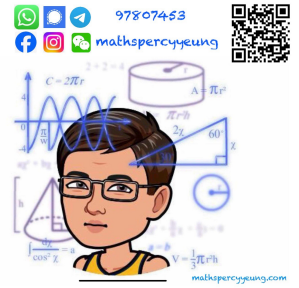


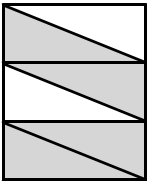
Chapter 8 Ratio and Rate



Multiple Choice

1. If $2x : 3y = 5 : 6$, then $x : y =$
A. $2 : 3$ B. $5 : 4$ C. $5 : 9$ D. $12 : 15$
2. If $5 : 6 = z : 4$, find the value of z .
A. $\frac{11}{3}$ B. $\frac{10}{3}$ C. $\frac{8}{3}$ D. $\frac{7}{3}$
3. Simplify $80¢ : \$4$.
A. $1 : 2$ B. $2 : 1$ C. $1 : 5$ D. $4 : 5$
4. If Chinese workbook has 119 pages and English workbook has 70 pages, find the ratio of the pages of Chinese workbook to that of English workbook.
A. $7 : 17$ B. $10 : 17$ C. $17 : 7$ D. $17 : 10$

5. The figure is formed by identical shapes. Find the ratio of the area of the shaded regions to that of the white regions.



- A. $1 : 2$ B. $2 : 1$ C. $2 : 3$ D. $3 : 2$
6. Simplify $2.4 : 0.48$.
A. $1 : 2$ B. $1 : 5$ C. $2 : 1$ D. $5 : 1$
7. Which of the following is equal to $2\frac{1}{2} : \frac{1}{3}$?
A. $3 : 10$ B. $2 : 15$ C. $15 : 2$ D. $10 : 3$
8. If $9 : 1 = (8x + 8) : 10$, find the value of x .
A. 9 B. 10 C. $\frac{39}{4}$ D. $\frac{41}{4}$

9. Simplify $7\ 000\ \text{cm} : 700\ \text{m} : 0.3\ \text{km}$.
- A. $1 : 10 : 3$ B. $7 : 70 : 30$ C. $700 : 70 : 3$ D. $70\ 000 : 700 : 3$
10. Billy, Peggy and Ben have 2 marbles, 8 marbles and 6 marbles respectively. Find the ratio of the number of marbles each has.
- A. $1 : 3 : 1$ B. $1 : 4 : 3$ C. $2 : 3 : 1$ D. $2 : 3 : 6$
11. $84\ \text{km/h} =$
- A. $8\ 400\ \text{km/h}$ B. $8\ 400\ \text{m/min}$ C. $\frac{7}{5}\ \text{m/h}$ D. $\frac{7}{5}\ \text{km/min}$
12. A certain machine produces 70 plastic bottles in every 130 minutes. Find the speed of production of that machine (in bottles/min).
- A. $\frac{6}{13}\ \text{bottle/min}$ B. $\frac{7}{13}\ \text{bottle/min}$ C. $1\frac{1}{7}\ \text{bottles/min}$ D. $1\frac{6}{7}\ \text{bottles/min}$
13. Given $a : b : c = 1 : 2 : 3$. If $a = 9$, find $b + c$.
- A. 18 B. 27 C. 45 D. 54
14. The sum of all interior angles of a pentagon is 540° . If the ratio of the 5 interior angles of the pentagon is $2 : 3 : 4 : 3 : 3$, find the smallest angle.
- A. 72° B. 101.25° C. 108° D. 202.5°
15. In a box of eggs, the ratio of the number of rotten eggs to that of broken eggs are $1 : 7$, and the ratio of the number of broken eggs to that of good eggs are $2 : 5$. If there are totally 10 rotten eggs, find the total number of eggs in the box.
- A. 60 B. 70 C. 175 D. 255
16. The price of Brand A, B and C green tea are \$5.2, \$6.5 and \$7.8 respectively. Find the ratio of the prices of Brand A, B and C green tea.
- A. $3 : 4 : 5$ B. $4 : 5 : 6$ C. $5 : 6 : 7$ D. $6 : 7 : 8$
17. The total marks of Mathematics examination is 90. It is known that the full marks of parts A, B and C are in the ratio of $3 : 2 : 4$. Find the full mark of part A.
- A. 60 B. 40 C. 30 D. 20

