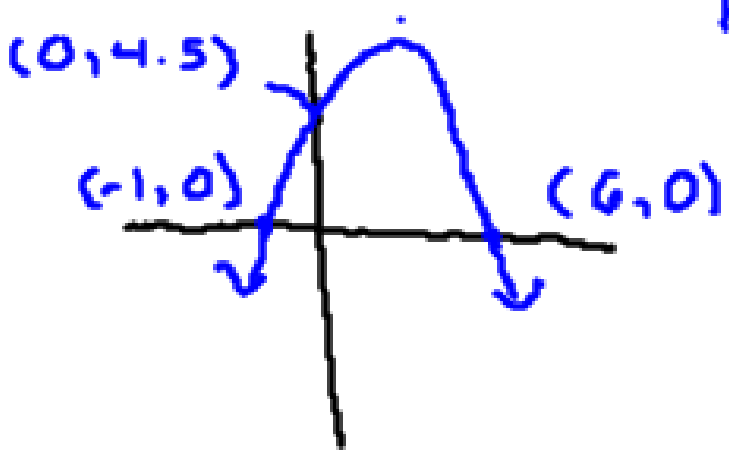
p.368

3b.



Domain $x \in R$

Range $y \leq 9.2$, $y \in R$

$$x = \frac{-1+6}{2} = \frac{5}{2} = 2.5$$

$x = 2.5$

Vertex $(2.5, 9.2)$ ← estimate if we don't have equation

7.3 Solving Quadratic Equations by Graphing

find x-int, roots, or zeros

$(x, 0)$ $x = \ldots$

x values when $y = 0$

$0 = ax^2 + bx + c$

For any quadratic equation there can be zero, one, or two roots

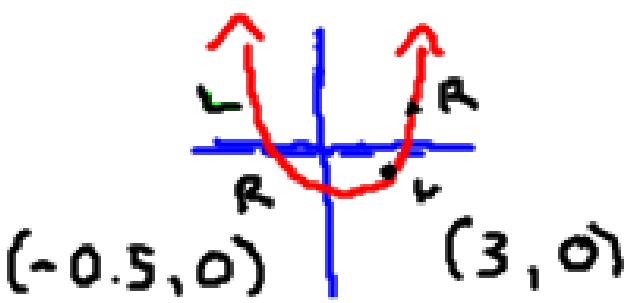
2 roots 1 root no real roots

1. Solve each equation by graphing the corresponding function and determining the zeros.

a) $2x^2 - 5x - 3 = 0$

$\boxed{Y=}$

$Y_1 = 2x^2 - 5x - 3$



Verify (-0.5,0)

$0 = 2x^2 - 5x - 3$

$0 = 2(-.5)^2 - 5(-.5) - 3$

$0 = 0.5 + 2.5 - 3$

$0 = 3 - 3$

$0 = 0$ ✓

$\boxed{\text{2ND}}$ $\boxed{\text{TRACE}}$

2: zero

2. Solve each equation by graphing the expressions on both sides of the equation.

a) $x^2 + 5x = 24$

Method 1

$Y_1 = x^2 + 5x$

$Y_2 = 24$

Zoom → 3: Zoom out

2ND TRACE

5: intersect

First Curve?

Second Curve?

Guess?

$x = -8$

$x = 3$

Method 2

$Y_1 = x^2 + 5x - 24$

2ND TRACE

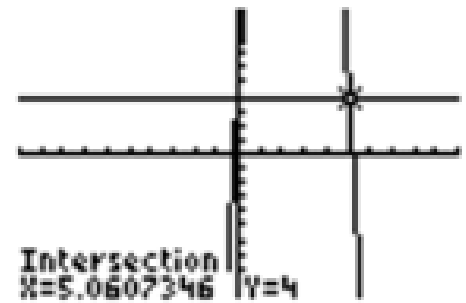
2: zeros

EXAMPLE 1 Verifying solutions to a quadratic equation

The flight time for a long-distance water ski jumper depends on the initial velocity of the jump and the angle of the ramp. For one particular jump, the ramp has a vertical height of 5 m above water level. The height of the ski jumper in flight, $h(t)$, in metres, over time, t, in seconds, can be modelled by the following function:

$$h(t) = 5.0 + 24.46t - 4.9t^2$$

How long does this water ski jumper hold his flight pose?



$x = 5.1$ s

The skier holds his flight pose until he is 4.0 m above the water.

$4.0\text{m} = 5.0 + 24.46t - 4.9t^2$

$Y_1 = 4$

$Y_2 = 5.0 + 24.46t - 4.9t^2$

EXAMPLE 3 Solving a quadratic equation in non-standard form

Determine the roots of this quadratic equation. Verify your answers.

$$3x^2 - 6x + 5 = 2x(4 - x)$$

p. 379 - 1a, 2a, 3a, 4a, 5a, 6a, 10, 13a