Example.
Write in circle-equation form: \((x-a)^2 + (y-b)^2 = r^2\)
\[x^2 + (y + 3)^2 = 16\]
Hence: center\(=\)(0, −3) radius = 4

5b. For the circle \(x^2 - 8x + y^2 + 6y = -9\)
(a) Write the equation in circle-equation form:
\((x-a)^2 + (y-b)^2 = r^2\) Complete the squares.
The form must be \((x-a)^2 + (y-b)^2 = r^2\) not \((x-a)^2 + (y+b)^2 = c.\)
19 symbols, chk=17.

(b)(1) Find the center. Write “center = (1,2)” not “center = 1,2”.
Center = (___, ___) 6 symbols, chk=7
(c)(1) Find the radius. 1 symbol. Radius = __
(d)(1) Find x-intercepts for \(x^2 - 8x + y^2 + 6y + 9 = 0\).
\[x^2 - 8x + 0^2 + 6(0) + 9 = 0\] set \(y = 0\)
\[x^2 - 8x + 9 = 0\] now use the quadratic formula
\[x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(9)}}{2(1)}\]
\[= \frac{8 \pm 2\sqrt{64 - 36}}{2} = \frac{8 \pm \sqrt{28}}{2} \text{ note } 28 = 4 \cdot 7\]
\[= \frac{8 \pm 2\sqrt{7}}{2} \text{ split into two fractions, then simplify} \]

(e) Example
Find the y-intercept for \(x^2 - 8x + y^2 + 6y + 9 = 0\).
Set \(x = 0\) and get \(y^2 + 6y + 9 = 0\). Now solve for \(y\) by factoring.
2 symbols after “\(y=\)”, chk=3.
\[y^2 + 6y + 9 = 0\]
\[(y + 3)(y + 3) = 0\]
\(y\)-intercept: \(y = -3\)

6. Find the equation for the line through (3, −1) and (1, 2).
Write the equation in the form \(y = mx + b.\)
(a) Example
Find the slope: \(m = \frac{y_2 - y_1}{x_2 - x_1} = ?\) 4 symbols. chk=5
\[m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - (-1)}{1 - 3} = \frac{3}{-2} = -\frac{3}{2}\]

(b)(2) Find the equation. Use one of the given points, say \((x_1, y_1) = (3, -1)\) and the slope \(m = -\frac{3}{2}\) above.
Use the point-slope formula \(y - y_1 = m(x - x_1)\)
Fill in the values for \(y_1, x_1, m\)
Write in the form \(y = mx + b.\) 9 symbols after “\(y = \)”, chk=14.