the unknown is less than 60° , shade the triangle that contains the unknown.
- What is special about all the shaded triangles?



3 Find the value of x .



ANSWERS

NC8-1 Powers of 10

Discussion

Ones: 10^0 , tenths: 10^{-1} , hundredths: 10^{-2} , thousandths: 10^{-3} .

NC8-2 Powers of 10 cont.

Activity

- 1 a 1000 b 10 000 c 1 d 10
 e 0.01 f 0.1 g 0.001 h 10 000
 i 1 000 000
 2 a 10^1 b 10^4 c 10^6 d 10^0
 e 10^{-1} f 10^{-3} g 10^{-4}

- 3 b $10^{-2} = \frac{1}{10^2} = \frac{1}{100} = 0.01$
 c $10^{-3} = \frac{1}{10^3} = \frac{1}{1000} = 0.001$
 d $10^{-4} = \frac{1}{10^4} = \frac{1}{10\,000} = 0.0001$
 e $10^{-3} = \frac{1}{10^3} = \frac{1}{1000} = 0.001$

- 4 a four point three times ten to the power of three metres or four thousand three hundred metres.
 b one point zero seven times ten to the power of six kilometres or one million and seventy thousand kilometres
 c six times ten to the power of negative two centimetres or six hundredths of a centimetre.
 d one point five times ten to the power of negative five metres.
 e five point five eight times ten to the power of six kilometres or five million five hundred and eighty thousand kilometres.
 f nine point four times ten to the power of twelve kilometres
 g one point six times ten to the power of negative five light years.
 h two point one times ten to the power of negative three watts or twenty one thousandths of a watt.

- 5 a 10^6 b 10^4 c 10^{-2} d 10^{-4}
 6 a 10^{13} km b 10^9 km c 10^{-3} kg

NC8-3 Ordering whole numbers using powers of 10

Activity

- 1 a 4100 g b 89 000 m c 786 000
 d 3.56×10^6 cm e 3.6×10^{-2} L f 5.8×10^{-1} kg
 g 5.2×10^{-1} m² h 6.3×10^{-3} i 9.8×10^{-3}
 j 7.6×10^{-2} k 6.9×10^{-4} l 0.001
 2 a 51 000, 5.0×10^3 , 48×10^1 , 4.6×10^2
 b 83.0×10^2 ; 7.8×10^3 , 77 040, 77 004
 c 60 000, 5.92×10^3 , 5.9×10^3 , 61×10^2
 d 0.03, 2.7×10^{-2} , 3.1×10^{-3} , 0.0028
 e $54, 530 \times 10^{-1}$, 5.3×10^0 ; 0.5×10^1
 f $67^0 \times 10$; 65×10^{-1} , 6.4×10^{-1} , 6.5×10^{-2}
 3 Alice's 4 greater

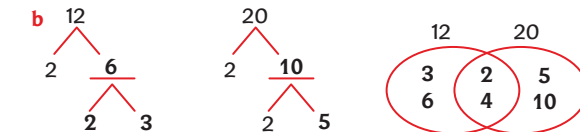
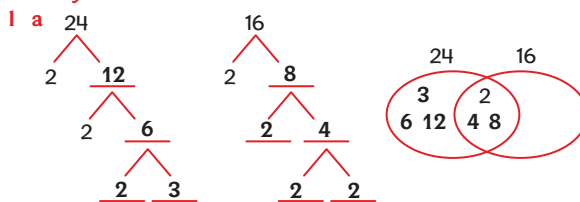
NC8-4 Composite numbers

Activity

- 1 a No b No c Yes d No
 e Yes f No g Yes h No
 i Yes j No k No l No
 m No n Yes o No
 2 4
 3 a 6, 9, 12, 21 b 9, 18, 21, 39 c 8, 14, 25, 27, 33
 d 9, 16, 28, 35 e 38, 49, 57, 63 f 12, 24, 51, 85
 4 32 5 102
 6 a 452 b 97 c 87
 7 a 49 b 41 c 130
 8 IF

NC8-5 Prime factorisation and finding HCF

Activity 1



- 2 a 8 b 4

NC8-6 Prime factorisation and finding HCF cont.

- 3 a 3 b 6 c 4 d 4 e 4 f 6

Activity 2

- 1 a 18: 2, 3 and 24: 2, 3
 b 8: 2 and 20: 2, 5
 c 72: 2, 3 and 100: 2, 5
 2 a 6 b 4 c 3 d 6 e 2
 f 8 g 4 h 2 i 9 j 4
 k 4 l 12 m 8 n 16 o 9
 3 a $\frac{3}{4}$ b $\frac{2}{5}$ c $\frac{4}{5}$ d $\frac{4}{5}$ e $\frac{2}{7}$
 f $\frac{4}{5}$ g $\frac{9}{25}$ h $\frac{68}{75}$ i $\frac{9}{10}$ j $\frac{5}{6}$
 k $\frac{4}{7}$ l $\frac{3}{2}$ or $1\frac{1}{2}$ m $\frac{5}{3}$ or $1\frac{2}{3}$ n $\frac{4}{3}$ or $1\frac{1}{3}$

NC8-7 Rounding to powers of 10

Activity

- 1 a 320 b 5900 c 5700 d 1830
 e 30 000 f 900 000 g 43 300 h 90 000
 i 700 000 j 68 400 k 59 000 l 70 000
 m 100 000 n 6 000 000 o 6 000 000
 2 a nearest 100 b nearest 10 000

NC8-8 Rounding to powers of 10 cont.

- 3 a nearest 10 000 b nearest 100 000
 4 Nearest hundred
 5 Chinese: 800 million, English 450 million, Hindi 350 million, Spanish 300 million, Russian 200 million
 6 Hunter is more accurate. His rounding is close to the actual enrolment number. James has rounded to the nearest 100 000 which has given a less accurate estimate.
 7 a 12 500 b 13 499
 8 a 175 000 b 184 999
 9 a 23 650 b 24 749
 10 Possible answers:
 a Val – \$2510, \$2550, \$2590
 b Maya – \$2410, \$2450, \$2490

NC8-9 Estimating and checking answers

Discussion

- Greater, because 0.59 is greater than 0.5 or $\frac{1}{2}$.
- less, less, more, more, less.