

A Ratio

- 4 Divide \$200 in the ratio 7:3.

$$7 + 3 = 10$$
$$200 \div 10 = 20$$

$$7:3$$
$$\times 20 \rightarrow 140:60 \rightarrow \times 20$$

\$ 140, \$ 60 [2]

- 7 Divide 96 cm in the ratio 5:3.

$$5 + 3 = 8$$

$$96 \div 8 = 12$$

$$5:3$$
$$\times 12 \rightarrow 60:36 \rightarrow \times 12$$

60 cm, 36 cm [2]

- 5 Divide 120 in the ratio 3:5.

$$3 + 5 = 8$$

$$120 \div 8 = 15$$

$$3:5$$
$$\times 15 \rightarrow 45:75 \rightarrow \times 15$$

45, 75 [2]

- 2 Sahil and Anika share \$78 in the ratio 5:8.

Calculate the amount each receives.

$$5 + 8 = 13$$

$$78 \div 13 = 6$$

$$5:8$$
$$\times 6 \rightarrow 30:48 \rightarrow \times 6$$

Sahil \$ 30

Anika \$ 48 [2]

- 2 Bob, Chao and Mei take part in a run for charity.

(a) Their times to complete the run are in the ratio Bob : Chao : Mei = 4 : 5 : 7.

(i) Find Chao's time as a percentage of Mei's time.

$$\frac{\text{Chao}}{\text{Mei}} = \frac{5}{7}$$

$$(5 \div 7) \times 100$$

71.4 % [1]

- 5 (a) Write the ratio $120 : 150 : 75$ in its simplest form.

$$\begin{array}{l} \div 5 \rightarrow 24 : 30 : 15 \\ \div 3 \rightarrow 8 : 10 : 5 \end{array}$$

$$8 : 10 : 5 \quad [2]$$

- (b) Advik and Bidhi share \$160 in the ratio 3 : 5.

Calculate how much they each receive.

$$3 + 5 = 8$$

$$160 \div 8 = 20$$

$$\begin{array}{l} 3 : 5 \\ \times 20 \rightarrow 60 : 100 \end{array}$$

$$\begin{array}{l} \text{Advik \$ } 60 \\ \text{Bidhi \$ } 100 \end{array} \quad [2]$$

- 6 Divide \$140 in the ratio 2 : 1 : 4.

$$2 + 1 + 4 = 7$$

$$140 \div 7 = 20$$

$$\begin{array}{l} 2 : 1 : 4 \\ \times 20 \rightarrow 40 : 20 : 80 \end{array}$$

$$\text{\$ } 40, \text{\$ } 20, \text{\$ } 80 \quad [2]$$

- (b) Share \$608 in the ratio 4 : 5 : 7.

$$4 + 5 + 7 = 16$$

$$608 \div 16 = 38$$

$$\begin{array}{l} 4 : 5 : 7 \\ \times 38 \rightarrow 152 : 190 : 266 \end{array}$$

$$\begin{array}{l} \$ 152 \\ \$ 190 \\ \$ 266 \end{array} \quad [3]$$

- 1 (a) An orchard has 1250 trees.
The trees are in the ratio apple : pear : cherry = 12 : 9 : 4.

(i) Calculate the number of apple trees.

$$\begin{aligned} 12 + 9 + 4 &= 25 \\ 1250 \div 25 &= 50 \\ 12 : 9 : 4 &\rightarrow \times 50 \\ 600 : 450 : 200 \end{aligned}$$

..... 600 [2]

- 3 \$126 is divided into 3 shares in the ratio 1 : 2 : 4 .

Find the value of the largest share.

$$\begin{aligned} 1 + 2 + 4 &= 7 \\ 126 \div 7 &= 18 \\ 1 : 2 : 4 &\rightarrow \times 18 \\ 18 : 36 : 72 \end{aligned}$$

\$ 72 [2]

- 1 (a) Malena has 450 fruit trees.
The fruit trees are in the ratio apple : pear : plum = 8 : 7 : 3.

(i) Show that Malena has 200 apple trees.

$$\begin{aligned} 8 + 7 + 3 &= 18 \\ 450 \div 18 &= 25 \\ 8 : 7 : 3 &\rightarrow \times 25 \\ 200 : 175 : 75 \end{aligned}$$

..... 200 apple trees

[2]

(ii) Find the number of plum trees.

..... 75 [1]

- 6 The angles of a triangle are in the ratio 2:3:7.

Find each angle.