18. The different plans of mobile phone of Apple Telephone Company are as follows:

	<u>Monthly fee</u>	<u>Airtime (min)</u>
Plan A :	\$65	100 min
Plan B :	\$153	180 min
Plan C :	\$256	320 min
Plan D :	\$369	450 min

According to the monthly fee and airtime of different plans, which is the cheapest for each minute?

- A. Plan A B. Plan B C. Plan C D. Plan D

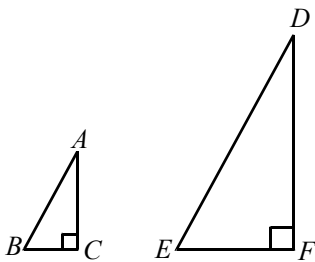
19. Jacky typed 20 Chinese words in $1\frac{1}{4}$ minutes, Mandy typed 8 Chinese words in 40 seconds. Find the ratio of the typing speed of Jacky to that of Mandy.

- A. 1 : 5 B. 4 : 3 C. 4 : 15 D. 4 : 75

20. Karen drives at a speed of 52 km/h for 1.5 hours, then at a speed of 50 km/h for 0.7 hour. How far has she travelled?

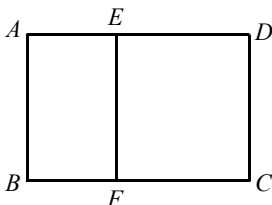
- A. 102km B. $106\frac{2}{21}$ km C. 111.4 km D. 113 km

21. In the figure, each side of $\triangle ABC$ is multiplied by $\frac{4}{3}$ to form $\triangle DEF$. Find the ratio of the area of $\triangle ABC$ to that of $\triangle DEF$.



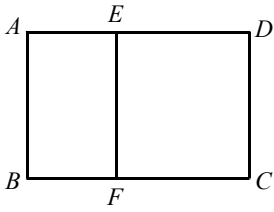
- A. 3 : 4 B. 4 : 3 C. 9 : 16 D. 16 : 9

22. The figure shows rectangle $ABFE$ and rectangle $CDEF$. If $BF : FC = 5 : 6$ and the area of rectangle $ABFE$ is 10 cm^2 , find the area of rectangle $CDEF$.



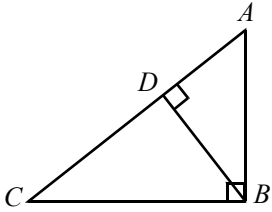
- A. 12 cm^2 B. 22 cm^2 C. $\frac{25}{3}\text{ cm}^2$ D. $\frac{55}{3}\text{ cm}^2$

23. In the figure, $ABFE$ is a rectangle, $CDEF$ is a square. If the area of rectangle $ABFE$ and that of square $CDEF$ are in the ratio of 5 : 6, find $AE : ED$.



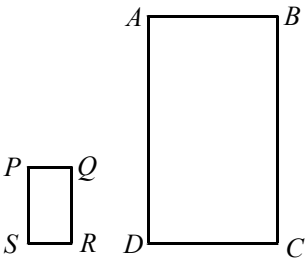
- A. $1 : \frac{5}{6}$ B. 5 : 3 C. 5 : 6 D. 25 : 36

24. In the figure, $\triangle ABD$ and $\triangle ACB$ are right-angled triangles. D is a point on AC . If the area of $\triangle ABD$ and that of $\triangle ACB$ are in the ratio of 5 : 8, find $AD : AC$.



