

# Solutions

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1. Solve.

- a)  $(x-3)(x-2) = 0$   
 b)  $(2x-5)(3x-1) = 0$   
 c)  $(m-4)(m-3) = 0$

Expand and simplify

$$\begin{aligned} \text{a) } & (x-3)(x-2) \\ & = x^2 - 3x - 2x + 6 \\ & = x^2 - 5x + 6 \end{aligned}$$

$$\begin{aligned} \text{b) } & (2x-5)(3x-1) \\ & = 6x^2 - 15x - 2x + 5 \\ & = 6x^2 - 17x + 5 \end{aligned}$$

$$\begin{aligned} \text{c) } & (m-4)(m-3) \\ & = m^2 - 4m - 3m + 12 \\ & = m^2 - 7m + 12 \end{aligned}$$

$$\begin{array}{r|rr} x & x & -3 \\ \hline x & x^2 & -3x \\ -2 & -2x & 6 \end{array}$$

$$\begin{array}{r|rr} x & 2x & -5 \\ \hline 3x & 6x^2 & -15x \\ -1 & -2x & 5 \end{array}$$

$$\begin{array}{r|rr} x & m & -4 \\ \hline m & m^2 & -4m \\ -3 & -3m & 12 \end{array}$$

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d)  $(3 - 2x)(4 - 3x) = 0$

e)  $(2y + 5)(3y - 7) = 0$

f)  $(5n - 3)(4 - 3n) = 0$

$$\begin{aligned} d) & (3 - 2x)(4 - 3x) \\ & = 12 - 8x - 9x + 6x^2 \\ & = 6x^2 - 17x + 12 \end{aligned}$$

$$\begin{aligned} e) & (2y + 5)(3y - 7) \\ & = 6y^2 + 15y - 14y - 35 \\ & = 6y^2 + y - 35 \end{aligned}$$

$$\begin{aligned} f) & (5n - 3)(4 - 3n) \\ & = 20n - 12 + 9n - 15n^2 \\ & = -15n^2 + 29n - 12 \end{aligned}$$

Expand and simplify

x	3	-2x
4	12	-8x
-3x	-9x	6x <sup>2</sup>

x	2y	5
3y	6y <sup>2</sup>	15y
-7	-14y	-35

x	5n	-3
4	20n	-12
-3n	-15n	9n

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2. f)  $2x^2 + 4x - 30 = 0$

Complete the square

$$\begin{aligned} & = 2(x^2 + 2x) - 30 \\ & = 2(x^2 + 2x + (1)^2 - (1)^2) - 30 \\ & = 2(x^2 + 2x + (1)^2) - (2)(1)^2 - 30 \\ & = 2(x + 1)^2 - 2 - 30 \\ & = 2(x + 1)^2 - 32 \end{aligned}$$

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## Complete the square

3)  $y = 2x^2 + 3x - 9$

$$\begin{aligned}
 &= 2\left(x^2 + \frac{3}{2}x\right) - 9 \\
 &= 2\left(x^2 + \frac{3}{2}x + \left(\frac{3}{4}\right)^2 - \left(\frac{3}{4}\right)^2\right) - 9 \\
 &= 2\left(x^2 + \frac{3}{2}x + \left(\frac{3}{4}\right)^2\right) - 2\left(\frac{3}{4}\right)^2 - 9 \\
 &= 2\left(x + \frac{3}{4}\right)^2 - \frac{9}{8} - 9 \\
 &= 2\left(x + \frac{3}{4}\right)^2 - 10\frac{1}{8}
 \end{aligned}$$

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## Complete the square

4)  $y = -3x^2 - 12x + 4$

$$\begin{aligned}
 &= -3(x^2 + 4x) + 4 \\
 &= -3\left(x^2 + 4x + (2)^2 - (2)^2\right) + 4 \\
 &= -3\left(x^2 + 4x + (2)^2\right) - (-3)(2)^2 + 4 \\
 &= -3(x + 2)^2 - (-12) + 4 \\
 &= -3(x + 2)^2 + 16
 \end{aligned}$$

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