

Ratios and rates - PART A

All Multiple Choice

- 1 Written as a ratio, 1 g is to 1 kg is:
 A 1:1
 B 1:100
 C 1:1000
 D 1:10
- 2 The school choir has 4 pianists, 3 guitarists and 5 drummers. The ratio of drummers : pianists is:
 A 5:3
 B 3:5
 C 4:5
 D 5:4
- 3 Of the 2700 babies born in a year, 900 are males. The ratio which compares the number of females to males is:
 A 2:1
 B 1:2
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- 4 The ratio 88 : 11 in simplest form is:
 A 4:1
 B 1:8
 C 8:1
 D 1:4
- 5 The ratio 15 min to 2 h in simplest terms is:
 A 1:8
 B 8:1
 C 15:2
 D 7.5:1

Name: _____

- 6 A container filled with 1.8 L of water has had 600 mL of water spilled from it. The ratio of water remaining to the original amount is approximately:
 A 2:1
 B 1:2
 C 3:2
 D 2:3
- 7 The value of n in $\frac{n}{2} = \frac{18}{12}$ is:
 A 6
 B 4
 C 3
 D 2
- 8 The ratio of dogs to cats in a pet shop is 2 : 3. If there are 6 dogs, there are:
 A 6 cats
 B 7 cats
 C 8 cats
 D 9 cats
- 9 The ratio of tennis balls to soccer balls is 8 : 3. If there are n soccer balls and 14 tennis balls, a correct proportion statement is:
 A $\frac{8}{3} = \frac{14}{n}$
 B $\frac{8}{14} = \frac{3}{n}$
 C $\frac{8}{3} = \frac{n}{14}$
 D $\frac{n}{3} = \frac{14}{8}$

- 10 The greater ratio in the pair 3 : 2 and 4 : 5 is:
 A 3 : 2
 B 2 : 3
 C 4 : 5
 D 5 : 4
- 11 If \$100 is increased in the ratio 5 : 2, the answer is:
 A \$200
 B \$250
 C \$500
 D \$550
- 12 If 640 cm^3 is decreased in the ratio 8 : 10, the answer is:
 A 215 cm^3
 B 430 cm^3
 C 512 cm^3
 D 800 cm^3
- 13 The cost of milk was once 80 cents a litre, it has now increased by one quarter. The new cost is:
 A \$1
 B 99 cents
 C 95 cents
 D 90 cents
- 14 When the ratio is 3 : 2, the total number of parts is:
 A 2
 B 3
 C 5
 D 6
- 15 \$5000 shared in the ratio 3 : 7 is:
 A \$1500, \$3500
 B \$2857, \$2143
 C \$833, \$4167
 D \$3500, \$1500

- 16 A grocer has 45 g, 55 g, and 60 g eggs in the ratio 4 : 2 : 3. There are 648 eggs altogether. The number of 55 g eggs is:
 A 144
 B 216
 C 288
 D 324
- 17 Betty is paid \$11.50 per hour. If she works 6 hours in a day she earns:
 A \$69
 B \$45
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- 18 A particular cricketer scores on average 35 runs per game. In a season there are seven games. The number of runs he scored would be:
 A 77
 B 133
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- 19 The average speed of a car travelling 500 km in 6 h is:
 A 75 km/h
 B 83 km/h
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 D 96 km/h
- 20 64 km/h converted to m/s is:
 A 1.77 m/s
 B 17.78 m/s
 C 177.7 m/s
 D 1777 m/s

Ratios and rates - PART B

Name: _____

- (1) What quantities are being compared by each of the following rates?
- (a) 60 km/h
 - (b) \$2.50/kg
 - (c) 7.8 L/100 km

- (2) What units would you use to measure each of the following?
- (a) The speed at which a person can run 100 m.
 - (b) The amount of rainfall in a certain city.
 - (c) The price of potatoes.
 - (d) The rate at which a tree grows.

- (3) Calculate:
- (a) the amount of petrol that I can buy with \$40.00 at a price of \$1.05 per litre.
 - (b) the distance that I can travel if my car has a 65 litre petrol tank and travels an average of 13.9 km/litre.

