

Sept 4/2013

Review - Part 2

Solving Systems of Equations

Expanding & Simplifying Quadratic Relations

The solution to a linear system is the point (x,y) where the lines intersect.

Three methods to solve:

1. Graphically
2. By substitution
3. By elimination

$$y = 3x$$

$$\text{let } x = 5$$

$$y = 3(5)$$

Ex.1 Substitution: Solve $3x - y = 2$ and $x = y - 2$

Ex.2 Elimination: Solve $5x + 2y = 5$ and $3x - 4y = -23$

$$10x + 4y = 10$$

Ex.1 Substitution: Solve $3x - y = 2$ and $x = y - 2$

Sub the x-value from the second equation into the first equation

$$x=2 \quad y=4 \quad (2, 4)$$

$$3x - y = 2 \quad (1) \quad x = y - 2 \quad (2)$$

Sub (2) into (1)

$$\begin{aligned} 3(y-2) - y &= 2 \\ 3y - 6 - y &= 2 \end{aligned}$$

$$\begin{array}{rcl} 2y &= 8 \\ \hline y &= 4 \end{array}$$

Sub into (2)
 $x = 4 - 2$
 $x = 2$

Ex.2 Elimination: Solve $5x + 2y = 5$ and $3x - 4y = -23$

Match coefficients of the x-term or y-term, then add or subtract equations

$$\begin{array}{rcl} 5x + 2y &= 5 & \xrightarrow{\times 2} 10x + 4y = 10 \quad (1) \\ && 3x - 4y = -23 \quad (2) \\ \text{add: } & 13x &= -13 \\ & \hline x &= -1 \end{array}$$

Sub $x = -1$ into (2)

$$\begin{array}{rcl} 3(-1) - 4y &= -23 \\ -3 - 4y &= -23 \\ +3 & & +3 \\ -4y &= -20 \\ \hline -4 & & -4 \\ y &= 5 \end{array}$$

$$\begin{array}{rcl} 5x + 2y &= 5 & \xrightarrow{\times 3} \\ & 15x + 6y &= 15 \\ 3x - 4y &= -23 & \xrightarrow{\times 5} \\ & 15x - 20y &= -115 \end{array}$$

Expanding two binomials

(a) distributive property

$$a(c+d) = ac+ad$$

$$(a+b)\underbrace{(c+d)}_e = ae + be$$

$$(a+b)(c+d) = a(c+d) + b(c+d)$$

$$= ac+ad+bc+bd$$

$$(a+b+c)(d+e+f)$$

$$(a+b)(c+d+e)$$

Expanding two binomials

(b) distributive property (using FOIL)

$$(a+b)(c+d)$$

$$= ac+ad+bc+bd$$

First

Outer/Outside

Inner/Inside

Last

Expanding two binomials
(c) area model

$$(a+b)(c+d) = ac + ad + bc + bd$$

$$\quad \quad \quad \begin{matrix} c & d \end{matrix}$$

a	ac	ad
b	bc	bd

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

$$\cancel{(2x)^2 + (3)^2}$$

$$\begin{array}{cc} 2x & 3 \\ \hline 2x & \boxed{4x^2} & 6x \\ 3 & \boxed{6x} & 9 \end{array} = 4x^2 + 12x + 9$$

Ex.1 Expand each of the following:

(a) $(x+4)(2x-3)$

(b) $(2x-3)^2$

$$= 2x^2 - 3x + 8x - 12 = (2x-3)(2x-3)$$

$$= 2x^2 + 5x - 12 = 4x^2 - 6x - 6x + 9$$

$$= 4x^2 - 12x + 9$$

(c) $(3x-2y)(x+5y) = 3x^2 + 13xy - 10y^2$

$3x$	$-2y$
x	$3x^2 - 2xy$
$+5y$	$15xy - 10y^2$

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

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

Homework:

p.29 # 1acf, 2ace

p.31 # 8ac, 9ace, 10ae

p.33 # 11ace, 12ace, 13ace

Tomorrow's Work:

p.3 # 4odd, 5odd, 6odd

$$13(a) (x-7)(x+1) + (x+6)(x+2)$$

$$= (x^2 + x - 7x - 7) + (x^2 + 2x + 6x + 12)$$

$$= 2x^2 + 2x + 5$$

m	$m+5$
m^2	$5m$

$$(e) 2(m-3)(m-4) - 3(m+5)^2 + 5 \boxed{5m} \boxed{25}$$

$$= 2(m^2 - 3m - 4m + 12) - 3(m^2 + 10m + 25)$$

$$= -m^2 - 14m - 30m + 24 - 75$$

$$= -m^2 - 44m - 51$$