- A. 5 : 3 B. 5 : 8 C. 3 : 5 D. 8 : 5

25. In the figure, both the length and width of rectangle $ABCD$ are $\frac{8}{3}$ times those of rectangle $PQRS$. Find the ratio of the area of rectangle $ABCD$ to that of rectangle $PQRS$.

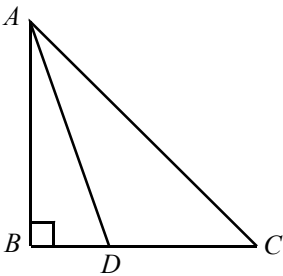


- A. 3 : 8 B. 8 : 3 C. 9 : 64 D. 64 : 9

26. It is known that the speed of sound is 340 m/s. If David shouts at a perpendicular slope and he can hear his echo in 8 seconds, find the distance between David and the slope.

- A. 2 720 m B. 1 360 m C. 340 m D. 42.5 m

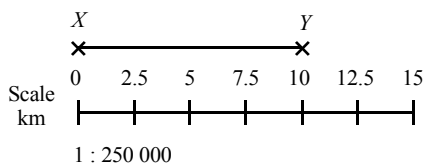
27. The figure shows $\triangle ABC$. D is a point on BC such that $BD : DC = 2 : 7$. If AB is the height of $\triangle ABC$, find the ratio of the area of $\triangle ABD$ to that of $\triangle ADC$.



- A. 2 : 7 B. 7 : 2 C. 4 : 49 D. 49 : 4

28. Express the scale 3 cm to 21 km in the form of $1 : n$.
- A. $1 : 7$ B. $1 : 7\ 000$ C. $1 : 100\ 000$ D. $1 : 700\ 000$

29. Find the actual length of the line XY .



- A. 2.5 km B. 4 km C. 10 km D. 1 000 000 km
30. The scale of a map is $1 : 100$. If the actual distance is 7 km, find the distance on the map.
- A. 7 m B. 70 m C. 700 m D. 7 km
31. The scale of a map is $1 : 250\ 000$, and the length of the subway on the map is 0.6 cm. If a car travelled through the subway at a constant speed in 2 minutes. Find the speed of that car in km/h.
- A. 45 km/h B. 90 km/h C. 95 km/h D. 135 km/h
32. The scale of a map is $2 : 6\ 000$. If the actual area of a reservoir is $10\ 000\ \text{m}^2$, find the area of that reservoir on the map.
- A. $1\frac{2}{3}\ \text{cm}^2$ B. $3\frac{3}{10}\ \text{cm}^2$ C. $11\frac{1}{9}\ \text{cm}^2$ D. $9\ 000\ 000\ \text{cm}^2$
33. The scale of a map is $1 : 200$. If the actual area is $3\ 600\ 000\ \text{cm}^2$, find the corresponding area on the map.
- A. $90\ \text{cm}^2$ B. $1\ 800\ \text{cm}^2$ C. $18\ 000\ \text{cm}^2$ D. $720\ 000\ 000\ \text{cm}^2$
34. The scale of a map is 1 cm to 1 m. If the area of a square flower-bed on the map is $11\ \text{cm}^2$, find the actual area of that flower-bed.
- A. $11\ \text{m}^2$ B. $1\ 100\ \text{m}^2$ C. $110\ 000\ \text{m}^2$ D. $11\ 000\ 000\ \text{cm}^2$
35. The scale of a map is $1 : 200\ 000$. If the actual length of a highway is 26 km, find the length of that highway on the map.
- A. 2 cm B. 13 cm C. 26 cm D. 52 cm

Section A(1)

1. Simplify the following ratios.

(a) $16 : 20$

(b) $0.91 : 0.26$

(c) $\frac{3}{2} : \frac{12}{7}$

2. Simplify the following ratios.

(a) 2 weeks : 4 days

(b) 10 km : 25 cm

(c) $180^\circ : \frac{3}{5}$ right-angle

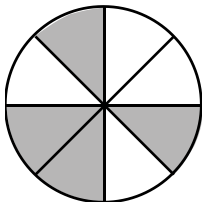
3. (a) If $\frac{3}{5} = \frac{x}{45}$, find the value of x .

