

13:02A | The Substitution Method

Name: _____

Class: _____

Examples

Substitute one equation into the other, then solve for x , then for y .

1 $y = x - 1$ (A)

$x + 2y = 4$ (B)

Put (A) into (B).

$x + 2(x - 1) = 4$

$x + 2x - 2 = 4$

$3x = 6$

$\therefore x = 2$

Put $x = 2$ in (A).

$y = 2 - 1$

$\therefore y = 1$

$\therefore x = 2, y = 1$

2 $y = 3x$ (A)

$2x - y = 2$ (B)

Put (A) into (B).

$2x - (3x) = 2$

$-x = 2$

$\therefore x = -2$

Put $x = -2$ in (A).

$y = 3 \times -2$

$\therefore y = -6$

$\therefore x = -2, y = -6$

3 $y = 2x + 1$ (A)

$x + y = -2$ (B)

Put (A) into (B).

$x + (2x + 1) = -2$

$3x + 1 = -2$

$3x = -3$

$\therefore x = -1$

Put $x = -1$ in (A).

$y = 2 \times -1 + 1$

$\therefore y = -1$

$\therefore x = -1, y = -1$

Exercise

1 Solve these equations.

a $x + (x + 4) = 6$

c $4x + 2(x - 3) = 6$

e $3x - 2(x + 1) = 4$

g $2x - 3(2x + 5) = -10$

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

d $x - (2x - 1) = 4$

f $2x + (3x - 4) = 6$

h $-x + 2(4x + 3) = -8$

2 a Substitute $y = x + 2$ for y in the equation $x + y = 10$, and solve.b Substitute $y = 2x$ for y in the equation $x - y = 3$, and solve.c Substitute $y = 1 - x$ for y in the equation $x - y = 3$, and solve.d Substitute $y = x + 2$ for y in the equation $x - 2y = -1$, and solve.e Substitute $y = x - 1$ for y in the equation $2x + y = 14$, and solve.f Substitute $y = -x$ for y in the equation $x + 5y = 8$, and solve.g Substitute $y = 3 - x$ for y in the equation $5x - 2y = 1$, and solve.h Substitute $y = 3x - 7$ for y in the equation $4x + 3y = 5$, and solve.i Substitute $y = 2x + 8$ for y in the equation $3x + 2y = 2$, and solve.j Substitute $y = 3x + 2$ for y in the equation $2x - 3y = 8$, and solve.3 Complete the solutions for Question 2 by solving for y also.

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- 1 a $x=1$ b $x=8$ c $x=2$ d $x=-3$ e $x=6$ f $x=2$ g $x=-\frac{5}{4}$ h $x=-2$
- 2 a $x+(x+2)=10, x=4$ b $x-2x=3, x=-3$
c $x-(1-x)=3, x=2$ d $x-2(x+2)=-1, x=-3$
e $2x+(x-1)=14, x=5$ f $x+5(-x)=8, x=-2$
g $5x-2(3-x)=1, x=1$ h $4x+3(3x-7)=5, x=2$
i $3x+2(2x+8)=2, x=-2$ j $2x-3(3x+2)=8, x=-2$
- 3 a $y=6$ b $y=-6$ c $y=-1$ d $y=-1$ e $y=4$ f $y=2$
g $y=2$ h $y=-1$ i $y=4$ j $y=-4$