Name: SOLUTIONS

GCSE (1 - 9)

Quadratic Simultaneous Equations

Solutions by
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These questions are compiled from released Pearson Edexcel GCSE maths exam papers

They contain exam questions from up until the ***November 2023*** exam series

More recent exam papers do exist but are withheld for mock exams

As new exam papers are released these worksheets will gradually be updated

The **most current** version of these worksheets will always be available at: kennethstafford.co.uk

Past Papers:	Similar Worksheets:
Solutions:	This worksheet:

1

Solve algebraically the simultaneous equations

$$x^2 + y^2 = 25$$
$$y - 3x = 13$$

$y = 3x + 13$

$y^2 = (3x+13)(3x+13)$

$y^2 = 9x^2 + 78x + 169$

$x^2 + y^2 = 25$

$x^2 + 9x^2 + 78x + 169 = 25$

$10x^2 + 78x + 169 = 25$

$10x^2 + 78x + 144 = 0$

$5x^2 + 39x + 72 = 0$

$(5x + 24)(x + 3) = 0$

$x = -\frac{24}{5} = -4.8$ $\quad x = -3$

$y - 3(-4.8) = 13$ $\quad y - 3(-3) = 13$

$y + 14.4 = 13$ $\quad y + 9 = 13$

$y = -1.4$ $\quad y = 4$

$y = -1.4$, $x = -4.8$ $\quad y = 4$, $x = -3$

(Total for Question 20 is 5 marks)

[Edexcel, GCSE, Summer 2017, Paper 1H, Q20]

2

Prove algebraically that the straight line with equation $x - 2y = 10$ is a tangent to the circle with equation $x^2 + y^2 = 20$

$x - 2y = 10$

$x = 2y + 10$

$x^2 = (2y+10)(2y+10)$

$x^2 = 4y^2 + 40y + 100$

$x^2 + y^2 = 20$

$4y^2 + 40y + 100 + y^2 = 20$

$5y^2 + 40y + 100 = 20$

$5y^2 + 40y + 80 = 0$

$y^2 + 8y + 16 = 0$

$(y+4)(y+4) = 0$

$y = -4$

$x - 2(-4) = 10$

$x + 8 = 10$

$x = 2$

only one point of intersection

so line is a tangent.

(Total for Question 19 is 5 marks)

[Edexcel, GCSE, Autumn 2017, Paper 3H, Q19]

3

Solve algebraically the simultaneous equations

$$2x^2 - y^2 = 17$$
$$x + 2y = 1$$

$x+2y=1$

$x=1-2y$

$x^2=(1-2y)(1-2y)$

$x^2=1-4y+4y^2$

$2x^2-y^2=17$

$2(1-4y+4y^2)-y^2=17$

$2-8y+8y^2-y^2=17$

$7y^2-8y+2=17$

$7y^2-8y-15=0$

$(7y-15)(y+1)=0$

$y=\frac{15}{7}$ $\quad$ $y=-1$

$x+2(\frac{15}{7})=1$ $\quad$ $x+2(-1)=1$

$x+\frac{30}{7}=1$ $\quad$ $x-2=1$

$x=1-\frac{30}{7}$ $\quad$ $x=3$

$x=-\frac{23}{7}$

$y=\frac{15}{7}$ $\quad$ $y=-1$

$x=-\frac{23}{7}$ $\quad$ $x=3$

(Total for Question 19 is 5 marks)

[Edexcel, GCSE, Autumn 2018, Paper 3H, Q19]

4

Solve algebraically the simultaneous equations

$$x^2 - 4y^2 = 9$$
$$3x + 4y = 7$$

$3x+4y=7$

$3x=7-4y$

$x=\frac{7}{3}-\frac{4}{3}y$

$x^2=\left(\frac{7}{3}-\frac{4}{3}y\right)\left(\frac{7}{3}-\frac{4}{3}y\right)$

$x^2=\frac{49}{9}-\frac{28}{9}y-\frac{28}{9}y+\frac{16}{9}y^2$

$x^2=\frac{49-56y+16y^2}{9}$

$x^2-4y^2=9$

$\frac{49-56y+16y^2}{9}-4y^2=9$

$49-56y+16y^2-36y^2=81$

$-20y^2-56y+49=81$

$-20y^2-56y-32=0$

$20y^2+56y+32=0$

$5y^2+14y+8=0$

$(5y+4)(y+2)=0$

$y=-\frac{4}{5}$ $\quad$ $y=-2$

$3x+4\left(-\frac{4}{5}\right)=7$

$3x-\frac{16}{5}=7$

$3x=10.2$

$x=\frac{10.2}{3}$

$x=3.4$

$y=-\frac{4}{5}$

$3x+4(-2)=7$

$3x-8=7$

$3x=15$

$x=5$

$x=5$

$y=-2$

(Total for Question 20 is 5 marks)

[Edexcel, GCSE, Summer 2019, Paper 3H, Q20]

5

L is the straight line with equation $y = 2x - 5$

C is a graph with equation $y^2 = 6x^2 - 25x - 8$

Using algebra, find the coordinates of the points of intersection of **L** and **C**.
You must show all your working.

(..... , ...)

(..... , ...)

(Total for Question 22 is 5 marks)

[Edexcel, GCSE, Summer 2022, Paper 3H, Q22]