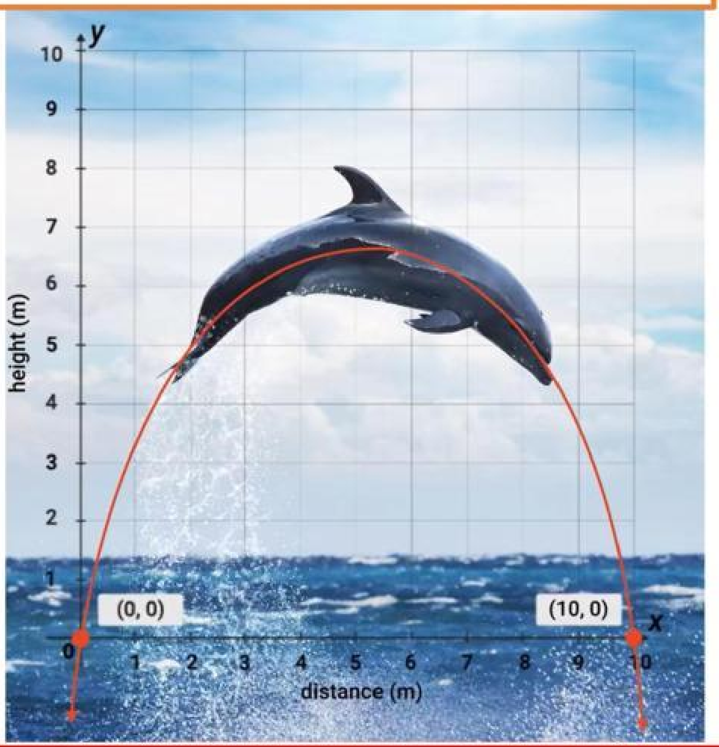
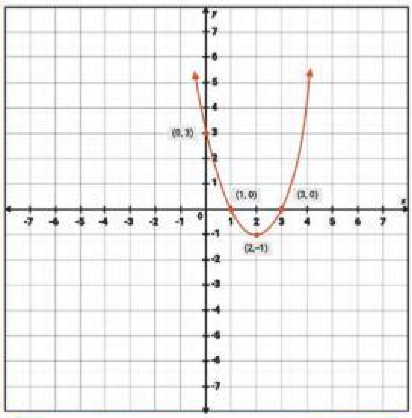
Learn

Mark the point where the dolphin jumps out of the water. (……., ……)

estimate the point where the dolphin jumps back to the water. (…….., …….)

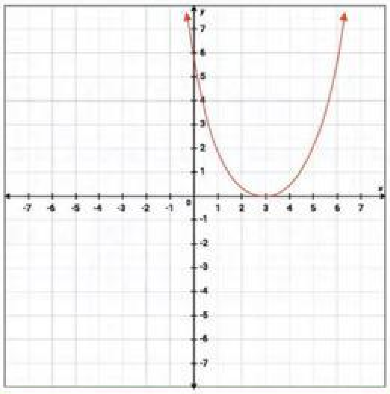


There can be **3 types** of solutions or roots:



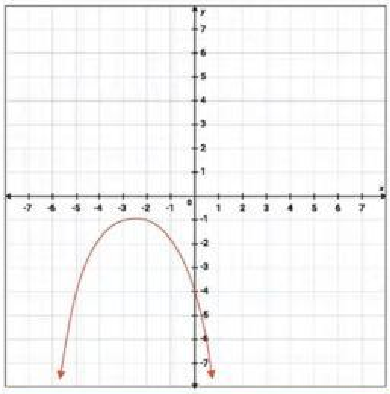
two unique real solutions

Solutions: x = …….. and
x = ……..



one unique real solution

Solution: x = ……..



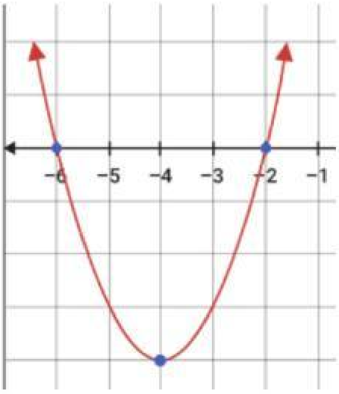
no real solutions

Solution: x = ……..

