**Tick (✔) the correct answer in each of the following:**

**1.***If 14 kg of pulses cost $ 441, what is the cost of 22 kg of pulses?*

  (a) $ 627
  (b) $ 649
  (c) $ 671
  (d) $ 693

**2.***If 36 men can do a piece of work in 25 days, in how many days will 15 men do it?*

  (a) 50
  (b) 56
  (c) 60
  (d) 72

**3.***If 20 men can build a wall 56 metres long in 6-daysWhat length of a similar wall can be built by 35 men in 3 days?*

  (a) 49 metres
  (b) 36 metres
  (c) 52 metres
  (d) 42 metres

**4.***120 men had provisions for 200 days. After 5 days, 30 men died due to an epidemic. The remaining food will last for …………. .*

  (a) 146 1/4 days
  (b) 150 days
  (c) 2251/2 days
  (d) 260 days

**5.***A garrison of 500 men had provisions for 24 days. However, a reinforcement of 300 men arrived. The food will now last for ……………. .*

  (a) 15 days
  (b) 16 days
  (c) 17 1/2 days
  (d) 18 days

**6.***12 men, working 8 hours a day, complete a piece of work in 10 days. To complete the same work in 8 days, working 15 hours a day, the number of men required, is …………. .*

  (a) 4
  (b) 5
  (c) 6
  (d) 8

**7.***39 persons can repair a road in 12 days, working 5 hours a day. In how many days will 30 persons, working 6 hours a day, complete the work?*

  (a) 10
  (b) 13
  (c) 14
  (d) 15

**8.***If men or 9 women can do a piece of work in 19 days then in how many days will 3 men and 6 women do the same work?*

  (a) 12
  (b) 15
  (c) 18
  (d) 21

Answers for practice test on direct variation and inverse variation are given below to check the exact answers of the above word problems on direct variation and inverse variation.

**Answers:**

1. (d)
2. (c)
3. (c)
4. (d)
5. (a)
6. (d)
7. (b)
8. (b)

**General Rules**

(i) Suppose if a person A can finish a work in n days.

Then, work done by A in 1 day = 1/nth part of the work.

(ii) Suppose that the work done by A in 1 day is 1/n

Then, time taken by A to finish the whole work = n days.

**Problems on Time and Work :**

**1. Aaron alone can finish a piece of work in 12 days and Brandon alone can do it in 15 days. If both of them work at it together, how much time will they take to finish it?**

**Solution:**

Time taken by Aaron to finish the work = 12 days.

Work done by Aaron in 1 day = 1/12

Time taken by Brandon to finish the work = 15 days.

Work done by Brandon in 1 day = 1/15

Work done by (Aaron + Brandon) in 1 day = 1/12 + 1/15 = 9/60 = 3/20

Time taken by (Aaron + Brandon) to finish the work = 20/6 days, i.e., 6 2/3days.

**Hence both can finish the work in 6 2/3 days.**

**2. A and B together can do a piece of work in 15 days, while B alone can finish it 20 days. In how many days can A alone finish the work?**

**Solution:**

Time taken by (A + B) to finish the work = 15 days.

Time taken by B alone to finish the work 20 days.

(A + B)’s 1 day’s work = 1/15

and B’s 1 day’s work = 1/20

A’s 1 day’s work = {(A + B)’s 1 day’s work} — {B’s 1 day’s work}

= (1/15 – 1/20) = (4 – 3)/60 = 1/60

**Therefore, A alone can finish the work in 60 days.**

**3. A can do a piece of work in 25 days and B can finish it in 20 days. They work together for 5 days and then A leaves. In how many days will B finish the remaining work?**

**Solution:**

Time taken by A to finish the work = 25 days.

A’s 1 day’s work = 1/25

Time taken by B to finish the work = 20 days.

B’s 1 day’s work = 1/20

(A + B)’s 1 day’s work = (1/25 + 1/20) = 9/100

(A + B)’s 5 day’s work (5 × 9/100) = / = 9/20

Remaining work (1 - 9/20) = 11/20

Now, 11/20 work is done by B in 1 day

Therefore, 11/20 work will be done by B in (11/ × ) days = 11 days.