- (4) A school is staffed at a rate of 16.4 students per teacher.
- (a) How many teachers will be required for a school of 1180 students?
 - (b) How many students would there be at a school with 85 teachers?

- (5) (a) Calculate Neville's weekly wage if he works 40 hours at a rate of \$15.60 per hour.
- (b) Calculate the hourly rate earned by Nora who works 40 hours for a total of \$582.60

- (6) Express each of the following statements using a rate in simplest form.

(a) A tap leaks 6 L of water in 8 hours.

(b) The cost of an overseas phone call was \$22 for 4 minutes.

- (7) Lynn earns \$15.50 an hour. If she earned \$139.50 in a day, how many hours did she work?

- (8) Two litres of juice cost \$3.10 while 5 litres cost \$7.50. Which way of buying juice is better value?

- (9) Calculate the average speed (in km/h) in each case.

(a) An athlete runs 5 km in half an hour.

(b) A car travels 500 km in 7 hours.

(e) Convert 55 km/h to m/s.

(ii) Convert 120 km/h to m/s.

Ratios and rates ~ PART C

Name: _____

1 Write each ratio in simplest terms.

(a) 30 cm to 2 m

(b) \$5 to \$2.40

2 In each of the following state which is the greater ratio.

(a) 1 : 2 or 2 : 3

(b) 7 : 4 or 9 : 8

(c) 4 : 9 or 16 : 81

3 In each of the following decide which team has the better record.

(a) Sharks won 4 out of 7 matches while
Tigers won 3 out of 5 matches.

(b) Broncos won 17 out of 26 matches while
Cowboys won 15 out of 22 matches.

(c) Panthers won 6 out of 13 matches while
Eels won 5 out of 11 matches.

4 In testing two new drugs, doctors find that Drug A cured 32 out of 40 patients while Drug B cured 39 out of 50 patients. Which drug had the higher ratio of curing patients?

5 Increase the following quantities in the ratio given.

(a) Increase 70 g in the ratio 7 : 2.

(b) Increase \$22 in the ratio 6 : 5.

6 Decrease the following quantities in the ratio given.

(a) Decrease 35 cm in the ratio 8 : 10.

(b) Decrease 48 mm^2 in the ratio 2 : 5.

7 Choose the correct answer.

A square area of 36 cm^2 was increased in the ratio of 3 : 1. The new square has an area of:

A 114 cm^2

B 108 cm^2

C 55 cm^2

D 24 cm^2

8 An equilateral triangle has been decreased by two-fifths. If the old triangle had a side length of 20 mm, calculate the new quantity.

9 Write three different ratios in which the total number of parts is 12.

10 If Ben and Casey decided to share their weekly pocket money of \$15 in the following ratios, how much would each receive?

(a) 3 : 2

(b) 5 : 6

Ratios and rates - PART D

Name: _____

- 1 (a) Draw a rectangle to represent 2 shaded parts to 4 unshaded parts.

- (b) Draw full and semicircles to represent 7 full circles to 3 semicircles.

- 2 Charlie has 50 items of clothing: 17 shirts, 20 pants, and the rest are jumpers.

Write down the ratio of:

- (a) pants : shirts
(b) jumpers : pants
(c) shirts : clothing

- 3 Rewrite each statement as a ratio.

- (a) 4 cm is to 5 cm
(b) 7 min is to 1 hour
(c) 5 eggs is to 2 dozen eggs

- 4 Express each ratio in simplest form.

- (a) 9 : 18
(b) 21 : 14
(c) 60 : 20

- 5 Write the ratio in simplest terms.

(a) 40 mL to 1 L

(b) 20 cents to \$1.40

(c) 500 g to 1.5 kg

- 6 Is the following statement true or false?

A restaurant cooks 50 000 grams of white rice and 95 000 grams of brown rice. The ratio of brown to white rice is 2 : 1.

- 7 Determine which pairs of ratios are in proportion.

(a) $\frac{2}{5}$; $\frac{4}{10}$

(b) $\frac{2}{3}$; $\frac{1}{2}$

(c) $\frac{7}{14}$; $\frac{35}{70}$

- 8 Find the value of a in each of the following proportions.