Because …………………..

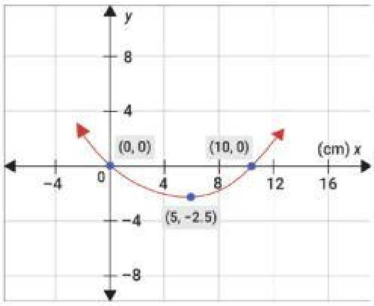
Hint: solutions are the x-intercepts

Find the solutions



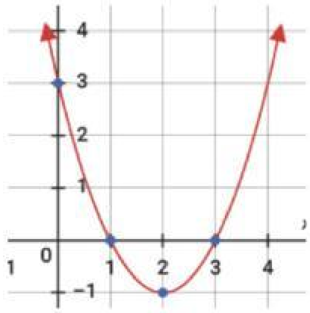
Solutions: x = …….. and

x = ……..



Solutions: x = …….. and

x = ……..

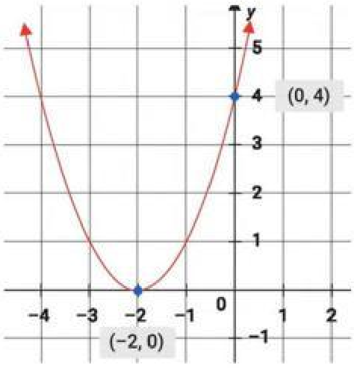


Solutions: x = …….. and

x = ……..

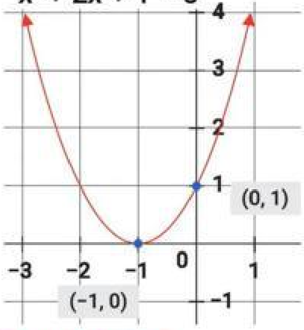
Hint: solutions are the x-intercepts

Find the solutions



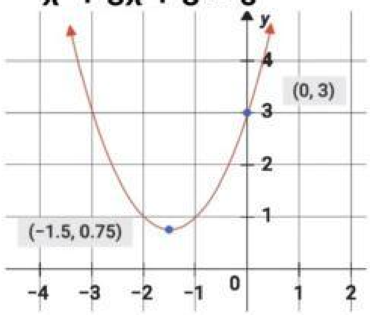
Solutions: x = ………..

$x^2 + 2x + 1 = 0$



Solutions: x = ………..

$x^2 + 3x + 3 = 0$

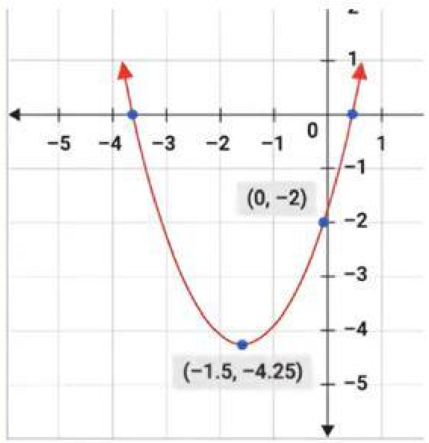


Solutions: x = ………..

Because …………………..

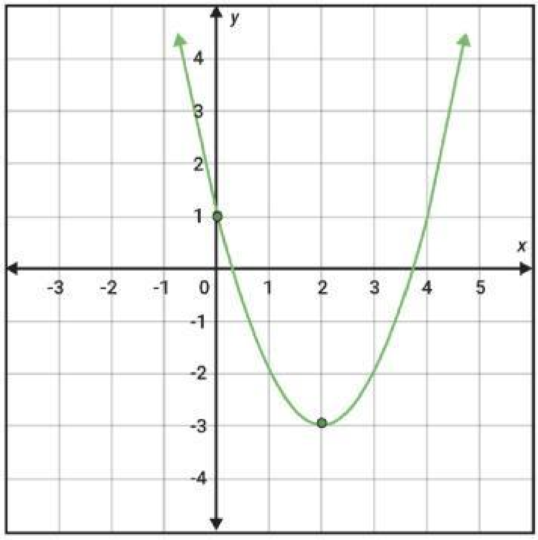
Hint: solutions are the x-intercepts

Estimate the solutions of the quadratic equations shown in the graphs



The first solution lies between .... And ....

