Sixteenth Set of Homework for Math 05

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Please note: You should fully justify your answers.

1 Completing the square

1. Solve each of the following equations:
   (a) $3x^2 - 7 = -4$ $x = -1, \quad x = 1$
   (b) $(x-3)^2 = 49$ $x = -4, \quad x = 10$
   (c) $(3x-1)^2 - 3 = 61$ $x = -\frac{7}{3}, \quad x = 3$
   (d) $(2x+1)^2 = 5$ $x = \frac{-1 \pm \sqrt{5}}{2}$
   (e) $(x-2)^2 + 7 = 3$ No real solutions
   (f) $(3x+5)^2 - 7 = -3$ $x = -1, \quad x = -\frac{7}{3}$
   (g) $(x+11)^2 - 2 = 10$ $x = -11 \pm 2\sqrt{3}$
   (h) $(3x-7)^2 + 6 = 81$ $x = \frac{7 \pm \sqrt{3}}{3}$
2. Solve each of the following equations by completing the square:
   (a) $x^2 - 10x = -19$ $x = 5 \pm \sqrt{6}$
   (b) $x^2 - 4x + 4 = 4$ $x = 0, \quad x = 4$
   (c) $x^2 - 6x + 9 = 11$ $x = 3 \pm \sqrt{11}$
   (d) $x^2 - 14x + 46 = 33$ $x = 1, \quad x = 13$
   (e) $x^2 + 10x + 25 = 13$ $x = -5 \pm \sqrt{13}$
   (f) $x^2 + 8x = 11$ $x = -4 \pm 3\sqrt{3}$
   (g) $x^2 - 22x + 121 = -5$ No real solutions
   (h) $x^2 + 3x - 8 = 5x + 11$ $x = 1 \pm 2\sqrt{5}$
   (i) $x^2 + 6x - 12 = 4$ $x = -8, \quad x = 2$
   (j) $x^2 - 30x + 3 = 45$ $15 \pm \sqrt{267}$
   (k) $x^2 - 3x - 30 = 3x + 10$ $x = -4, \quad x = 10$
   (l) $x^2 + 7x - 44 = 0$ $x = -11, \quad x = 4$
   (m) $x^2 + 3x - 6 = 11$ $x = \frac{3 \pm \sqrt{77}}{2}$
   (n) $3x^2 - x + 3 = 18$ $x = \frac{1 \pm \sqrt{181}}{6}$