Written assignments to hand in.

Discussion Problems From the department syllabus
These are not to hand in.

Section 3.1
32, 34
due Tuesday 11/7

Section 3.1, Page 273 focus on modeling.
at the end of Chapter 2 in the ebook.

WebAssign

Focus on modeling
24, 64
due Wednesday 11/8

Section 3.1

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

put $f(x)$ into standard form $f(x) = a(x-h)^2 + k$

graph $y = f(x)$ labeling x- and y-intercepts and the "vertex" of the parabola.

2 ways to get to the standard form.

① complete square.

$f(x) = (x^2 - 2x) + 3 = (x^2 - 2x + 1) - 1 + 3 = \boxed{(x-1)^2 + 2}$ vertex $(1, 2)$

$+ \left(\frac{2}{2}\right)^2 \qquad - \left(\frac{2}{2}\right)^2$

② for $f(x) = ax^2+bx+c$ the vertex (h,k) satisfies $h = \frac{-b}{2a}$

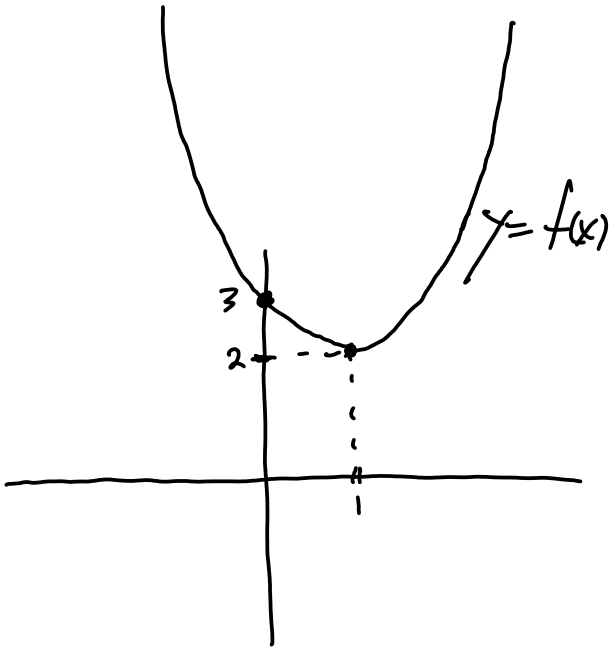
$k = f\left(\frac{-b}{2a}\right)$

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

$h = \frac{-(-2)}{2} = 1$

$k = f(1) = 1 - 2 + 3 = 2$

$\boxed{f(x) = (x-1)^2 + 2}$



y-intercept
let $x = 0$

$f(0) = (-1)^2 + 2 = 3$

⑱ $f(x) = -x^2 - 4x + 4$ same instructions

$a = -1$

$b = -4$

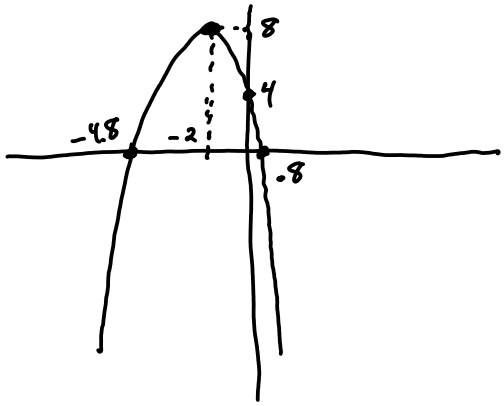
$c = 4$

$h = \frac{-b}{2a} = \frac{-(-4)}{2(-1)} = -2$

$k = f(-2) = -(-2)^2 - 4(-2) + 4 = -4 + 8 + 4 = 8$

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

$\boxed{f(x) = -(x+2)^2 + 8}$



y-intercept
let $x = 0$

$f(0) = -(2)^2 + 8 = 4$

x-intercepts
let $y = f(x) = 0$

$0 = -(x+2)^2 + 8$

$(x+2)^2 = 8$

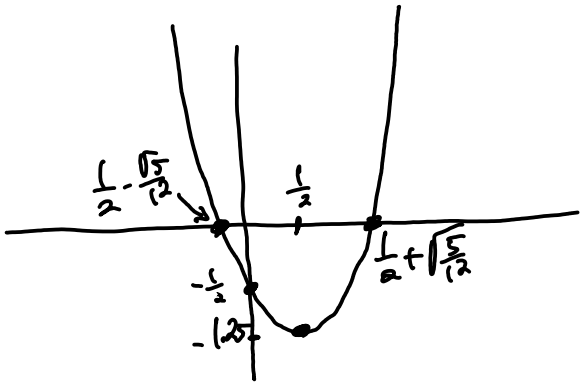
$x+2 = \pm\sqrt{8}$

$x = -2 \pm \sqrt{8}$

(30) $f(x) = 3x^2 - 6x + 1$ put into standard form. sketch the graph. find the absolute minimum or absolute maximum value of $f(x)$ and where it occurs.

$h = \frac{-b}{2a} = \frac{-(-6)}{2 \cdot 6} = \frac{1}{2}$

$k = f\left(\frac{1}{2}\right) = 3\left(\frac{1}{2}\right)^2 - 6\left(\frac{1}{2}\right) + 1 = \frac{3}{4} - 3 + 1 = \frac{3}{4} - 2 = \frac{3}{4} - \frac{8}{4} = \frac{-5}{4} = -1.25$



$f(x) = 3\left(x - \frac{1}{2}\right)^2 - 1.25$

y-intercept

$f(0) = 3\left(-\frac{1}{2}\right)^2 - 1.25 = \frac{3}{4} - 1.25 = .75 - 1.25 = -\frac{1}{2}$

x-intercepts

$0 = 3\left(x - \frac{1}{2}\right)^2 - 1.25$

$\frac{5}{4} = 3\left(x - \frac{1}{2}\right)^2$

$\frac{5}{12} = \left(x - \frac{1}{2}\right)^2$

$\pm\sqrt{\frac{5}{12}} = x - \frac{1}{2}$

$\frac{1}{2} \pm \sqrt{\frac{5}{12}} = x$

Absolute minimum value of $f(x)$ is

$y = -1.25$

which occurs at

$x = \frac{1}{2}$