**Hence, the remaining work is done by B in 11 days.**

**4. A and B can do a piece of work in 18 days; B and C can do it in 24 days while C and A can finish it in 36 days. If A, B, C works together, in how many days will they finish the work?**

**Solution:**

Time taken by (A + B) to finish the work = 18 days.

(A + B)’s 1 day’s work = 1/18

Time taken by (B + C) to finish the work = 24 days.

(B + C)’s 1 day’s work = 1/24

Time taken by (C + A) to finish the work = 36 days.

(C + A)’s 1 day’s work = 1/36

Therefore, 2(A + B + C)’s 1 day’s work = (1/18 + 1/24 + 1/36) = (4 + 3 + 2)/72 = / = 1/8

⇒ (A + B + C)’s 1 day’s work = (1/2 × 1/8) = 1/16

**Therefore, A, B, C together can finish the work in 16 days.**

**5. A and B can do a piece of work in 12 days; B and C can do it in 15 days while C and A can finish it in 20 days. If A, B, C works together, in how many days will they finish the work? In how many days will each one of them finish it, working alone?**

**Solution:**

Time taken by (A + B) to finish the work = 12 days.

(A + B)’s 1 day’s work = 1/12

Time taken by (B +C) to finish the work = 15 days.

(B + C)’s 1 day’s work = 1/15

Time taken by (C + A) to finish the work = 20 days.

(C + A)’s 1 day’s work = 1/20

Therefore, 2(A + B + C)’s 1 day’s work = (1/12 + 1/15 + 1/20) = / = 1/5

⇒ (A + B + C)’s 1 day’s work = (1/2 × 1/5) = 1/10

**Therefore, A, B, C together can finish the work in 10 days.**

Now, A’s 1 day’s work

= {(A + B + C)’s 1 day’s work} - {(B + C)’s 1 day’s work}

= (1/10 – 1/15) = 1/30

**Hence, A alone can finish the work in 30 days.**

B’s 1 day’s work

{(A + B + C)’s 1 day’s work} - {(C + A)’s 1 day’s work}

(1/10 – 1/20) = 1/20**Hence, B alone can finish the work in 20 days.**

C’s 1 days work

= {(A + B + C)’s 1 day’s work} - {(A + B)’s 1 day’s work}

= (1/10 – 1/12) = 1/60

**Hence, C alone can finish the work in 60 days.**

**1.**A can do a piece of work in 24 days while B can do it in 30 days. In how many days can they complete it, if they work together?

**2.**A can do a piece of work in 15 hours while B can do it in 12 hours. How long will both take to do it, working together?

**3.**A and B, working together can finish a piece of work in 6 days, while A alone can do it in 9 days. How much time will B alone take to finish it?

**4.**Two motor mechanics, Ron and Sam, working together can overhaul a scooter in 6 hours. Ron alone can do the job in 15 hours. In how many hours, can Sam alone do it?

**5.**A, B and C can do a piece of work in 8 days, 12 days and 15 days respectively. How long will they take to finish it if they work together?

**6.**A can do a piece of work in 6 hours while B alone can do it in 16 hours. If A, B and C working together can finish it in 8 hours, in how many hours can C alone finish the work?

**7.**A, B and C working together can finish a piece of work in 8 hours. A alone can do it in 20 hours and B alone can do it in 24 hours. In how many hours will C alone do the same work?

**8.**A and B can finish a piece of work in 6 days and 4 days respectively. A started the work and worked at it for 2 days. He was then joined by B. Find the total time taken to finish the work.

**9.**A can do a piece of work in 14 days while B can do it in 21 days. They began together and worked at it for 7 days. Then, A was not well and B had to complete the work. In how many days was the work completed?

**10.**A, B and C can do a piece of work in 15, 12 and 20 days respectively. They started the work together, but C left after 2 days. In how many days will the remaining work be completed by A and B?

**11.**A and B can do a piece of work in 18 days; B and C can do it in 24 days while C and A can finish it in 36 days. In how many days can A, B, C finish it, if they all work together?

**12.**A and B can do a piece of work in 12 days, B and C in 15 days, and C and A in 20 days. How much time will A alone take to finish the job?

**13.**Pipes A and B can fill an empty tank in 10 hours and 15 hours respectively. If both are opened together in the empty tank, how much time will they take to fill it completely?

**14.**Pipe A can fill an empty tank in 5 hours while pipe B can empty the full tank in 6 hours. If both are opened at the same time in the empty tank, how much time will they take to fill it up completely?

