3.8 Inverse Proportion: 1-hour Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The table shows pairs of values of two quantities that are directly proportional.

x	7	11
y	49	?

Work out the missing value.

(2)

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2 4 workers take 18 days to build a wall. All workers work at the same rate. How long would 12 workers take?

(3)

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3 y is directly proportional to x. When x = 2, y = 6. Work out the value of y when x = 13.

(2)

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4 In an inverse proportion y = k/x. Find the constant k for each case.

(a) When x = 2, y = 9. **(1)**

(b) When x = 7, y = 3/7. **(1)**

5 A tank is emptied by 10 identical pumps in 6 hours. How long would 15 of these pumps take to empty it?

(3)

6 2 workers take 18 days to build a wall. All workers work at the same rate. How long would 6 workers take?

(3)

7 y is inversely proportional to x. When x = 2, y = 20. Work out the value of y when x = 8.

(2)

8 y is directly proportional to x. When x = 8, y = 32. Work out the value of y when x = 13.

(2)

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9 A group of 9 people can paint a fence in 12 hours. Each person paints at the same rate. How many people are needed to paint it in 9 hours?

(3)

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10 y is directly proportional to x. When x = 7, y = 35. Work out the value of y when x = 12.

(2)

---

11 A tank is emptied by 10 identical pumps in 10 hours. How long would 20 of these pumps take to empty it?

(3)

---

12 y is directly proportional to x. When x = 5, y = 20. Work out the value of y when x = 12.

(2)

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13 A job takes 6 workers 10 hours to finish. Assuming work completed is fixed and workers are equally efficient, how long would it take 15 workers?

(3)

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14 5 workers take 8 days to build a wall. All workers work at the same rate. How long would 4 workers take?

(3)

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15 y is inversely proportional to x. When x = 4, y = 30. Work out the value of y when x = 20.

(2)

---

16 The table shows pairs of values of two quantities that are directly proportional.

x	9	11
y	45	?

Work out the missing value.

(2)

---

17 y is directly proportional to x. When x = 7, y = 14. Work out the value of y when x = 4.

(2)

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18 A tank is emptied by 5 identical pumps in 24 hours. How long would 12 of these pumps take to empty it?

(3)

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19 Two machines working together complete a task in 4 hours. If one machine alone would take 6 hours, find how long the second machine would take alone. Assume each machine works at constant rate and rates add.

(2)

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Mark scheme · 3.8 Inverse Proportion: 1-hour Pack

Question 1

49 ÷ 7	M1
77 cao	A1

Answer: **77**

Question 2

4 x 18 = 72 worker-days	M1
72 ÷ 12	M1
6 days cao	A1

Answer: **6 days**

Question 3

y = kx with k = 6 ÷ 2 = 3	M1
39 cao	A1

Answer: **39**

Question 4

(a) k = 18 cao	B1

(a) Answer: **18**

(b) k = 3 cao	B1

(b) Answer: **3**

Question 5

10 x 6 = 60	M1
60 ÷ 15	M1
4 hours cao	A1

Answer: **4 hours**

Question 6

2 x 18 = 36 worker-days	M1
36 ÷ 6	M1
6 days cao	A1

Answer: **6 days**

Question 7

y = k/x with k = 2 x 20 = 40	M1
5 cao	A1

Answer: **5**

Question 8

y = kx with k = 32 ÷ 8 = 4	M1
52 cao	A1

Answer: **52**

Question 9

9 x 12 = 108	M1
108 ÷ 9	M1
12 cao	A1

Answer: **12 people**

Question 10

y = kx with k = 35 ÷ 7 = 5	M1
60 cao	A1

Answer: **60**

Question 11

10 x 10 = 100	M1
100 ÷ 20	M1
5 hours cao	A1

Answer: **5 hours**

Question 12

y = kx with k = 20 ÷ 5 = 4	M1
48 cao	A1

Answer: **48**

Question 13

use inverse proportion: k = workers * time = 6*10 = 60 or state time = k/workers	M1
substitute: time = 60/15	M1
4 hours cao	A1

Answer: **4 hours**

Question 14

5 x 8 = 40 worker-days	M1
40 ÷ 4	M1
10 days cao	A1

Answer: **10 days**

Question 15

y = k/x with k = 4 x 30 = 120	M1
6 cao	A1

Answer: **6**

Question 16

45 ÷ 9 = 5	M1
55 cao	A1

Answer: **55**

Question 17

y = kx with k = 14 ÷ 7 = 2	M1
8 cao	A1

Answer: **8**

Question 18

5 x 24 = 120	M1
120 ÷ 12	M1
10 hours cao	A1

Answer: **10 hours**

Question 19

use rates: 1/6 + 1/t = 1/4 or state combined rate = 1/4	M1
t = 12/1 = 12 hours cao	A1

Answer: **12 hours**

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