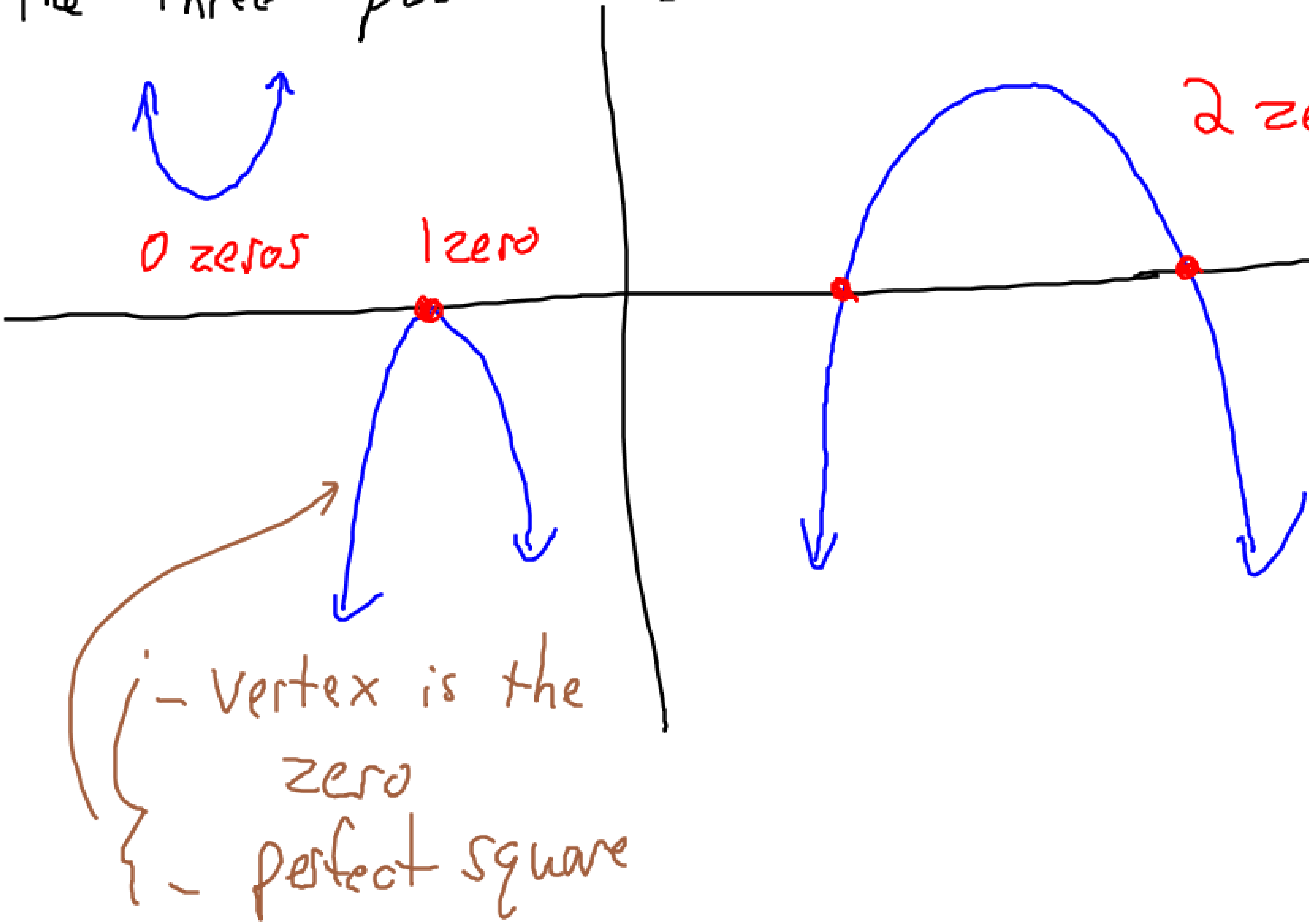
3.6 The Zeros of a Quadratic Fn

Remember, zeros are also called the solutions, the roots, or the x-intercepts.

Today, we will look at how to find whether zeros exist, not how to find the actual zeros.

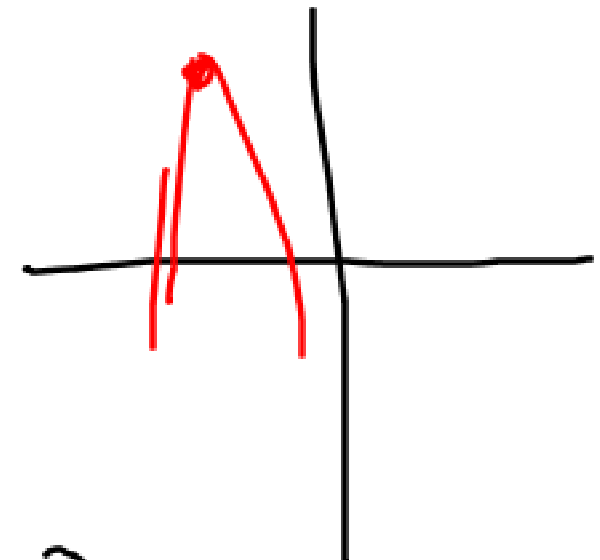
The three possibilities:



3 methods:

1. Graph it and see.

2. Vertex form: $f(x) = -2(x+3)^2 + 8$ 2



The a and k must have opposite signs

$f(x) = 3(x+5)^2 + 9$ 0

③ Algebra!

recall: $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$?

To solve # of zeros, look at the radical.

If $b^2 - 4ac > 0$, 2 zeros

$b^2 - 4ac = 0$, 1 zero

$b^2 - 4ac < 0$, 0 zeros

ex: $f(x) = -2x^2 + 6x - 9$

a b c

$b^2 - 4ac = 6^2 - 4(-2)(-9)$

$= 36 - 72$

$= -36$ $\therefore$ no zeros

Curveball

$$f(x) = \overset{a}{-2}x^2 + \overset{b}{3}x + \overset{c}{k}$$

Solve for k so that this has 1 zero.

$$b^2 - 4ac = 0$$

$$3^2 - 4(-2)(k) = 0$$

$$9 + 8k = 0$$

$$8k = -9$$

$$k = \frac{-9}{8}$$