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

1.   [11-12 S.2 S.Test #6]
 Abby and Ben have a total of 150 stickers. It is given that the ratio of the number of Abby's stickers to the number of Ben's stickers is 17 : 13.
(a)   Find the number of stickers that each of them has.   **(3 marks)**
(b)   Abby buys an extra number of stickers, and then Ben buys twice as many as Abby. The new ratio found then becomes 20 : 19. How many stickers did each of them buy?
(4 marks)

2.   [11-12 S.2 S.Test #7]
 In a race between Tortoise and Rabbit, Tortoise walks steadily uphill at 2 km/h for 1 hour, then walks downhill at 4.5 km/h for 40 min to the finish line.
(a)   Find the total distance travelled by Tortoise in km.   **(2 marks)**
(b)   Find Tortoise's average speed in km/h.   **(2 marks)**
(c)   Rabbit runs at 4 km/h for 10 minutes, then decides to sleep. He wakes up after 1 h 10 min and runs at x km/h. If Rabbit finishes the race 6 minutes after Tortoise, find the value of x.   **(4 marks)**

3.   [11-12 S.2 Mid-year Exam #6]
 The capacity of an oil tank is 1800 L. A crack in the oil tank causes 20 L of oil to leak in 2 minutes. How many minutes does it take for one-third of the oil to leak?   **(2 marks)**

4.   [11-12 S.2 Final exam #5]
 In the morning session of a library tour, the ratio of the number of boys to the number of girls is 13:17. If 22 more boys join and 2 girls leave the tour in the afternoon session, the number of boys and girls are the same. Find the number of girls in the tour in the morning session.
(4 marks)

5.   [12-13 S.2 S. Test 1 #4]
 There are 60 balls in a bag with the ratio of the number of red balls to the number of blue balls to be 2 : 3. Find
(a) the number of red balls.   **(2 marks)**
(b) the new ratio of the number of red balls to the number of blue balls if 10 more red balls are added to the bag.   **(2 marks)**

6.   [12-13 S.2 S. Test 1 #6]
 A car park charges $50 for the first 2 hours and $20 for each additional hour.
(a) Find the average parking rate in $/h if a car is parked for 4 hours.   **(2 marks)**
(b) Find the number of parking hours if the average parking rate is $22/h.   **(2 marks)**
(c) Peter claims that if a car is parked for 10 hours, the average parking rate is lower than that if a car is parked for 4 hours. Do you agree?   Explain briefly.   **(1 mark)**

7.   [12-13 S.2 Mid-year Exam #6]
 A length of 3 cm on a map represents an actual distance of 15 km.
(a)   Find the scale of the map in the form of 1 : n.   **(2 marks)**
(b)   Find the actual distance, in km, represented by 7 cm on the map.   **(2 marks)**

8.   [12-13 S.2 Mid-year Exam #12]
Mary runs a coffee shop. **Table 1** below shows the cost prices of three types of coffee beans. She plans to mix the 3 types of coffee beans to produce several new brands of coffee powder.

(a) A new brand of coffee powder is produced by mixing 3 kg of type A coffee beans and 2 kg of type B coffee beans. Find the cost price of the new brand of coffee powder in dollar/kg. **(2 marks)**

(b) Another new brand of coffee powder is produced by mixing type *A* coffee beans and type *C* coffee beans with a cost price of $5.9/kg. Find the ratio of type *A* to type *C* coffee beans in this new brand of coffee powder. **(2 marks)**

Type of coffee bean	Cost price (dollar/kg)
A	3.3
B	4.5
C	7.2

Table 1

9. [12-13 S.2 Final Exam #5]
Mr. Jackson gives his savings among his three children, Peter, Paul and Mary. The ratio of Peter's share to Mary's share is 6 : 1.   The ratio of Paul's share to Mary's share is 3 : 1.
**(a)** Find the ratio of Peter's share : Paul's share : Mary's share. **(1 mark)**
(b) If Peter's share is $2460 more than Paul's share, what is the amount of Mary's share? **(2 marks)**

10. [13-14 S.2 S.Test 1 #3]

(a) In a typing test, Angel types 280 words in 5 minutes. Find her typing speed in words/min. **(1 mark)**

(b) Hence, find the time required for her to type an essay of 1,400 words. **(2 marks)**

11. [13-14 S.2 S.Test 1#4]
Figure 1 shows the floor plan of a rectangular room with a scale $1:80$ and dimensions 10.5 cm $\times$ 9 cm.   Find the actual area of the room in m2. **(2 marks)**

9 cm

10.5 cm
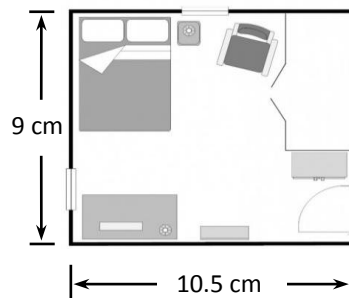
Figure 1

12. [13-14 S.2 S.Test 1#5]
It is given that $a = 2b$ and $\dfrac{6}{a} : \dfrac{3}{c} = \dfrac{1}{2} : \dfrac{1}{5}$, find $b : c$. **(2 marks)**

13. [13-14 S.2 S.Test 1 #8]
Athena, Ben and Chloe shared a bag of 216 candies yesterday.   Chloe got twice as many as Ben. The number of candies Ben got is $\dfrac{2}{3}$ that of Athena.