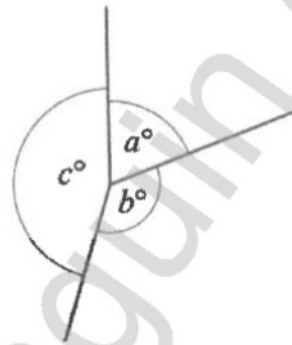
angles in a triangle = 180°
 $2 + 3 + 7 = 12$
 $180 \div 12 = 15$
 $2:3:7$
 $\times 15 \rightarrow 30:45:105 \rightarrow \times 15$

$30^\circ, 45^\circ, 105^\circ$ [3]

- (b) The diagram shows three lines meeting at a point.
 The ratio $a:b:c = 3:4:5$.

Find the value of c .

angles around a point = 360°
 $3 + 4 + 5 = 12$
 $360 \div 12 = 30$
 $3:4:5$
 $\times 30 \rightarrow 90:120:150 \rightarrow \times 30$
 $a:b:c$



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$c = 150^\circ$ [3]

- 2 (a) Alex, Bobbie and Chris share strawberries in the ratio Alex : Bobbie : Chris = 3 : 2 : 2.
Chris receives 12 strawberries.

Calculate the total number of strawberries shared.

$2 \text{ parts} = 12$
 $1 \text{ part} = 6$
 $3:2:2$
 $\times 6 \rightarrow 18:12:12 \rightarrow \times 6$

$18 + 12 + 12 = 42$

42 [2]

- 1 (a) (i) At a football club, season tickets are sold for seated areas and for standing areas.
The cost of season tickets are in the ratio seated : standing = 5 : 3.
The cost of a season ticket for the standing area is \$45.

Find the cost of a season ticket for the seated area.

$$\begin{array}{l} \div 3 \left\{ \begin{array}{l} 3 \text{ parts} = 45 \\ 1 \text{ part} = 15 \end{array} \right. \div 3 \end{array}$$

$$\begin{array}{l} \times 15 \left\{ \begin{array}{l} 5 : 3 \\ 75 : 45 \end{array} \right. \times 15 \end{array}$$

\$ 75 [2]

- 2 (a) A plane has 14 First Class seats, 70 Premium seats and 168 Economy seats.

Find the ratio First Class seats : Premium seats : Economy seats.
Give your answer in its simplest form.

$$\begin{array}{l} \div 7 \left\{ \begin{array}{l} 14 : 70 : 168 \\ 2 : 10 : 24 \end{array} \right. \div 7 \\ \div 2 \left\{ \begin{array}{l} 2 : 10 : 24 \\ 1 : 5 : 12 \end{array} \right. \div 2 \end{array}$$

1 : 5 : 12 [2]

- (b) (i) For a morning flight, the costs of tickets are in the ratio

First Class : Premium : Economy = 14 : 6 : 5.

The cost of a Premium ticket is \$114.

Calculate the cost of a First Class ticket and the cost of an Economy ticket.

$$\begin{array}{l} \div 6 \left\{ \begin{array}{l} 6 \text{ parts} = 114 \\ 1 \text{ part} = 19 \end{array} \right. \div 6 \end{array}$$

$$\begin{array}{l} \times 19 \left\{ \begin{array}{l} 14 : 6 : 5 \\ 266 : 114 : 95 \end{array} \right. \times 19 \end{array}$$

First Class \$ 266

Economy \$ 95 [3]

- 12 Alex and Chris share sweets in the ratio Alex : Chris = 7 : 3.
Alex receives 20 more sweets than Chris.

Work out the number of sweets Chris receives.

$$7 - 3 = 4 \text{ parts (more for Alex)}$$

$$\begin{aligned} \rightarrow 4 \text{ parts} &= 20 \\ \div 4 \quad \downarrow & \quad \downarrow \div 4 \\ 1 \text{ part} &= 5 \end{aligned}$$

$$\begin{aligned} 7 : 3 \\ \times 5 \quad \downarrow \quad \downarrow \times 5 \\ 35 : 15 \end{aligned}$$

15

[2]

- 1 (a) (i) Yasmin and Zak share an amount of money in the ratio 21 : 19.
Yasmin receives \$6 more than Zak.

Calculate the total amount of money shared by Yasmin and Zak.

$$21 - 19 = 2 \text{ parts (more for Yasmin)}$$

$$\begin{aligned} \rightarrow 2 \text{ parts} &= \$6 \\ \div 2 \quad \downarrow & \quad \downarrow \div 2 \\ 1 \text{ part} &= \$3 \end{aligned}$$

$$\begin{aligned} 21 : 19 \\ \times 3 \quad \downarrow \quad \downarrow \times 3 \\ 63 : 57 \\ 63 + 57 = 120 \$ \quad 120 \end{aligned}$$

[2]

- 3 Mass of box A : Mass of box B = 4 : 7

The mass of box B is 2.4 kg more than the mass of box A.

