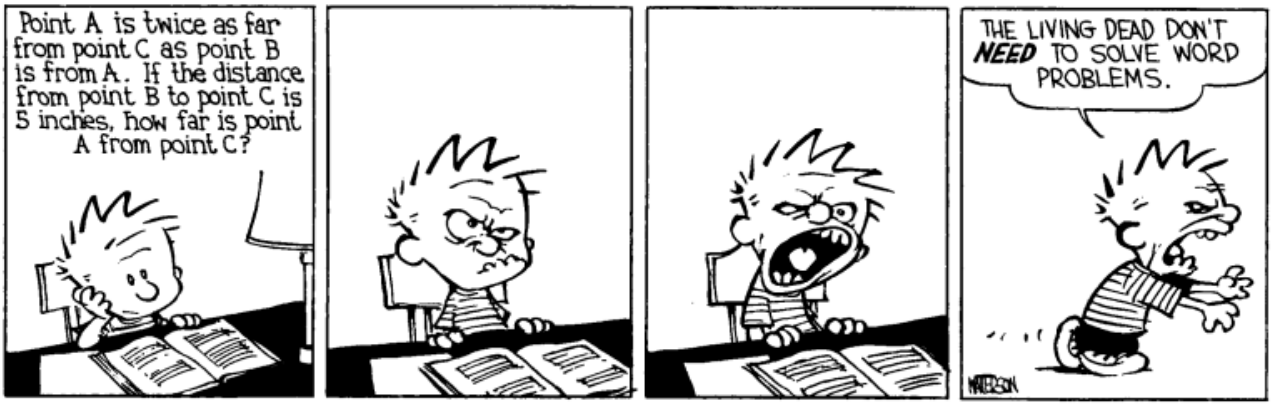
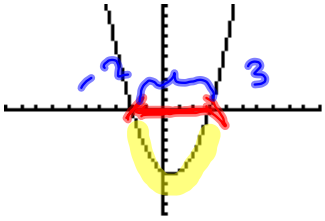
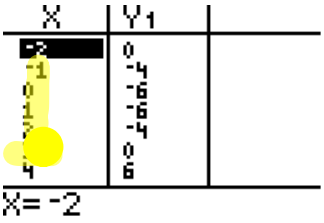
Solving Quadratic Inequalities/ Modeling with Quadratics


Point A is twice as far from point C as point B is from A. If the distance from point B to point C is 5 inches, how far is point A from point C?
THE LIVING DEAD DON'T NEED TO SOLVE WORD PROBLEMS.
WATTERSON

$x^2 - x - 6 < 0$





QUADRATIC INEQUALITIES

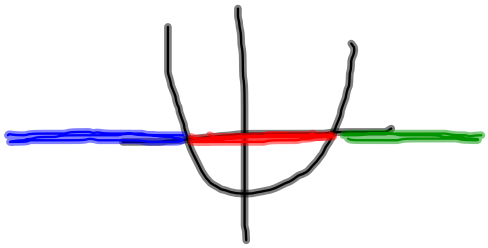
1) Change inequality to equation and solve to find all x intercepts (zeros).

2) If the inequality is in fraction form--- find the values that make the fraction undefined.
*The values from steps 1 and 2 are called critical numbers

3) Arrange the critical numbers in order smallest to largest… set up as intervals.

4) Test a number in each interval to see if it satisfies the original problem.

$x^2 - x - 6 < 0$



$x^2 - x - 6 = 0$

$(x - 3)(x + 2) = 0$

$x = 3, -2$

$(-\infty, -2)$ $(-2, 3)$ $(3, \infty)$

-4 0 4

X ✓ X

$$x^2+4x+4 \geq 9$$

$x^2+4x-5=0$

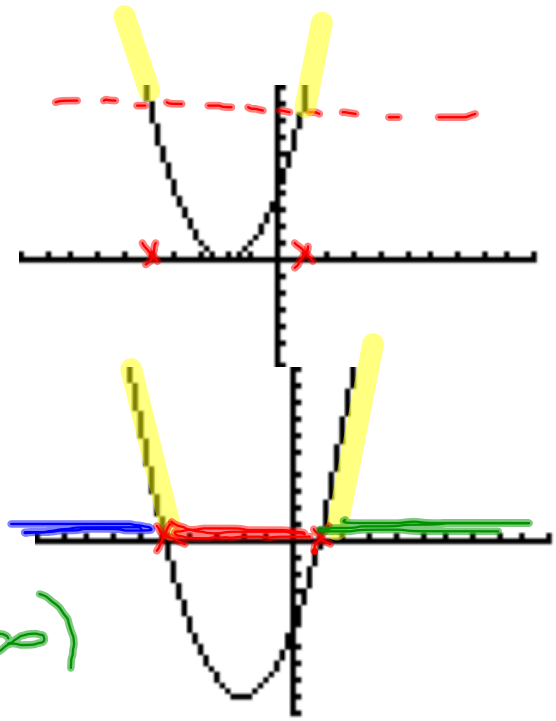
$(x+5)(x-1)=0$

$x=-5, 1$

$(-\infty,-5]$ $[-5,1]$ $[1,\infty)$

-6 0 4

Yes No yes



$(-\infty,-5] \cup [1,\infty)$

Modeling with Quadratics

Find two consecutive even numbers such that the sum of their squares is 724. Find all possible solutions!

n^2

$(n+2)^2$

$$n^2 + n^2 + 4n + 4 = 724$$

$$2n^2 + 4n - 720 = 0$$

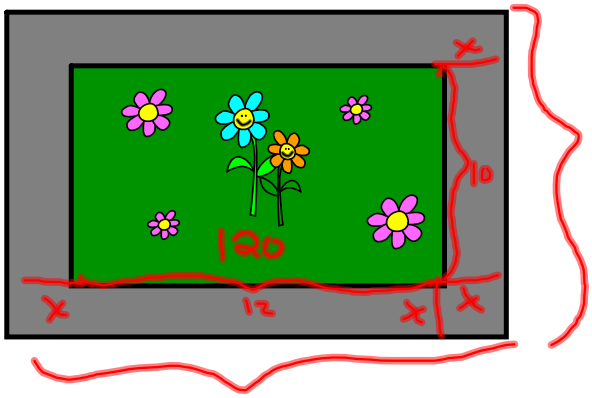
$$n^2 + 2n - 360 = 0$$

$$(n-18)(n+20) = 0$$

$n = 18, -20$

$20, -18$

Mrs. Noyes would like to plant a rectangular garden with a path around the garden. The garden needs to be 10 by 12 feet. The area of the garden and path need to be three times the area of just the garden. If the path is to remain a constant width all around the garden, what is that width?



$(2x+10)(2x+12)=360$

$4x^2+44x+120=360$

$4x^2+44x-240=$

$x^2+11x-60=0$

$(x+15)(x-4)=0$

$x=-\cancel{15}, 4$

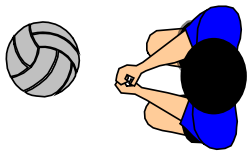
4 ft

In a volleyball game, a player on one team spikes the ball over the net when the ball is 10 feet above the court. The spike drives the ball downward with an initial velocity of -55 feet per second. Players on the opposing team must hit the ball back over the net before the ball touches the court. Using the thrown object model:

$$H = -16t^2 + v_0t + H_0$$

H: end height; t: time; v_0: initial velocity; H_0: initial height

How much time do the opposing players have to hit the spiked ball?



$$0 = -16t^2 - 55t + 10$$

$$t = .17 \text{ sec}$$

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