7.3 Direct and Inverse Proportion Depth: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 y is directly proportional to x^2. When x = 3, y = 45.

(a) Find a formula for y in terms of x. **(2)**

.....

(b) Work out the value of y when x = 6. **(2)**

.....

(Total for Question 1 is 4 marks)

---

2 m is directly proportional to n. When n = 8, m = 20.

(a) Find a formula for m in terms of n. **(2)**

.....

(b) Find the value of n when m = 45. **(1)**

.....

(Total for Question 2 is 3 marks)

© Revision Library | revisionlibrary.co.uk

3 For each equation, state whether y is directly proportional to x, inversely proportional to x, or neither. Give a reason for each answer.

(a) $y = 5x$ **(1)**

(b) $y = 7/x$ **(1)**

(c) $y = x + 3$ **(1)**

(Total for Question 3 is 3 marks)

---

4 It takes 6 builders 15 days to build a wall, all working at the same constant rate. The number of days, D, needed is inversely proportional to the number of builders, n.

(a) Find the value of k in the formula $D = k/n$. **(1)**

.....

(b) Work out how many days it would take 9 builders, working at the same rate, to build the same wall. **(2)**

.....

(c) Give one reason why this inverse proportion model might not give a realistic answer if a very large number of builders were used. **(1)**

(Total for Question 4 is 4 marks)

© Revision Library | revisionlibrary.co.uk

5 Aisha is exchanging £ for euros before a trip to France. The number of euros, E, she receives is directly proportional to the number of pounds, P, she exchanges. She is given 172.50 euros for £150.

(a) Work out how many euros she would receive for £220. **(2)**

.....

(b) On her return she has 40 euros left. Assuming the same exchange rate, work out how many pounds this is worth. Give your answer to the nearest penny. **(2)**

.....

(Total for Question 5 is 4 marks)

---

6 y is directly proportional to x^2.

(a) x is increased by 20%. Find the percentage increase in y. **(3)**

.....

(b) y is now inversely proportional to x^2 instead. x is increased by 20%. Find the percentage decrease in y, correct to 1 decimal place. **(3)**

.....

(Total for Question 6 is 6 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 7.3 Direct and Inverse Proportion Depth: 30-minute Pack

Question 1

(a) finds $k = 45/3^2$ (= 45/9) oe **M1**

(a) $y = 5x^2$ oe **A1**

(a) Answer: $y = 5x^2$

(b) substitutes x = 6 into their formula **M1**

(b) y = 180 cao **A1**

(b) Answer: y = 180

Question 2

(a) k = 20/8 (=2.5) **M1**

(a) m = 2.5n oe (accept m = 5n/2) **A1**

(a) Answer: m = 2.5n

(b) n = 18 (ft from their formula in part a) cao **B1**

(b) Answer: n = 18

Question 3

(a) directly proportional, since it is of the form y = kx with k = 5 **B1**

(a) Answer: Directly proportional (k = 5)

(b) inversely proportional, since it is of the form y = k/x with k = 7 **B1**

(b) Answer: Inversely proportional (k = 7)

(c) neither, since it is not of the form y = kx or y = k/x (does not pass through the origin) oe **B1**

(c) Answer: Neither

Question 4

(a) k = 90 **B1**

(a) Answer: k = 90

(b) substitutes n = 9 into D = 90/n (ft their k) **M1**

(b) 10 days cao **A1**

(b) Answer: 10 days

(c) any sensible practical limitation, e.g. there may not be enough space or tools for all the builders to work efficiently at the same time, so the time cannot keep decreasing indefinitely (oe) **B1**

(c) Answer: e.g. with very many builders there is not enough space or materials for them all to work efficiently, so productivity per builder falls and the model breaks down

Question 5

(a) finds the constant of proportionality k = 172.5/150 (=1.15) **M1**

(a) 253 euros cao **A1**

(a) Answer: 253 euros

(b) P = 40/1.15 (ft rate from part a) **M1**

(b) £34.78 (awrt 34.78) **A1**

(b) Answer: £34.78 (awrt)

Question 6

(a) new x = 1.2x oe **M1**

(a) new $y = k(1.2x)^2 = 1.44kx^2$ oe, showing the multiplier 1.44 **M1**

(a) 44% increase oe **A1**

(a) Answer: 44% increase

(b) new x = 1.2x oe **M1**

(b) new $y = k/(1.2x)^2 = k/(1.44x^2)$ oe, showing the multiplier 1/1.44 **M1**

(b) 30.6% decrease (awrt 30.6%) **A1**

(b) Answer: 30.6% decrease (awrt)

© Revision Library | revisionlibrary.co.uk