(a) $\frac{a}{9} = \frac{7}{3}$

(b) $\frac{12}{14} = \frac{6}{a}$

9 Solve the following using a proportion statement.

- (a) The ratio of radio listeners to TV watchers is 4 : 7. If there are 500 TV watchers how many radio listeners are there?
- (b) The ratio of roosters to hens is 1 : 4. If there are 8 roosters how many hens are there?

10 Write a proportion statement and then solve the problem.

To dissolve washing powder Bill uses 1 cup of powder to 4 cups of water. How many cups of powder will he need if he uses 10 cups of water?

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211

Q16

Q20

~~5 x 158~~
21

45g : 55g : 60g
64 km/h

4 : 2 : 3

m/s

altogether = 648

~~6400/60~~

9 = 648

m/s

Q12

1 = 72

6400/60

~~8 x 64~~
10

2 = 144

6400/3600

55g = 144

= 1778 m/s

= 512

45g : 55g : 60g

4 : 2 : 3

Part B

Q13

288 : 144 : 216

Q21

80 cents = 1L

a = km per hr ✓

25 cents

Q17

b = dollars per kg ✓

80 + 25 = 1L

\$11.50 = 1 hr

c = liters per km ✓

105 = 1L

= 6hr

\$1.05 = 1L

= 11.50 x 6

Q2

= \$60

a = ~~km~~ m/s

Q14

b = ~~km~~ m/day

3 : 2

Q18

c) \$/kg

3 + 2

35 runs / game

d) m. cm/year
or
m/year

= 5

1 = 35

Q3

Q15

7 = 245 runs

a) ~~\$1.05~~ = 1 liter

\$5000 ÷ 3 + 7

~~\$4000~~

5000 ÷ 10

~~\$1.05~~ = 1000

= 500

\$40.00 =

3 : 7

x500

S = D
T

\$1.05 = 1L

1500 : 3500

S = 500

\$1 = 952.8 m/h

6 hrs / ~~38097~~

\$40 = 38097

~~83.3~~ km

\$40 = 38.092 L

= 83.3 km/h
= 83 km/h

13. 9 km = 11
 1 km = 71.9 L
 1 min / \$5.50

903.5 L = 65 L
 Q7

903.5 km / 65 L
 \$15.50 / hr.
 11 = 13.9 km
 65 L = 903.5 L

Q8

2 L / \$3.10 ← 10 L cost \$15.50

5 L / \$7.50 is cheaper

a) 16.4 / 1 teacher
 10 L cost \$15

Q9

b) 16.4 / teachers
 a) S = D

S = 5 km
 $\frac{36}{\frac{1}{2} \text{ hr}}$ = 10 km/hr

Q5

S = 1 km / 6 min

a) 40 hrs

\$15.60 / hr
 b) S = 500
 7 hrs

\$624 / 40 hr

\$14.5
 x / 40 hrs
 S = 71.4 km/hr

\$58260 / 40 hrs
 Q10

\$14.57 / hr
 55 km/h

Q6

m/s

6 L / 18 hr 8 hr / 6 L
 55×1000
 $5500 / 3600$

1000 / 1 L 1 hr / 750 mL
 $\frac{1}{75} = 15.28 \text{ m/s}$

Q3

120km/h
m/s
a) sharks: 4:7

Tiger: $\frac{3}{5}$

a) $35cm \times 18 \frac{8}{10}$
= 33.630cm
= 6.2m

b) $48mm^2 \times 7 \frac{2}{3}$

3000/900
1000/300
b) Broncos 17
26

Cowboys: 15
22

= 3.36m²

Part C

Q7

Q1

a) 30cm to 2m
30cm to 200cm
Panthers $\frac{6}{13} = 0.46$
 $36cm^2 \times 4 = 144cm^2$

