STANDARD 7TH: CHAPTER 9

Direct and Indirect Proportion

Q.1. Choose the correct alternative.

1. Shiva, who is 5 inches taller than her brother Vishwa casts a shadow that is a foot longer than his. If Shiva is 50 inches tall, what is the length in inches of Vishwa's shadow?
   a. 120 inches
   b. 110 inches
   c. 108 inches
   d. 112 inches

2. Tommy is constructing a model boat. The scale of the model is 1/4 inch = 1 foot. If the model of the boat is 14 inches long, how long is the real boat?
   a. 56 feet
   b. 65 feet
   c. 84 feet
   d. 48 feet

3. 6 builders can build 10 houses in 30 months. How long would it take 18 builders to build the same number of houses?
   a. 20 months
   b. 60 months
   c. 50 months
   d. 10 months

4. Given that y is inversely proportional to x, complete the following table.

x	4	60	b
y	7.5	a	12

   a. a=0.5, b=2.5
   b. a=0.5, b=1.5
   c. a=1.5, b=2.5
   d. a=2.5, b=3.5

5. y is directly proportional to x^2. When x=2 then y=36. Find k.
    a. 7
    b. 9
    c. 8
    d. 5

6. p is inversely proportional to m. And p = 48 when m = 9
    a. 420
    b. 415
    c. 432
    d. 450

7. Whether y is directly proportional to x. Observe the table and answer yes or No.

x	20	17	14	11	8	5	2
y	40	34	28	22	16	10	4

    a. Yes
    b. No

8. If the temperature of a gas is inversely proportional to its volume at constant pressure, and the temperature is 300 K when the volume is 2 L, what is the temperature when the volume is 4 L?
    a. 650K
    b. 200 K
    c. 300 K
    d. 150 K

9. In inverse proportion, _____ of corresponding values remains constant.
    a. Ratio
    b. Product
    c. Sum
    d. Difference

10. Check constant of proportionality from the table deciding proportion.

x	1	2	4	8
y	40	20	10	5

a. 40
b. 20
c. 1/20
d. 1/40

Q.2. Solve the following problems

1. y is directly proportional to x^2 . When x=2 and y=36 find k
   Express y in terms of x:

2. The time taken (t) for customers to receive their orders at a fast-food restaurant is inversely proportional to the square of the number of staff (s) on duty. It takes 2020 minutes for customer orders to be taken when there are 44 staff members on duty.

   a) Write an equation for t in terms of s (Ans: $t = \frac{k}{s^2}$)

   b) If the number of staff is doubled, how many times quicker
      will the customers receive their orders?
      (Ans: if you double the number of staff the orders take 5 minutes
          to be received instead of 20 minutes, so the orders
          are received 4 times faster.)

3. 44 cows can graze a field in 9 days. How many less/ more cows will graze the same field in 12 days?

4. In a hostel of 50 girls, there are food provisions for 40 days. If 30 more girls join the hostel, how long will this provision last?

5. The following table shows the distance travelled by one of the new eco-friendly energy efficient cars travelled on gas

x	1	0.5	2	2.5	3	5
y	15	7.5	30	37.5	45	75

Which type of properties are indicated by the table? How much distance will be covered by the car in 8 litres of gas?

6. The scale of a map is given as I: 3,00,00.000. Two cities are 4 cm apart on the maps. Find the actual distance between them.

7. A water tank casts a shadow 21 m long. A tree of height 9.5 m casts a shadow 8 m long at the same time. The lengths of the shadows are directly proportional to their heights. Find the height of the tank.

8. If 25 metres of costs Rs.337.50, then
   a. What will be the cost of 40 metres of the same type of cloth?
   b. What will be the length of the cloth bought for Rs.810?

9. A ball falls vertically after being dropped. The ball falls a distance d metres in a time of t seconds. d is directly proportional to the square of t. The ball falls 20 metres in a time of 2 seconds.
   a. Find a formula for 'd' in terms of 't'
   b. Calculate the distance the ball falls in 3 seconds.
   c. Calculate the time the ball takes to fall 605 m.

10. Define Inverse proportion and direct proportion and give two examples of each.