Side skill: Completing the Square

Ex. 6: Use completing the square to change the look of these quadratic functions:

$F(x) = x^2 + 4x - 8$ (a = 1, b = 4, c = −8)

take half of b & square it! $\left(\frac{b}{2}\right)^2$

$x^2 + 4x + \left(\frac{4}{2}\right)^2 - 8 - \left(\frac{4}{2}\right)^2$ remember to also subtract $\left(\frac{b}{2}\right)^2$ so that the value is unchanged

$(x^2 + 4x + 4) - 8 - 4$

$(x+2)^2 - 12$

$G(x) = x^2 - 10x - 12$

$x^2 - 10x + \left(\frac{-10}{2}\right)^2 - 12 - \left(\frac{-10}{2}\right)^2$

$(x^2 - 10x + 25) - 12 - 25$

$(x-5)^2 - 37$

Why would I mention this now? For solving a problem involving circles like the following:

Ex. 7: Change this equation of a circle to be in standard form.

$x^2 + 2x - 5 + y^2 - 6y + 10 = 11$

$x^2 + 2x + \left(\frac{2}{2}\right)^2 - 5 - \left(\frac{2}{2}\right)^2 + y^2 - 6y + \left(\frac{-6}{2}\right)^2 - 1 - \left(\frac{-6}{2}\right)^2 = 0$

$(x^2 + 2x + 1) - 5 - 1 + (y^2 - 6y + 9) - 1 - 9 = 0$

$(x+1)^2 - 6 + (y-3)^2 - 10 = 0$

$(x+1)^2 + (y-3)^2 = 16$

Now identify the center and radius:

center: $(-1, 3)$

radius: 4

Selected homework from sections 1.2 and 1.5 and 1.8:

p. 22-24 # 17 – 27 odd, 59, 61, 63, 67, 69
p. 61-63 # 1,3, 13, 15, 19, 23, 71, 73, 75
p. 89 # 1, 3, 43, 45