Eels $\frac{5}{11} = 0.45$

Q8

$\frac{3}{5} \times 20$

Q4

= 12 ✓

b) \$5 to \$2.40

500e to 240c

A = $\frac{32}{40} = \frac{4}{5}$

250 to 120

Q9

50 to 24 ✓

B = $\frac{39}{50}$

1:1-12 1:11

(25 to 12) ✓

50

2 3:8:1 ✓

Drug A ✓

3 4:3:5 ✓

Q2

a) $\frac{2}{3} : \frac{3}{5} = 0.5 \frac{2}{3} = 0.66$

Q5

b) 9:8
 $\frac{7}{4} = 1 \frac{3}{4} = 1 \frac{6}{8} = 1 \frac{6}{8}$

Q10

a) 70g $\times \frac{1}{3}$

a) 5 = \$15 ✓

c) 4:9 ✓

= ~~62.40~~ 24.59

1 = \$3

b) \$22 $\times \frac{1}{6}$

3:2

= ~~\$24.2~~

\$9.16 ✓

\$ 26.40

11 = \$15

Q 3

~~1 = \$1~~ 1.36

a) 4cm to 5cm

5:6 = \$6.82 = \$8.18 ✓

4:5 ✓

~~25:2.4~~

b) Train: 1hr

Part D.

Train: 60min

Q 1

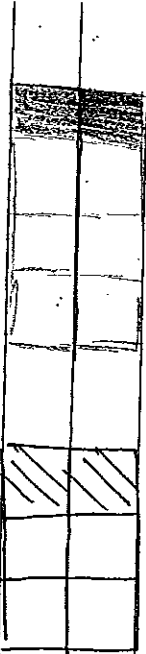
7:60 ✓

a)

c) 5 eggs to 2 dozen eggs

5 eggs to 24 eggs

5:24 ✓

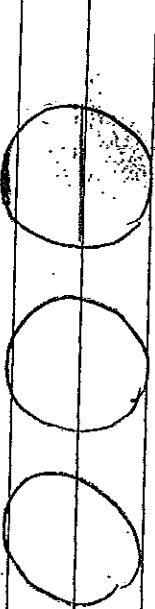


Q 4

b)

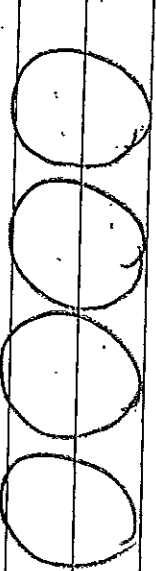
a) 9:18

1:2 ✓



b) 21:14

3:2 ✓



c) 60:20

3:1 ✓



Q 5

a) 40ml to 7L

Q 2

40:1000

17 = shirts, 20 = pants, 13 = jumpers, 5 = cloths

4:100

a) 20:17 ✓

1:25 ✓

b) 13:20 ✓

c) 17:50 ✓

b) 20c : \$1.40

20:140

1:7 ✓

Q5) 500g to 1.5kg

500 : 1500 ✓

Q9

a) ratio: 1x

$\frac{4}{7} = \frac{x}{500}$

1 : 3 ✓

$x = 14$, 4 : 7

2886 : 500

$\therefore x = \frac{4}{7} \times 500$

Q6. 50 000 : 95 000

11 = 500

= 215.7

10 000 : 10 000

1 = 45.4

$\div \approx 286$

1 000 : 19 000 ✓

415 : 81.6

: 317.8

10 : 19 ✓ FALSE

b) mastered to hens

Q17 7

a) $\frac{4}{10} = \frac{3}{5}$ ✓ yes

$x = 1$, 4 : 8 ✓

b) NO ✓

Q10

c) $\frac{35}{70} = \frac{7}{14} = \frac{1}{2}$ ✓ yes

powder. 1 cup to 4 cups water. $\times 2.5$
 $\rightarrow 2.5 \text{ cups} = 10 \text{ cups water}$

~~Q8~~

Q8

a) $\frac{9}{9} = \frac{7}{3}$

Q19 $\frac{1}{3} \div 3$

7 : 3

a = 21 ✓

b) $\frac{12}{14} = \frac{6}{9}$

2 $(\frac{12}{14} \div 2)$
 $\rightarrow \frac{6}{9}$

a = 7 ✓