(a) Find the ratio of Athena's share : Ben's share : Chloe's share. **(2 marks)**
(b) Today, after Chloe has eaten some of her candies, the ratio of Athena's share to Ben's share to Chloe's share becomes $9:6:10$.   How many candies has Chloe eaten today? **(3 marks)**

14. [13-14 S.2 Mid-year Exam #5]

It is given that $2x + 3y = 2(3x - 4y)$.

(a) Find $x : y$.   **(2 marks)**
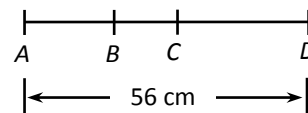
(b) Hence find $x : y : z$ if $x : z = 5 : 4$.   **(2 marks)**

15. [13-14 S.2 Mid-year Exam #6]

Figure 1 shows a line segment AD of length 56 cm with points B and C lying on it.   It is given that AB is shorter than CD by 6 cm and $AB : CD = 3 : 4$.

(a) Find the length of AB.   **(2 marks)**

(b) If $AB : BC : CD = 9 : x : 12$, find the value of x.   **(2 marks)**

Figure 1

16. [13-14 S.2 Mid-year Exam #12]

Mr Lee drives at the same speed of 80 km/h on a highway which is 110 km long.   He fills his car with 20 L of petrol before the journey.   In the first 10 km of his journey, his car consumes 2 L of petrol.   Assume that the petrol consumption rate is the same throughout the journey.

(a) Find the petrol consumption rate in L/km.   **(2 marks)**

(b) Can he complete the whole journey within 1.5 hours without refilling petrol to his car? Explain your answer.   **(3 marks)**

17. [13-14 S.2 Final Exam #4]

The distance between Mongkok and Tai Po on a map with scale 1 : 100 000 is 22 cm. If the speed of a red van is 88 km/h, what is the time required (in min) for the red van to travel from Mongkok to Tai Po?   **(3 marks)**

18. [14-15 S.2 Mid-Year Exam #5]

It is given that $a : b = 3 : 8$ and $11b = 20c$.

(a)   Find $a : b : c$.   **(3 marks)**

(b)   Find the value of $\dfrac{3a - 2c}{6a + 5c}$.   **(2 marks)**

19. [14-15 S.2 Mid-Year Exam #11]

On the map as shown in Figure 2, the road from town P to town Q, which is a straight line, is 7 cm long. It is given that a length of 4 cm on the map represents an actual distance of 18 km.

(a)   (i) Express the scale of the map in the form of 1 : n.   (1 mark)
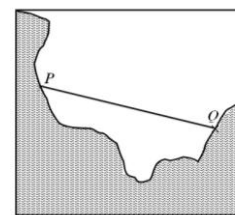   (ii Find the actual distance between town P and town Q.   (2 marks)

(b)   Raymond starts driving from town P to town Q along the road first. 15 minutes later, Janice starts driving from town Q to town P along the same road at a speed of 35 km/h. If they meet each other exactly at the mid-point between town P and town Q, find the speed of Raymond's car.   (3 marks)

Figure 2

20. [14-15 S.2 Final Exam #2]

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

(a) Find $x : y : z$.   **(1 mark)**

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

21. [15-16 S.2 Mid-year Exam #3]

On a map, 5 cm represents an actual distance of 6 km.

(a) Write down the scale of the map in the form of 1: n, where n is an integer.   **(1 mark)**

(b) If a road is 8.4 km long, find its length in cm on the map.   **(2 marks)**

22. [15-16 S.2 Mid-year Exam #5]

It is given that $15a = 2b$ and $2a - 3c = 4a - 8c$. Find $a : b : c$.   **(3 marks)**

23. [15-16 S.2 Mid-year Exam #13]

ΔABC is a right-angled triangle, where $\angle ABC$ = 90°. It is given that $AB : BC : AC$ = 3 : 4 : 5. ΔABC is enlarged to ΔPQR by a scale factor of 3.5.

(a) If the difference between the perimeters of ΔABC and ΔPQR is 93 cm, find AB.   **(2 marks)**

(b) Write down the ratio of the area of ΔABC to the area of ΔPQR.   **(1 mark)**

~ End ~