2.8 Direct and Inverse Proportion: 30-minute Pack

AQA 8365 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 y is directly proportional to the cube of x. When x = 3, y = 486. Find the value of y when x = 14.

(Total for Question 1 is 3 marks)

---

2 y is inversely proportional to x. When x = 10, y = 60. Find the positive value of x when y = 100.

(Total for Question 2 is 4 marks)

---

3 y is inversely proportional to the square of x. When x = 5, y = 24. Find the value of y when x = 10.

(Total for Question 3 is 3 marks)

© Revision Library | revisionlibrary.co.uk

4 y is inversely proportional to the square of x. When x = 2, y = 45. Find a formula for y in terms of x.

(Total for Question 4 is 3 marks)

---

5 y is directly proportional to the square of x and inversely proportional to z. When x = 2 and z = 4, y = 4. Find the value of y when x = 2 and z = 2.

(Total for Question 5 is 4 marks)

---

6 y is inversely proportional to x. When x = 5, y = 18. Find the value of y when x = 9.

(Total for Question 6 is 2 marks)

---

7 y is directly proportional to the square root of x. x is increased by 125%. Work out the percentage change in y. State whether it is an increase or a decrease.

(Total for Question 7 is 3 marks)

---

8 Which of the following equations shows y directly proportional to x^3?

- ☐ A) $y = k/x^3$
- ☐ B) $y = 3x$
- ☐ C) $y = kx^3$
- ☐ D) $y = x^3 + k$

(Total for Question 8 is 1 mark)

© Revision Library | revisionlibrary.co.uk

9 m is inversely proportional to n. Given that m = 6 when n = 5, state the value of the constant of proportionality k.

(Total for Question 9 is 1 mark)

---

10 z is directly proportional to x and inversely proportional to y. When x = 6 and y = 3, z = 8. Find the value of z when x = 9 and y = 2.

(Total for Question 10 is 2 marks)

---

11 y is directly proportional to x^2. Show that if x is doubled, y increases by 300%.

(Total for Question 11 is 3 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 2.8 Direct and Inverse Proportion: 30-minute Pack

Question 1

writes $y = kx^3$ or equivalent	**M1**
finds k = 18	**M1**
y = 49392 cao	**A1**

Answer: y = 49392

Question 2

writes y = k/x or equivalent	**M1**
finds k = 600	**M1**
substitutes y and solves for x	**M1**
x = 6 cao	**A1**

Answer: x = 6

Question 3

writes $y = k/x^2$ or equivalent	**M1**
finds k = 600	**M1**
y = 6 cao	**A1**

Answer: y = 6

Question 4

$y = k/x^2$ or equivalent	**M1**
substitutes to find k = 180	**M1**
$y = 180/x^2$ cao	**A1**

Answer: $y = 180/x^2$

Question 5

$y = kx^2/z$ or equivalent	**M1**
substitutes to find k = 4	**M1**
substitutes the new values	**M1**
y = 8 cao	**A1**

Answer: y = 8

Question 6

finds the constant of proportionality, k = 90 (from k = 5 x 18)	**M1**
y = 10 cao	**A1**

Answer: y = 10

Question 7

new x = 9/4x, so y is multiplied by 9/4 to the power 1/2	**M1**
multiplier = 3/2	**M1**
y increases by 50% cao	**A1**

Answer: y increases by 50%

Question 8

C cao	**B1**

Answer: C) $y = kx^3$

Question 9

30 cao	**B1**

Answer: k = 30

Question 10

finds k = 4 (from 8 = k(6)/3, i.e. 8 = 2k) and sets up z = 4(9)/2	**M1**
z = 18 cao	**A1**

Answer: z = 18

Question 11

lets the original $y = kx^2$	**M1**
finds the new y when x is doubled: $k(2x)^2 = 4kx^2 = 4y$	**M1**
correct conclusion: the increase is 4y - y = 3y, which is 300% of the original value, as required	**A1**

Answer: y increases by 300% (shown)

© Revision Library | revisionlibrary.co.uk