PEARSON EDEXCEL INTERNATIONAL GCSE MATHEMATICS A (4MA1) · HIGHER TIER

Simultaneous Equations: exam questions

10 questions · 37 marks · mark schemes at the end

Name _____ Date _____ Score / 37

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/simultaneous-equations

1. **3 marks**

Solve the simultaneous equations

$$3x + 2y = 16$$

$$x - 2y = 0$$

2. **4 marks**

Solve the simultaneous equations

$$4x + 3y = 6$$

$$3x - 5y = 19$$

3. **4 marks**

3 pens and 2 rulers cost £4.10. 5 pens and 3 rulers cost £6.60.

Work out the cost of one pen and the cost of one ruler.

4. **5 marks**

Solve the simultaneous equations

$y = x + 1$

$x^2 + y^2 = 13$

5. **4 marks**

Solve the simultaneous equations

$y = x^2 - 3x + 2$

$y = 2x - 4$

6. **5 marks**

The line $y = 2x - 5$ meets the circle $x^2 + y^2 = 25$ at the points A and B.

Find the coordinates of A and B.

7. **3 marks**

Solve the simultaneous equations

$$\frac{x}{2} + y = 7$$

$$3x - \frac{y}{2} = 9.5$$

8. **3 marks**

Two adult tickets and three child tickets cost £52. One adult ticket and four child tickets cost £46.

Work out the cost of an adult ticket.

9. **3 marks**

The straight line $y = mx + c$ passes through the points $(2, 7)$ and $(5, 16)$.

Find the values of m and c.

10. **3 marks**

Use algebra to show that the line $y = x - 5$ does not meet the curve $y = x^2 - 3x$.

Answers and worked solutions

Question 1 — 3 marks

M1 adding: $4x = 16$

A1 $x = 4$

A1 $y = 2$

Answer: $x = 4$, $y = 2$

Question 2 — 4 marks

M1 coefficients of one variable made equal, e.g. $20x + 15y = 30$ and $9x - 15y = 57$

M1 adding: $29x = 87$

A1 $x = 3$

A1 $y = -2$

Answer: $x = 3$, $y = -2$

Question 3 — 4 marks

M1 $3p + 2r = 410$ and $5p + 3r = 660$

M1 $9p + 6r = 1230$ and $10p + 6r = 1320$

A1 pen $90p$

A1 ruler $70p$

Answer: pen $90p$, ruler $70p$

Question 4 — 5 marks

M1 $x^2 + (x+1)^2 = 13$

M1 $2x^2 + 2x - 12 = 0$

M1 $(x+3)(x-2) = 0$

A1 $x = 2$ or $x = -3$

A1 $x = 2, y = 3$ and $x = -3, y = -2$

Answer: $x = 2, y = 3$ and $x = -3, y = -2$

Question 5 — 4 marks

M1 $x^2 - 3x + 2 = 2x - 4$

M1 $x^2 - 5x + 6 = 0$, $(x-2)(x-3) = 0$

A1 $x = 2$ or $x = 3$

A1 $x = 2, y = 0$ and $x = 3, y = 2$

Answer: $x = 2, y = 0$ and $x = 3, y = 2$

Question 6 — 5 marks

M1 $x^2 + (2x - 5)^2 = 25$

M1 $5x^2 - 20x = 0$

M1 $5x(x - 4) = 0$

A1 $x = 0$ or $x = 4$

A1 $(0, -5)$ and $(4, 3)$

Answer: $(0, -5)$ and $(4, 3)$

Question 7 — 3 marks

M1 $x + 2y = 14$ and $6x - y = 19$

M1 $x + 2(6x - 19) = 14$, or another full elimination

A1 $x = 4$, $y = 5$

Answer: $x = 4$, $y = 5$

Question 8 — 3 marks

M1 $2a + 3c = 52$ and $a + 4c = 46$

M1 $2(46 - 4c) + 3c = 52$, so $c = 8$

A1 £14

Answer: £14

Question 9 — 3 marks

M1 $2m + c = 7$ and $5m + c = 16$

A1 $m = 3$

A1 $c = 1$

Answer: $m = 3$, $c = 1$

Question 10 — 3 marks

M1 $x^2 - 3x = x - 5$, so $x^2 - 4x + 5 = 0$

M1 $(x-2)^2 + 1 = 0$, or $b^2 - 4ac = 16 - 20$

A1 $(x-2)^2 = -1$ has no solutions (or $b^2 - 4ac = -4 < 0$), so the line does not meet the curve

Answer: shown

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/simultaneous-equations
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