**15.**Three taps A, B and C can fill an overhead tank in 6 hours, 8 hours and 12 hours respectively. How long would the three taps take to fill the empty tank, if all of them are opened together?

**16.**A cistern has two inlets A and B which can fill it in 12 minutes and 15 minutes respectively. An outlet C can empty the full cistern in 10 minutes. If all the three pipes are opened together in the empty tank, how much time will they take to fill the tank completely?

**17.**A pipe can fill a cistern in 9 hours. Due to a leak in its bottom, the cistern fills up in 10 hours. If the cistern is full, in how much time will it be emptied by the leak?

**Hint.** Work done by the leak in 1 hour = (1/9 – 1/10) = 1/90

**18.**Pipe A can fill a cistern in 6 hours and pipe B can fill it in 8 hours. Both the pipes are opened and after two hours, pipe A is cl?sed. How much time will B take to fill the remaining part of the tank?

**Hint.** Work done by (A + B) in 1 hour = (1/6 + 1/8) = 7/24

Work done by both in 2 hours = (7/24 × 2) = 7/12

Remaining part = (1 - 7/12) = 5/12

Now, 1/8 part is filled by B in 1 hour. Find how much time B will take to fill5/12 part.

**Below the worksheet on time and work we will find the answers of the given question.**

**Answers:**

**1.**13 1/3 days.

**2.**6 hours 40 minutes.

**3.**18 days.

**4.**10 hours

**5.**3 7/11 days.

**6.**48 hours.

**7.**30 hours.

**8.**3 3/5 days.

**9.**10 1/2 days.

**10.**4 days.

**11.**16 days.

**12.**30 days.

**13.**6 hours.

**14.**30 hours.

**15.**2 hours 40 minutes.

**16.**20 minutes.

**17.**90 hours.

**18.**31/3 hours

**Examples on Direct Variation or Direct Proportion:**

(i) The cost of articles varies directly as the number of articles. (More articles, more cost)

(ii) The distance covered by a moving object varies directly as its speed. (More speed, more distance covered in the same time)

(iii) The work done varies directly as the number of men at work. (More men at work, more is the work done in the same time)

(iv) The work done varies directly as the working time. (More is the working time, more is the work done)

**Solved worked-out problems on Direct Variation:**

**1.***If $ 166.50 is the cost of 9 kg of sugar, how much sugar can be purchased for $ 259?*

**Solution:**

For $ 166.50, sugar purchased = 9 kg

For $ 1, sugar purchased = 9/166.50 kg   **[less money, less sugar]**

For $ 259, sugar purchased = {(9/166.50) × 259} kg    **[More money, more sugar]**

                                      = 14 kg.

Hence, 14 kg of sugar can be purchased for $ 259.

**2.***If one score oranges cost $ 45, how many oranges can be bought for $ 72?*

**Solution:**

For $ 45, number of oranges bought = 20

For $ 1, number of oranges bought = 20/45   **[less money, less oranges]**

For $ 72, number of oranges bought = {(20/45) × 72}    **[More money, more oranges]**

                                                = 32.

Hence, the number of oranges bought for $ 72 is 32.

**3.***If a car covers 82.5 km in 5.5 litres of petrol, how much distance will it cover in 13.2 litres of petrol?*

**Solution:**

In 5.5 litres of petrol, distance covered = 82.5 km

In 1 litre of petrol, distance covered = 82.5/5.5 km    **[less petrol, less distance]**

In 13.2 litres of petrol, distance covered = {(82.5/5.5) × 13.2} km    **[More petrol, more distance]**

                                                      = 198 km.

Hence, the car covers 198 km in 13.2 litres of petrol.

