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Quadratic Simultaneous Equations

Grade 8/9 topic · Higher tier · Edexcel and AQA

How to use this pack
20 questions that get harder as you go. Questions 1–15 (77 marks) build up to the harder Grade 8–9 style questions at the end; aim to complete all 20. Show your working on the lines and write your final answer on the answer line, then mark yourself with the answers at the back. Diagrams are not drawn accurately. Total: 107 marks.

Warm-up

1 Solve the simultaneous equations $y = x^2 + 4x - 4$ and $y = 12x - 19$. **[5 marks]**

Answer _____

2 Solve the simultaneous equations $y = x^2 - 4$ and $y = 8x - 19$. **[5 marks]**

Answer _____

3 Solve the simultaneous equations $y = x^2 - 3x - 4$ and $y = -8x - 8$. **[5 marks]**

Answer _____

4 Solve the simultaneous equations $y = x^2 + 2x + 5$ and $y = 9x - 7$. **[5 marks]**

Answer _____

5 Solve the simultaneous equations $y = x^2 - x + 5$ and $y = x + 20$. **[5 marks]**

Answer _____

Core

6 Solve $y = x^2$ and $y = -3x$. **[5 marks]**

Answer _____

7 Show that the line $y = 2x - 1$ is a tangent to the curve $y = x^2$. **[5 marks]**

Answer _____

8 How many points of intersection are there between $y = x^2$ and $y = -1$? **[3 marks]**

Answer _____

9 Solve $x^2 = 6x - 5$ (the x-values where $y = x^2$ meets $y = 6x - 5$). **[4 marks]**

Answer _____

10 Solve $y = x^2 - 4$ and $y = 6x - 12$. **[5 marks]**

Answer _____

Stretch

11 Solve the simultaneous equations $x^2 + y^2 = 25$ and $y = x + 1$. **[6 marks]**

Answer _____

12 Solve the simultaneous equations $x^2 + y^2 = 100$ and $y = x + 2$. **[6 marks]**

Answer _____

13 Solve the simultaneous equations $x^2 + y^2 = 169$ and $y = x + 7$. **[6 marks]**

Answer _____

14 Solve the simultaneous equations $x^2 + y^2 = 25$ and $x + y = 7$. **[6 marks]**

Answer _____

15 Solve the simultaneous equations $x^2 + y^2 = 100$ and $x + y = 14$. **[6 marks]**

Answer _____

Challenge

16 Solve $y = x^2 - 3x - 4$ and $y = -2x + 8$ and give the coordinates of both points. **[6 marks]**

Answer _____

17 The line $y = 2x + k$ is a tangent to $y = x^2$. Find k. **[6 marks]**

Answer _____

18 Show that $x^2 + y^2 = 25$ and $y = x + 8$ do not intersect. **[6 marks]**

Answer _____

19 Solve $x^2 + y^2 = 25$ and $3y = 4x$. Give both solutions. **[6 marks]**

Answer _____

20 The line $y = x + c$ meets $x^2 + y^2 = 25$ once only. Find the positive value of c, to 2 d.p. **[6 marks]**

Answer _____