2.8 Direct and Inverse Proportion: 1-hour Pack

AQA 8365 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 y is directly proportional to the square of x. When x = 2, y = 28. Find the value of y when x = 7.

(Total for Question 1 is 3 marks)

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2 y is directly proportional to the cube of x. When x = 3, y = 54. Find a formula for y in terms of x.

(Total for Question 2 is 3 marks)

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3 y is inversely proportional to x. When x = 8, y = 18. Find the value of y when x = 2.

(Total for Question 3 is 3 marks)

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4 y is directly proportional to the square of x. When x = 11, y = 2178. Find a formula for y in terms of x.

(Total for Question 4 is 3 marks)

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5 y is inversely proportional to the square of x. When x = 2, y = 90. Find the positive value of x when y = 40.

(Total for Question 5 is 4 marks)

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6 y is directly proportional to the cube of x. When x = 9, y = 6561. Find the value of y when x = 5.

(Total for Question 6 is 3 marks)

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7 y is directly proportional to the square of x. When x = 5, y = 400. Find a formula for y in terms of x.

(Total for Question 7 is 3 marks)

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8 y is directly proportional to the square of x and inversely proportional to z. When x = 7 and z = 3, y = 49. Find the value of y when x = 4 and z = 2.

(Total for Question 8 is 4 marks)

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9 y is inversely proportional to x. When x = 6, y = 24. Find a formula for y in terms of x.

(Total for Question 9 is 3 marks)

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10 y is directly proportional to the square root of x. When x = 16, y = 36. Find the value of y when x = 100.

(Total for Question 10 is 3 marks)

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11 y is inversely proportional to the square of x. When x = 2, y = 100. Find the value of y when x = 4.

(Total for Question 11 is 3 marks)

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12 y is directly proportional to the square root of x. When x = 36, y = 66. Find the positive value of x when y = 77.

(Total for Question 12 is 4 marks)

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13 A table shows corresponding values of x and y. It is given that y is proportional to x^2.

x: 9, 2, 11

y: 810, 40, p

Work out the value of p.

(Total for Question 13 is 3 marks)

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14 y is directly proportional to x^2. Given that y = 48 when x = 4, state the value of the constant of proportionality k.

(Total for Question 14 is 1 mark)

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15 z is directly proportional to x and inversely proportional to y^2. When x = 8 and y = 2, z = 12.

(a) Find a formula connecting x, y and z. **(2)**

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(b) Find z when x = 10 and y = 5. **(2)**

.....

(c) Find the value of y when x = 27 and z = 2. **(2)**

.....

(Total for Question 15 is 6 marks)

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16 p is directly proportional to q^3. Show that if q is halved, p is divided by 8.

(Total for Question 16 is 3 marks)

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Mark scheme · 2.8 Direct and Inverse Proportion: 1-hour Pack

Question 1

writes $y = kx^2$ or equivalent	**M1**
finds $k = 7$	**M1**
$y = 343$ cao	**A1**

Answer: $y = 343$

Question 2

$y = kx^3$ or equivalent	**M1**
substitutes to find $k = 2$	**M1**
$y = 2x^3$ cao	**A1**

Answer: $y = 2x^3$

Question 3

writes $y = k/x$ or equivalent	**M1**
finds $k = 144$	**M1**
$y = 72$ cao	**A1**

Answer: $y = 72$

Question 4

$y = kx^2$ or equivalent	**M1**
substitutes to find $k = 18$	**M1**
$y = 18x^2$ cao	**A1**

Answer: $y = 18x^2$

Question 5

writes $y = k/x^2$ or equivalent	**M1**
finds $k = 360$	**M1**
substitutes y and solves for x	**M1**
$x = 3$ cao	**A1**

Answer: $x = 3$

Question 6

writes $y = kx^3$ or equivalent	**M1**
finds $k = 9$	**M1**
$y = 1125$ cao	**A1**

Answer: $y = 1125$

Question 7

$y = kx^2$ or equivalent	**M1**
substitutes to find $k = 16$	**M1**
$y = 16x^2$ cao	**A1**

Answer: $y = 16x^2$

Question 8

$y = kx^2/z$ or equivalent	**M1**
substitutes to find $k = 3$	**M1**
substitutes the new values	**M1**
$y = 24$ cao	**A1**

Answer: $y = 24$

Question 9

$y = k/x$ or equivalent	**M1**
substitutes to find $k = 144$	**M1**
$y = 144/x$ cao	**A1**

Answer: $y = 144/x$

Question 10

writes $y = k\sqrt{x}$ or equivalent	**M1**
finds $k = 9$	**M1**
$y = 90$ cao	**A1**

Answer: $y = 90$

Question 11

writes $y = k/x^2$ or equivalent	**M1**
finds $k = 400$	**M1**
$y = 25$ cao	**A1**

Answer: $y = 25$

Question 12

writes $y = k\sqrt{x}$ or equivalent	**M1**
finds $k = 11$	**M1**
substitutes y and solves for x	**M1**
$x = 49$ cao	**A1**

Answer: $x = 49$

Question 13

uses the given relationship with a constant k	**M1**
finds $k = 10$	**M1**
$p = 1210$ cao	**A1**

Answer: $p = 1210$

Question 14

3 cao	**B1**

Answer: $k = 3$

Question 15

(a) finds $k = 6$ (from $12 = k(8)/2^2$, i.e. $12 = 2k$)	**M1**
(a) $z = 6x/y^2$ cao	**A1**

(a) Answer: $z = 6x/y^2$

(b) substitutes $x = 10$, $y = 5$ into their formula	**M1**
(b) $z = 2.4$ cao	**A1**

(b) Answer: $z = 2.4$

(c) sets up $2 = 6(27)/y^2$ and solves $y^2 = 81$	**M1**
(c) $y = 9$ cao	**A1**

(c) Answer: $y = 9$

Question 16

lets the original $p = kq^3$	**M1**
finds the new p when q is halved: $k(q/2)^3 = kq^3/8 = p/8$	**M1**
correct conclusion: p is divided by 8, as required	**A1**

Answer: p is divided by 8 (shown)

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