

L2 Simultaneous Equations Practice #1

Solve the following pairs of Simultaneous Equations

Warm Up

1. $y = 2x + 3$ and $y = 4x - 5$

2. $3x + 2y = 5$ and $8x - 3y = 3$

Achieved

3. $y = x(x - 4)$ and $y = 3x - 10$

4. $x - 2y - 3 = 0$ and $y = \frac{6}{x+1}$

Merit

5. $y = x - 2$ and $x^2 - y^2 = 16$

6. $a - b = 3$ and $ab = 40$

Excellence

7. $3x - 4y = 15$ and $x^2 - 10x + y^2 = 0$

8. Find k so that $y = x^2 + 7$ does not intersect $y = 3x + k$

Answers: L2 Simultaneous Equations Practice #1

1. $y = 2x + 3$ and $y = 4x - 5$

make $y = y$: $2x + 3 = 4x - 5$ answer = (4, 11)

2. $3x + 2y = 5$ and $8x - 3y = 3$ rearranges to $y = 2.5 - 1.5x$ and $8x - 3y = 3$

substitute out y : $8x - 3(2.5 - 1.5x) = 3$ answer = $(\frac{21}{25}, \frac{31}{25}) = (0.84, 1.24)$

3. $y = x(x - 4)$ and $y = 3x - 10$

make $y = y$: $x(x - 4) = 3x - 10$ answer = (2, -4) and (5, 5)

4. $x - 2y - 3 = 0$ and $y = \frac{6}{x+1}$ rearranges to $x = 2y + 3$ and $y(x + 1) = 6$

substitute out x : $y(2y + 3 + 1) = 6$ answer = (5, 1) and (-3, -3)

5. $y = x - 2$ and $x^2 - y^2 = 16$

substitute out y : $x^2 - (x - 2)^2 = 16$ answer = (5, 3)

6. $a - b = 3$ and $ab = 40$ rearranges to $a = b + 3$ and $ab = 40$

substitute out a : $(b + 3)b = 40$

$b^2 + 3b - 40 = 0$ answer $a = -5, b = -8$ and $a = 8, b = 5$

7. $3x - 4y = 15$ and $x^2 - 10x + y^2 = 0$ rearranges to $y = 0.75x - 3.75$

substitute out y : $x^2 - 10x + (\frac{3}{4}x - \frac{15}{4})^2 = 0$

$x^2 - 10x + (\frac{9}{16}x^2 - \frac{90}{16}x + \frac{225}{16})^2 = 0$ then multiply by 16 to remove 16^{ths}

$16x^2 - 160x + 9x^2 - 90x + 225 = 0$ answer = (1, -3) and (9, 3)

8. Find k so that $y = x^2 + 7$ does not intersect $y = 3x + k$

$y = y$: $x^2 + 7 = 3x + k$ which gives : $x^2 - 3x + (7 - k) = 0$

no intersection when $b^2 - 4ac < 0$ which gives: $(-3)^2 - 4 \times 1 \times (7 - k) < 0$

$9 - 28 + 4k < 0$ answer $k < 4.75$