Find the value of c that completes the square. Write your expression as a square of a binomial.

$x^2 + 12x + c$

$x^2 - 6x + c$

$x^2 - 15x + c$

$x^2 + 11x + c$

$x^2 - \frac{25}{13}x + c$

$f(x) = a(x-h)^2 + k$

Standard → Vertex
Complete the square

Use completing the square to write each function in vertex form. Label the vertex and find the y-intercept.

Step #1
Everything with an x on one side of equation

Step #2
Complete the Square
(b-term Divide by 2 Square it)

$f(x) = x^2 - 6x + 11$

$f(x) - 11 = x^2 - 6x + 9$

$f(x) - 2 = (x-3)^2$

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

$V(3,2)$

$f(0) = (0-3)^2 + 2$

$(0,11)$

$f(x) = x^2 - 2x - 9$

$f(x) + 9 = x^2 - 2x + 1$

$f(x) + 10 = (x-1)^2$

$f(x) = (x-1)^2 - 10$

$V(1,-10)$

$f(0) = (0-1)^2 - 10$

$(0,-9)$

$2 + \frac{9}{4}$

$4\times\ \frac{2}{1} + \frac{9}{4}$

$\frac{8}{4} + \frac{9}{4} = \frac{17}{4}$

$f(x) = x^2 + 16x + 14$

$-14 \qquad -14$

$f(x) - 14 = x^2 + 16x + 64$

$+64$

$f(x) + 50 = (x+8)^2$

$-50 \qquad -50$

$f(x) = (x+8)^2 - 50$

$V(-8, -50)$

y-inter $(0, 14)$

$f(x) = x^2 - 3x - 2$

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

$+\frac{9}{4}$

$f(x) + \frac{17}{4} = \left(x - \frac{3}{2}\right)^2$

$-\frac{17}{4}$

$f(x) = \left(x - \frac{3}{2}\right)^2 - \frac{17}{4}$

$V\left(\frac{3}{2}, -\frac{17}{4}\right)$

y-intercept $(0, -2)$

$\frac{3}{2}$ $\frac{9}{4}$ $\frac{9}{4}$ $-\frac{17}{4}$

$f(x) = x^2 + 7x - 1$

$+1$

$f(x) + 1 = x^2 + 7x + \frac{45}{4}$ $\left(\frac{7}{2}\right)^2$

$+\frac{45}{4}$

$f(x) + \frac{53}{4} = \left(x + \frac{7}{2}\right)^2$

$f(x) = \left(x + \frac{7}{2}\right)^2 - \frac{53}{4}$

$V\left(-\frac{7}{2}, -\frac{53}{4}\right)$

$f(x) = -x^2 + 20x - 80$

$f(x) = x^2 + 20x -$

$f(x) + 80 = x^2 + 20x + 100$

$+100$

$f(x) + 180 = (x+10)^2$

$f(x) = (x+10)^2 - 180$

$V(-10, -180)$