TB(2A) Ch. 1 Rate and Ratio
Conventional Questions

1. [16-17 S.2 Mid-year Exam #4]

The distance between two cities on a map is 7.5 cm. The actual distance between them is 48.75 km.

(a) Find the scale of the map in the form 1 : *n*. **(2 marks)**

(b) If the actual length of a highway is 19.5 km, find the length of the highway on the map. **(1 mark)**

(c) A country park in the map is a rectangle of size 6 cm × 8 cm. Find the actual area of the park in km^2. **(2 marks)**

2. [16-17 S.2 Mid-year Exam #9]

Early this year, 1360 Great British Pounds (GBP) can be exchanged for 2000 United States Dollars (USD) and 234 USD can be exchanged for 1800 Hong Kong Dollars (HKD).

(a) Find the exchange rates between

(i) GBP and USD in GBP/USD, **(1 mark)**

(ii) HKD and USD in USD/HKD. **(1 mark)**

(b) How many GBP can be exchanged for 120000 HKD? **(2 marks)**

(c) Recently, the same amount 1360 GBP can be exchanged for 1700 USD only while the exchange rate between HKD and USD remains unchanged. What is the change in the amount of GBP that can be exchanged for 120000 HKD? **(2 marks)**

3. [16-17 S.2 Final Exam #1]

A number of candies are shared among Annie, Mary and Janice in a ratio of 1 : 3 : 5. Janice has 12 more candies than that Annie has.

(a) Find the number of candies Mary has. **(2 marks)**

(b) After Janice has given 3 candies to Annie, write down the new ratio of numbers of candies among Annie, Mary and Janice. **(1 mark)**

4. [17-18 S.2 Mid-year Exam #5]

It is given that the scale of the map is 1:10 000. The actual distance between Good Hope School and Choi Hung MTR station is 2 km.

(a) Find the distance on the map in cm. **(2 marks)**

(b) A shuttle bus drives from Choi Hung MTR station to Good Hope School at 35 km/h. Find the required travelling time in minutes**.** **(2 marks)**

5. [17-18 S.2 Mid-year Exam #10]

A bag of *x* candies is shared between Sarah and Zoe. The ratio of Sarah's share to Zoe's share is 2 : 1.

(a) Write down the number of Sarah's candies in terms of *x*. **(1 mark)**

(b) If Sarah gives 10 candies to Zoe, then the ratio of Sarah's share to Zoe's share becomes 8 : 7. Find the value of *x*. **(2 marks)**

6. [17-18 S.2 Mid-year Exam #13]

It is given that the ratio of the base length, base width and height of cuboid *A* and cuboid *B* are 1 : 2 : 4 and 3 : 4 : 6 respectively. If the perimeter of the base of cuboid *A* is twice that of cuboid *B*, find the ratio of the volume of cuboid *A* to the volume of cuboid *B*. **(3 marks)**

7. [17-18 S.2 S.Test 1 #1]

It is given that $\frac{x}{y}=\frac{3}{5}$ and $\frac{y}{z}=\frac{3}{2}$.

(a) Write down the ratio $x : y : z$. **(1 mark)**

(b) Find the value of $\frac{x+y}{x-y+z}$. **(2 marks)**

8. [17-18 S.2 S.Test 1 #2]

A length of 2 cm on a map represents an actual distance of 6 km.

(a) Express the scale of the map in the form of $1 : n$. **(1 mark)**

(b) Town *A* and town *B* are 4 cm apart on the map. If Victoria walked at a speed of 80 m/min, how long would it take for her to travel from town *A* to town *B*? **(2 marks)**

9. [17-18 S.2 S.Test 1 #6]

In a factory, a machine produces 4200 bags of potato chips in 7 days. The machine operates 10 hours a day.

(a) Find the production rate in bags/hour. **(1 mark)**

(b) If the production rate of the machine remains unchanged, can it produce more than 800 bags of potato chips in 15 hours? Explain briefly. **(2 marks)**

(c) The production cost \$*C* of each bag of potato chips is given by $C=\frac{k}{n}+5$, where *n* is the number of bags of potato chips produced and *k* is a constant. It is known that the cost of each bag is \$20 when 15 bags are produced. The manager of the factory claims that when the cost of each bag is \$10, 50 bags are produced. Do you agree? Explain briefly. **(3 marks)**

10. [17-18 S.4 Final Exam #3]

700 coins are shared among Adrian, Bernard and Calvin. It is known that the ratio of Adrian's share to Bernard's share is 6 : 7, and that of Adrian's share to Calvin's share is 2 : 5. Find the number of coins in Calvin's share. **(3 marks)**

11. [18-19 S.2 S.Test 1 #1]

On a map, a length of 2 cm represents an actual length 50 km.

(a) Find the scale of the map in the form 1 : *n*. **(1 mark)**

(b) It takes 2 hours for Sam to drive from city *P* to *Q* at a speed of 20 km/h. Find the distance between city *P* and *Q* on the map. **(3 marks)**

12. [18-19 S.2 S.Test 1 #7]

1000 mL of drink is prepared by mixing juice and alcohol in a ratio of 5 : 3.

(a) Find the volume of alcohol in the drink? **(2 marks)**

(b) If more juice is added to the drink so that the ratio of the volume of alcohol to the volume of the drink is 1 : 5, find the volume of juice added. **(2 marks)**

13. [18-19 S.2 S.Test 1 #8]

It is given that the ratio of the volumes of two square prisms is 2 : 25 and the total volume is 1296 cm^3. If the ratio of the side length of the base to the height of the smaller prism is 2 : 3, find the height of the smaller prism. **(2 marks)**

14. [18-19 S.2 Mid-year #7]

An empty tank in the shape of a cuboid has a capacity of 480L. Water flows into the tank at a rate of 1200L per hour.