(b) If $5 : 4 = y : 24$, find the value of y .

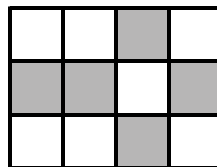
(c) If $2 : 5 = 10 : z$, find the value of z .

4. Each of the following figures is formed by identical shapes. Find the ratio of the area of the shaded regions to that of the white regions.

(a)



(b)



5. John's weight is 52 kg. His father's weight is 78 kg. Find the ratio of John's weight to his father's.

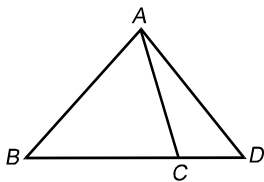
6. The costs of two computers are in the ratio of 4 : 6. If the cost of the cheaper one is \$8 400, find the cost of the more expensive one.

7. If $a : b = 2 : 5$ and $b : c = 3 : 7$, find $a : b : c$.

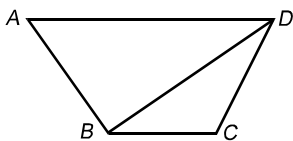
8. If $\frac{1}{a} : \frac{1}{b} : \frac{1}{c} = 3 : 4 : 9$, find $a : b : c$.

9. The ratio of three integers is 5 : 6 : 7. The sum of the three integers is 540, find the largest integer.

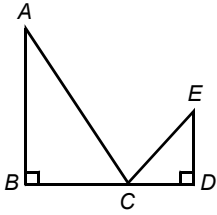
10. Express the rates of the following in the units stated in the brackets.
- (a) The price of 4 kg of beef is \$48. (\$/kg)
- (b) The rent of a flat is \$8 100 for $2\frac{1}{2}$ months. (\$/month)
11. A motor car runs 810 km in 9 hours and a train runs 567 km in 6 hours. Which vehicle runs faster?
12. A car took 35 minutes to travel 70 km, find the speed of the car
- (a) in km/h. (b) in m/s.
13. John completed 7 rounds in a 400 m field in 14 minutes, find his speed in km/h.
14. Express the scale below in the form of 1 : n .
- (a) 20 mm : 4 000 cm (b) 0.65 cm : 13 m (c) 2.5 cm : 1 km
15. On a map, an actual distance of 12 km is represented by 0.6 cm. What is the scale of the map?
16. The scale of a map is 1 : 80 000. If the actual distance between two buildings is 640 m, find their distance on a map (in cm).
17. In the figure, BCD is a straight line and $BC : CD = 2 : 1$. Find the ratio of the area of $\triangle ABC$ to that of $\triangle ACD$.



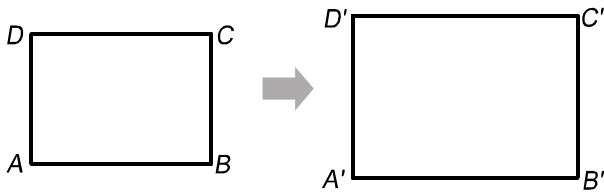
18. The figure shows trapezium $ABCD$. If the ratio of the area of $\triangle BCD$ to that of $\triangle ABD$ is 4 : 7, find $BC : AD$.



19. In the figure, ABC and CDE are two right-angled triangles where $AB : DE = 5 : 3$ and $BC : CD = 5 : 2$. Find the ratio of the area of $\triangle ABC$ to that of $\triangle CDE$.



20. In the figure, rectangle $A'B'C'D'$ is obtained when each side of rectangle $ABCD$ is enlarged by 0.25. Find the ratio of the area of rectangle $ABCD$ to that of rectangle $A'B'C'D'$.



