

Systems of Semi-Linear Equations

1. Factor each expression.

(a) $3x^2 - 6x$

(b) $x^2 + 6x + 9$

(c) $x^2 + 5x - 14$

2. Solve each equation.

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

(b) $x^2 - 32x + 12 = 0$

(c) $4x^2 + x - 1 = 0$

3. Determine the zeros of each function.

(a) $y = 2x - 3$

(b) $y = x^2 - 2x - 8$

4. Sketch a graph of each function.

(a) $y = 2x + 3$

(b) $y = 2x^2 + 2x - 4$

5.

(a) Determine the point(s) of intersection, if any, of the parabola $y - 4 = -(x + 1)^2$ and the line $y = -4x + 4$.

(b) Determine the point(s) of intersection, if any, of $y = -x^2 + 6x$ and $y = 2x + 3$.

(c) Determine the point(s) of intersection, if any, for $y = x^2 + 2x$ and $y = x - 1$.

6.

(a) Determine the point(s) of intersection, if any, of $y = 8x + 3$ and $y = x^2 + 4x - 9$.

(b) Determine the point(s) of intersection, if any, of $y + 3x^2 = -7x + 2$ and $y + x = 5$.

(c) Determine the point(s) of intersection, if any, of $y = -3x$ and $x^2 + y = 10$.

(d) Determine the point(s) of intersection, if any, of $y - 5x^2 + 2 = 0$ and $y + 3x + 10 = 0$.

(e) Determine the point(s) of intersection, if any, of $y + 4x^2 - 2 = -x$ and $y + x = 2$.

(f) Determine the point(s) of intersection, if any, of $y = -x^2 + 2x + 2$ and $y = 3x + 1$.

Word Problem

An acorn falls from the top of a 45-foot tree. The height of the acorn is modeled by the function $h(t) = -16t^2 + 45$, where h is the height in feet and t is the time in seconds after the acorn begins to fall. Before it can hit the ground a squirrel runs along a lower branch and intercepts it. If the squirrel's height is modeled by the equation $h(t) = -3t + 32$, at what height did the squirrel intercept the acorn?