Calculate the mass of box A and the mass of box B.

$$7 - 4 = 3 \text{ parts (more for B)}$$

$$\begin{aligned} \rightarrow 3 \text{ parts} &= 2.4 \text{ kg} \\ \div 3 \quad \downarrow & \quad \downarrow \div 3 \\ 1 \text{ part} &= 0.8 \text{ kg} \end{aligned}$$

$$\begin{aligned} 4 : 7 \\ \times 0.8 \quad \downarrow \quad \downarrow \times 0.8 \\ 3.2 : 5.6 \end{aligned}$$

box A 3.2 kg

box B 5.6 kg

[3]

- 16 Jo and Mo share \$26.
Jo receives \$5 more than Mo.

Find the ratio Jo's money : Mo's money.
Give your answer in its simplest form.

$$\begin{aligned} \text{Mo} &: x \\ \text{Jo} &: x + 5 \end{aligned}$$

Sum:

$$\begin{aligned} x + 5 + x &= 26 \\ 2x + 5 &= 26 \\ -5 & \quad -5 \\ 2x &= 21 \\ \div 2 & \quad \div 2 \\ x &= 10.5 \end{aligned}$$

$$\text{Mo} : \$10.50$$

$$\text{Jo} : \$15.50$$

$$J : M$$

$$15.5 : 10.5$$

$$\times 2 \quad 31 : 21 \quad \div 2 \quad 31 : 21 \quad [3]$$

- (c) The visitors to the campsite today are in the ratio

$$\text{men} : \text{women} = 5 : 4 \text{ and } \text{women} : \text{children} = 3 : 7.$$

Find LCM of two numbers for women

- (i) Calculate the ratio men : women : children in its simplest form.

$$\text{LCM of 3 and 4} = 12$$

Re-write ratios:

$$\begin{aligned} 5 : 4 & \quad 3 : 7 \\ \times 3 \quad \downarrow \times 3 & \quad \times 4 \quad \downarrow \times 4 \\ 15 : 12 & \quad 12 : 28 \end{aligned}$$

$$15 : 12 : 28 \quad [2]$$

- (ii) Today there are 224 children at the campsite.

Calculate the total number of men and women.

$$\begin{aligned} 28 \text{ parts} &= 224 \\ \div 28 \quad \downarrow \div 28 & \\ 1 \text{ part} &= 8 \\ 5 : 12 : 28 & \\ \times 8 \quad \downarrow \times 8 & \\ 40 : 96 : 224 & \end{aligned}$$

$$\begin{aligned} \text{Men} + \text{women} & \\ &= 40 + 96 \\ &= 136 \end{aligned}$$

$$136 \quad [3]$$

(e) Arjun and Gretal each pay rent.

In 2018, the ratio of the amount each paid in rent was Arjun : Gretal = 5 : 7.

In 2019, the ratio of the amount each paid in rent was Arjun : Gretal = 9 : 13.

Arjun paid the same amount of rent in both 2018 and 2019.

Gretal paid \$290 more rent in 2019 than she did in 2018.

Find LCM of two numbers
for Arjun.

Work out the amount Arjun paid in rent in 2019.

LCM of 5 and 9: 45 | Gretal: $65 - 63 = 2$ parts (more in 2019)

2018: 5 : 7
 $\times 9 \rightarrow$ 45 : 63 $\rightarrow \times 9$

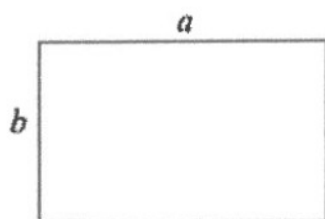
$\rightarrow \div 2 \downarrow$ 2 parts = 290 $\rightarrow \div 2$
1 part = 145

2019: 9 : 13
 $\times 5 \rightarrow$ 45 : 65 $\rightarrow \times 5$

2019: 45 : 65
 $\times 145 \rightarrow$ 6525 : 9425 $\rightarrow \times 145$

\$ 6525 [4]

- 14 A rectangular piece of paper has sides of length a cm and b cm.

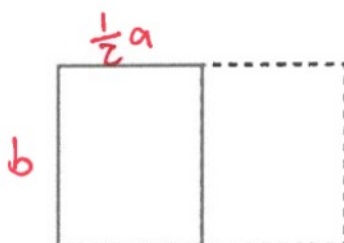


$L : S$

$a : b$

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The paper is cut in half.



$L : S$

$b : \frac{1}{2}a$

The ratio of the length of the longer side to the length of the shorter side in both pieces of paper is the same.

Find a in terms of b .

$a : b$ is the same as $b : \frac{1}{2}a$

Write as fractions instead:

$$\frac{a}{b} = \frac{b \times 2}{\frac{1}{2}a \times 2}$$

$$\frac{a}{b} = \frac{2b}{a}$$

$$a^2 = 2b^2$$

$$\sqrt{a^2} = \sqrt{2b^2}$$

$$a = \sqrt{2}b$$

$$a = \sqrt{2}b \quad [3]$$