(a) Find the time it takes (in minutes) for the tank to be fully filled. **(2 marks)**

(b) After the tank is fully filled, water is discharged from the tank. If the tank is 75% full after discharging for 1 hour, find the rate of water discharge in L per minute. **(2 marks)**

15. [18-19 S.2 Mid-year #8]

Alex, Katy and Yvonne have some stickers. The number of stickers owned by Alex to that of Katy is 2 : 3. It is given that the number of stickers owned by Yvonne equals the total that owned by Alex and Katy.

(a) Write down the ratio of the number of stickers owned by Alex to that of Katy to that of Yvonne. **(1 mark)**

(b) Yvonne gives 15% of her stickers to Alex and another 15% to Katy. If the three people have 200 stickers in total, find the number of stickers owned by Alex at the end. **(3 marks)**

16. [18-19 S.2 Mid-year #9]

It is given that the ratio of the actual weight of A to that of B is 2 : 3 and the ratio of the actual weight of B to that of C is 5 : 8.

(a) Find the ratio of A's actual weight to B's actual weight to C's actual weight. **(2 marks)**

(b) A's weight is measured to be 41 kg. Suppose the scale interval of the instrument is 1 kg. Find the range of actual values of C's weight. **(3 marks)**

17. [18-19 S.2 Final Exam #8]

The length of a rectangular living room is 1.4 cm on a floor plan and its actual length is 4.2 m.

(a) Find the scale of the floor plan in the form 1 : *n*. **(1 mark)**

(b) If the actual area of the living room is 26.46 m^2, find the width (in cm) of the living room on the floor plan. **(2 marks)**

18. [18-19 S.2 Final Exam #11]

In a park, the ratio of the number of boys to the number of girls is 8 : 7. If 3 boys leave the park and 3 girls enter the park, then the ratio of the number of boys to the number of girls is 7 : 8. Find the original number of boys in the park. **(3 marks)**

19. [19-20 S.2 Standardized test 1, #5]

The scale of a map is 1 : 40 000. It is given that the distance between city *A* and city *B* on the map is 9 cm.

(a) Find the actual distance (in km) between city *A* and city *B*. **(1 mark)**

(b) A car is travelling at a constant speed of 80 km/h. Find the time needed (in minute) for the car to travel from city *A* to city *B*. **(2 marks)**

20. [19-20 S.2 Standardized test 1, #8]

In an event, the ratio of the number of dancers to that of singers is 16 : 5. Due to personal reasons, 8 dancers will leave the event earlier. The ratio of the number of dancers to that of singers will become 8 : 3. How many dancers and singers are there altogether at the beginning?

(3 marks)

21. [19-20 S.2 Mid-year Exam #1b]

Give answers only. Working need not be shown.

(b) In November, Ben's expenditure on food and clothes are in the ratio 9 : 4. If his expenditure on clothes in November is $ 720, find his expenditure on food in that month. **(1 mark)**

22. [19-20 S.2 Mid-year Exam #10]

A sum of money is shared among Peter, Queenie and Raymond. The ratio of Peter's share to Raymond's share is 3 : 2 while the ratio of Queenie's share to Raymond's share is 4 : 7.

(a) Write down the ratio of Peter's share to Queenie's share to Raymond's share. **(1 mark)**

(b) Suppose Peter gives $ 100 to Raymond and the ratio of Peter's share to Queenie's share to Raymond's share becomes 37 : 16 : 33. Find Queenie's share. **(3 marks)**

23. [19-20 S.2 Mid-year Exam #11]

There are two brands of tea, *A* and *B*. The cost of brand *A* tea is $ 75 per 150 g, while the cost of brand *B* tea is $ 180 per 0.5 kg.

(a) Find the cost of brand *A* tea and brand *B* tea in $/kg. **(2 marks)**

(b) If x kg of brand *A* tea is mixed with y kg of brand *B* tea so that the cost of the mixture is $ 400 / kg, find $x : y$. **(2 marks)**

24. [20-21 S.2 Mid-year Exam #1]

It is given that $(3x - y) : (y + 2x) = 13 : 17$. Find $x : y$. **(3 marks)**

25. [20-21 S.2 Mid-year Exam #9]

The scale of a map is 1 : 12000.

(a) The actual area of Dan's house is 43200 m^2. On the map, the area of Dan's house is y cm^2. Find the value of y. **(2 marks)**

(b) The distance between the post office and Dan's house is 12.75 cm on the map. Dan's cycling speed is 3 m/s. How many minutes does Dan need to reach the post office from his house? **(2 marks)**

26. [20-21 F.2 Final Exam #6]

If $\frac{10x-8y}{x+8y}=3$, find $x : y$ **(2 marks)**

27. [20-21 F.2 Final Exam #13]

In a bag of marbles, the ratio of the number of red marbles to the number of blue marbles is 2 : 1 and the ratio of the number of blue marbles to the number of yellow marbles is 7 : 3.

(a) Write down the number of red marbles : the number of blue marbles : the number of yellow marbles. **(1 mark)**

(b) If the number of red marbles is 44 more than the number of yellow marbles, find the total number of marbles in the bag. **(2 marks)**

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