Section A(2)

21. Simplify the following ratios.

(a) $1.75 : 1\frac{2}{3}$

(b) $50 \text{ cm}^3 : 0.1 \text{ L}$

(c) $30 \text{ minutes} : 0.5 \text{ hour}$

22. A and B share \$3 600 in the ratio of 1 : 8. How much does each of them receive?

23. If the cost of 5 apples is \$12.5, and the cost of 8 oranges is \$24, find the ratio of the cost of each apple to that of orange.

24. There are 1 200 students in the Diligent Secondary School. Among them, 500 are boys.

Find the ratio of

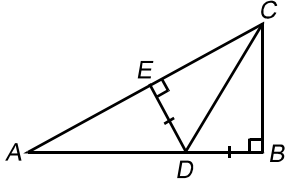
- (a) the number of boys to the total number of students.
- (b) the number of girls to the total number of students.
- (c) the number of boys to the number of girls.

25. A sum of \$1 200 is divided among Mary and Tom. Mary gets 3 times as many as Tom.

- (a) Find the ratio of the amount Mary gets to that of Tom.
- (b) How much does Mary get?

26. If $x : y : z = 2 : 3 : 4$ and $x + y + z = 27$, find the values of x , y and z .
27. A sum of \$3 900 is divided among Jacky, Jenny and Susan. The ratio of the amount Jacky gets to that of Jenny is $2 : 3$, the ratio of the amount Jenny gets to that of Susan is $2 : 1$. How much does each one get?
28. Given that $a : b : c = 9 : 8 : 5$.
- (a) Prove $\frac{1}{a} : \frac{1}{b} = 8 : 9$. (b) Find $\frac{1}{b} : \frac{1}{c}$. (c) Find $\frac{1}{a} : \frac{1}{b} : \frac{1}{c}$.
29. The ratio of basketballs, volleyballs and footballs in a bag is $2 : 3 : 5$. If there are 9 volleyballs in the bag,
- (a) find the total number of balls.
(b) find the number of footballs in the bag.
30. A car used 50 litres of petrol to travel 450 km.
- (a) How far does it travel for each litre of petrol on average?
(b) To travel 1 km, how much petrol is required?
(c) For a journey of 432 km, how much petrol is required?
31. Suppose that 4 US dollars can be exchanged with HK\$30 and 16 Japanese Yen can be exchanged with HK\$1.
- (a) How many HK dollars can be exchanged with 50 US dollars?
(b) How many Japanese Yen can be exchanged with 50 US dollars?
(c) How many Japanese Yen can be exchanged with 1 US dollars?
32. On a map of scale $1 : 25\ 000$, the length of a certain road is 4.5 cm. Find
- (a) the actual length of the road in km.
(b) the length of the road, in cm, on another map with the scale of $1 : 75\ 000$.

33. In the figure, $DE = DB$ and $\angle CED = \angle CBD = 90^\circ$. If $AC : BC = 13 : 5$, find the ratio of the area of $\triangle ACD$ to that of $\triangle BCD$.

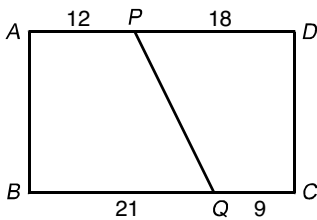


Section B

34. Suppose the cost of painting a wall is in proportion to the area of the wall. Given the cost of painting a 28 m (length) by 2.5 m (height) wall is \$5 000. There is another wall of which the length is 50% longer and the height is 10% shorter than the wall mentioned above.

- Find the ratio of the area of the new wall to that of the given one.
- Find the cost of painting the new wall.

35. In the figure, $ABCD$ is a rectangle with $AP = 12$, $PD = 18$, $BQ = 21$ and $QC = 9$.



- Find the ratio of the area of trapezium $ABQP$ to that of trapezium $PQCD$.
- If the area of the trapezium $ABQP$ is 297 square units, find the area of the trapezium $PQCD$.