Solve where $xy = a$ and $y = 2x + 1$ (substituting)

Maths

Mrs Dennett

Solve where $xy = a$ and $y = 2x + 1$ (substituting)

1. Solve by substitution

$xy = -16$

$y = x - 8$

2. Solve by substitution

$xy = 15$

$y = 2x + 7$

Solve where $xy = a$ and $y = 2x + 1$ (substituting)

3. Tom and Jim are solving these equations

$xy = 3$ A

$y - 8x = 10$ B

They both decide to rearrange the equation B in order to solve by substitution.

$y = 8x + 10$

$x = \frac{y - 10}{8}$

Which method do you think will be easier to use?

Solve the equations.

Solve where $xy = a$ and $y = 2x + 1$ (substituting)

4. Solve this pair of equations, giving your answers to 2 decimal places.

$$xy = 7$$

$$y = 4x + 1$$

HINT: If $ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Answers

Solve where $xy = a$ and $y = 2x + 1$ (substituting)

1. Solve by substitution

$xy = -16$

$y = x - 8$

$x(x - 8) = -16$

$x^2 - 8x + 16 = 0$

$(x - 4)(x - 4)$

$x = 4$ and $y = -4$

(note – only one pair of solutions!)

2. Solve by substitution

$xy = 15$

$y = 2x + 7$

$2x^2 + 7x - 15 = 0$

$(2x - 3)(x + 5)$

$x = \frac{3}{2}$ and $y = 10$

$x = -5$ and $y = -3$

Solve where $xy = a$ and $y = 2x + 1$ (substituting)

3. Tom and Jim are solving these equations

$xy = 3$ A

$y - 8x = 10$ B

They both decide to rearrange the equation B in order to solve by substitution.

$y = 8x + 10$

$x = \frac{y - 10}{8}$

Which method do you think will be easier to use?

Solve the equations.

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

$x = \frac{1}{4}$ and $y = 12$

Solve where $xy = a$ and $y = 2x + 1$ (substituting)

4. Solve this pair of equations, giving your answers to 2 decimal places.

$xy = 7$ $\quad$ $x = 1.29$ and $y = 5.43$

$y = 4x + 1$ $\quad$ $x = -1.54$ and $y = -4.55$

HINT: $\quad$ If $ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$