

In Exercises 1-4 (a) find the standard form of the equation, (b) find the x-intercepts, and (c) use this information to sketch a graph:

$$1. f(x) = x^2 - 2x - 3$$

a)

x	-1
x	$x^2 - x$
-1	$-x + 1$

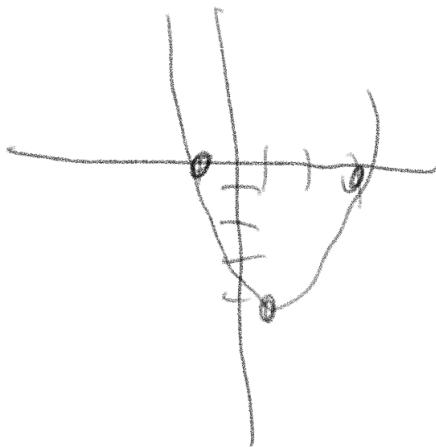
$$\begin{aligned} & (x^2 - 2x + 1) + -3 \\ &= (x-1)^2 - 4 \end{aligned}$$

b)

$$\begin{array}{r} -3 \\ \wedge \\ +1 -3 \end{array}$$

$$(x+1)(x-3)=0$$

$$x = -1, +3$$



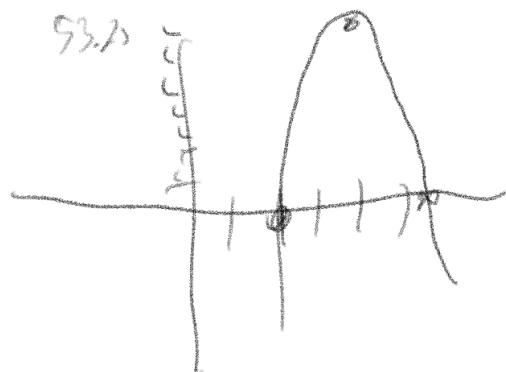
$$2. g(x) = 3x^2 - 21x + 30$$

x	$x^2 - 7x + 10$
-3.5	$-3.5^2 - 7(-3.5) + 10$
-3.5	12.25

$$\begin{aligned} g(x) &= 3((x-3.5)^2 - 12.25) + 30 \\ &= 3(x-3.5)^2 + 53.25 \end{aligned}$$

b)

$$\begin{array}{r} 3[x^2 - 7x + 10] \\ \wedge \\ (x-2)(x-5)^2 - 2 \\ x = 2, 5 \end{array}$$

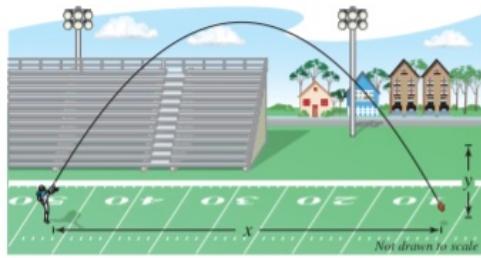


For (2) and (3), use the *how to solve it method*:

3. The path of a football is given by

$$y = -0.08x^2 + 1.8x + 3$$

How high will the football get? **Hint:** draw a graph!



$$-0.08[x^2 -$$

Sell Friday!

4. The population of Germany from 2000 through 2021 can be given by

$$P(t) = -14.83t^2 + 95.9t + 82,276$$

Where t is the year, with $t = 0$ corresponding to 2000.

- A. What will the population of Germany be?
- B. When is the population of Germany predicted to peak?

A. $P(76) = -14.83(76)^2 + 95.9(76) + 82,276$

$$\approx 3906.32$$

B. $-14.83[t^2 - 6.47t - 5547.9]$

$$\begin{array}{c} t \\ \hline t^2 & + 95.9t \\ -3235 & \hline 3.235t & 10.465 \end{array}$$

$$P(t) = -14.83[t - 3.235]^2 + 82,276 + 10.465 - 5547.9$$

The population $\approx -14.83(t - 3.235)^2 + 82,276 + 10.465 - 5547.9$
should peak in 2003.