The second solution lies between .... And ....



The first solution lies between .... And ....

The second solution lies between .... And ....

Hint: solutions are the x-intercepts

Estimate the solutions of the quadratic equations shown in the table

For the quadratic function $y = -x^2 + 2x + 4$, a table is used to approximate the zeros of the function

From the tables, identify the approximate zeros of the given function.

x	−1.5	−1.4	−1.3	−1.2	−1.1	−1	−0.9
y	−1.25	−0.76	−0.29	0.16	0.59	1	1.39

x	3.1	3.2	3.3	3.4	3.5	3.6	3.7
y	0.59	0.16	−0.29	−0.76	−1.25	−1.76	−2.29

The first solution is approximately ....

The second solution is approximately ....

Hint: the solutions are the x values for which the y values are closest to zero

Solved example:

Solve: $x^2 + 5x = -4$

solution:

Step 1) make the equation = 0 by moving the constant to the other side:

$$x^2 + 5x = -4$$
$$\quad +4 \qquad\quad +4$$
$$x^2 + 5x + 4 = 0$$

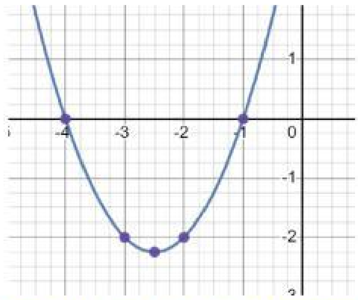
Step 2) graph by making a table of x and y values

A) Axis of symmetry $= -\frac{b}{2a} = -\frac{5}{2(1)} = -2.5$

B) Make a table where -2.5 is in the middle

x	y = $x^2 + 5x + 4$	(x, y)
-4	$y = (-4)^2 + 5(-4) + 4 = 0$	(-4, 0)
-3	$y = (-3)^2 + 5(-3) + 4 = -2$	(-3, -2)
-2.5	$y = (-2.5)^2 + 5(-2.5) + 4 = -2.25$	(-2.5, -2.25)
-2	$y = (-2)^2 + 5(-2) + 4 = -2$	(-2, -2)
-1	$y = (-1)^2 + 5(-1) + 4 = 0$	(-1, 0)

Step 3) plot the points



Step 4) find the x-intercepts:

Solutions: x = ... and
x = ...

Example:

Solve $10 - x^2 = 4x + 14$ by graphing.

solution:

Step 1) make the equation = 0 by moving the constant to the other side:

$$10 - x^2 = 4x + 14$$
$$-10 + x^2 \qquad -10 + x^2$$
$$0 = x^2 + ...x + ...$$

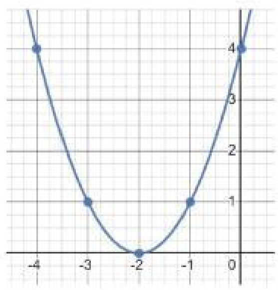
Step 2) graph by making a table of x and y values

A) Axis of symmetry $= -\frac{b}{2a} = -\frac{4}{2(1)} = -2$

B) Make a table where -2 is in the middle

x	y = $x^2 + 4x + 4$	(x, y)
-4	$y = (-4)^2 + 4(-4) + 4 =$.......	(-4, ...)
-3	$y = (-3)^2 + 4(-3) + 4 =$.......	(-3, ...)
-2	$y = (-2)^2 + 4(-2) + 4 =$.......	(-2, ...)
-1	$y = (-1)^2 + 4(-1) + 4 =$.......	(-1, ...)
0	$y = (0)^2 + 4(0) + 4 =$.......	(0, ...)

Step 3) plot the points



Step 4) find the x-intercepts:

Solution: x = ...