Direct Variation

1. If 8 oranges cost $ 10.40, how many oranges can be bought for $ 33.80?

      (a) 21
      (b) 23
      (c) 25
      (d) 26

2. If 18 dolls cost $ 630, how many dolls can be bought for $ 455?

      (a) 9
      (b) 11
      (c) 13
      (d) 15

3. If a man earns $ 805 per week, in how many days he will earn $ 1840?

      (a) 7 days
      (b) 16 days
      (c) 19 days
      (d) 23 days

4. If car covers 102 km in 6.8 litres of petrol, how much distance will it cover in 24.2 litres of petrol?

      (a) 363 km
      (b) 330 km
      (c) 375 km
      (d) 396 km

5. On a particular day, 200 US dollars are worth Rs 9666. On that day, how many dollars could be bought for Rs 5074.65?

      (a) 105 US dollars
      (b) 117 US dollars
      (c) 127 US dollars
      (d) 131 US dollars

6. If 5 men or 7 women earn $ 525 per day, how much would 7 men and 13 women earn per day?

      (a) $ 1331
      (b) $ 1816
      (c) $ 1710
      (d) $ 1041

7. The cost of 16 bags of washing powder, each weighing 1.5 kg, is $ 672. Find the cost of 18 bags of the same, each weighing 2 kg.

      (a) $ 1008
      (b) $ 1128
      (c) $ 1338
      (d) $ 1000

8. If 3 persons can weave 168 shawls in 1 4 days, how many shawls will be woven by 8 persons days?

      (a) 153
      (b) 189
      (c) 127
      (d) 160

9. If the cost of transporting 160 kg of goods for 125 km is Rs 60, what will be the cost of transporting 200 kg of goods for 400 km?

      (a) $ 118
      (b) $ 196
      (c) $ 240
      (d) $ 275

10. If the wages of 12 workers for 5 days are $ 7500, find the wages of 17 workers for 6 days.

      (a) $ 10943
      (b) $ 11057
      (c) $ 12750
      (d) $ 13473

Answers for worksheet on direct variation are given below to check the exact answers of the question.

**Answers:**

  **1.** 26
  **2.** 13
  **3.** 16
  **4.** 363 km
  **5.** 105 US dollars
  **6.** $ 1710
  **7.** $ 1008
  **8.** 160
  **9.** $ 240
**10.** $ 12750

**1.**  If 32 men can reap a field in 15 days, in how many days can 20 men reap the same field?

**2.**  12 men can dig a pond in 8 days. How many men can dig it in 6 days?

**3.**  A hostel has enough food for 125 students for 16 days. How long will the food last if75 more students join them?

**4.**  A fort had enough food for 80 soldiers for 60 days. How long would the food last if 20 more soldiers join after 15 days?

**5.**  500 soldiers in a fort had enough food for 30 days. After 6 days, some soldiers were sent to another fort and thus the food lasted for 32 more days. How many soldiers left the fort?

**Hint:**On the day of transfer of some soldiers from this fort, 500 soldiers had enough food for (30 - 60) = 24 days. But, the food lasted for 32 days.

**6.**  8 taps having the same rate of flow, fill a tank in 27 minutes. If two taps go out of order, how long will the remaining taps take to fill the tank?

**7.**  If 12 men or 15 women can finish a piece of work in 66 days, how long will 24 men and 3 women take to finish the work?

**8.**  70 patients in a hospital consume 1350 litres of milk in 30 days. At the same rate, how many patients will consume 1710 litres in 28 days?

**9.**  If 30 labourers working 7 hours a day can finish a piece of work in 18 days, how many labourers working 6 hours a day can finish it in 30 days?

**10.**  If 5 men working 6 hours a day can reap a field in 20 days, in how many days will 15 men reap the field if they work for 8 hours a day?

**11.**  If 18 binders can bind 900 books in 10 days, how many binders will be required to bind 660 books in 12 days?

**12.**  If 20 men can build a 112-m-long wall in 6 days, what will be the length of a similar wall that can be built by 25 men in 3 days?

**13.**  6 men, working 8 hours a day, earn $ 8400 per week. What will be the earning per week of 9 men who work for 6 hours a day?

**14.**  If 270 kg of corn would feed 42 horses for 21 days, for how many days would 360 kg of it feed 21 horses?

**15.**  Five machines, when operated for 9 hours each day, can harvest a farm in 16 days. How many days would 8 machines take to harvest the same farm, if each machine is now operated for 10 hours each day?

Answers for worksheet on inverse variation are given below to check the exact answers of the question.

### Answers:

1. 24 days
2. 16 men
3. 10 days
4. 51 days
5. 125 soldiers
6. 36 minutes
7. 30 days
8. 95 patients
9. 21 labourers
10. 56 days
11. 11 binders
12. 70 m
13. $ 9450
14. 56 days
15. 9 days