WARM UP

Solve the equation $3x^3 - 5x^2 - 48x + 80 = 0$ algebraically for all values of x.

$(3x^3 - 5x^2) + (-48x + 80) = 0$

$x^2(3x-5) - 16(3x-5) = 0$

$(3x-5)(x^2-16) = 0$

Factored Completely → $(3x-5)(x+4)(x-4) = 0$

$3x-5=0 \quad x+4=0 \quad x-4=0$

$3x=5$

Solved → $x = \{\pm 4, \frac{5}{3}\}$

2 x 2 Systems of Equations

(GRAPHICALLY)

What are systems of equations?

2 equations
2 variables

Equations solved simultaneously for their point(s) of intersection

What do solutions look like graphically?

Where the two graphs intersect

Things to THINK About

(when solving systems of equations)

1. What does each equation represent? circle linear quad
2. Are your equations in standard form? y=
3. Did you use your calculator properly?
4. How many solutions are there?
5. Did you write the solution down? (x,y)
6. Did you check your solutions?

WE TRY- Example #1:

Solve the system of equations graphically.

Use the intersection key on your calculator to check!

$$y+3=x^2-2x$$ quadratic

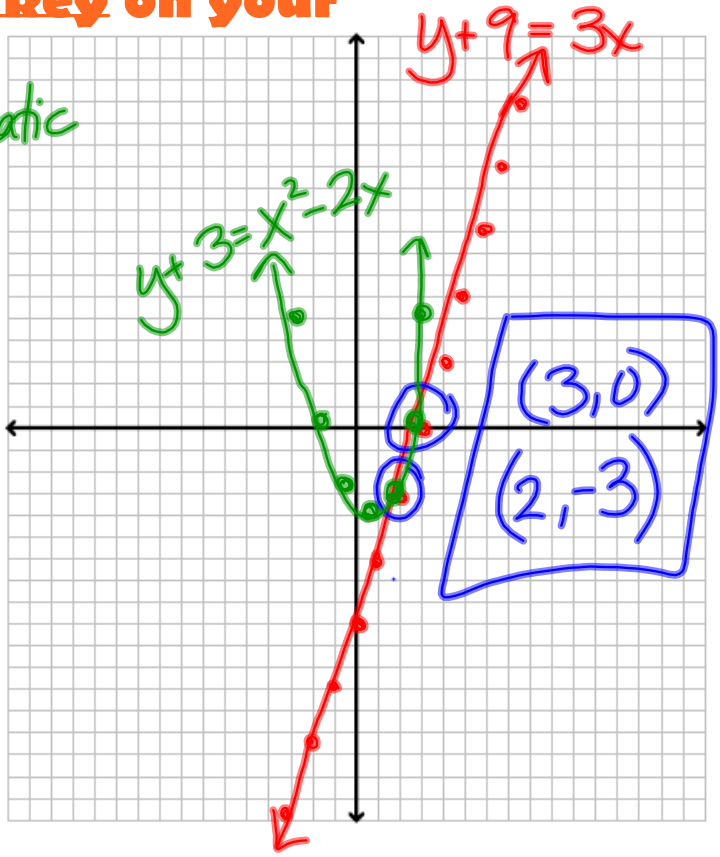
$y=x^2-2x-3$

$$y+9=3x$$ ← linear

$y=3x-9$

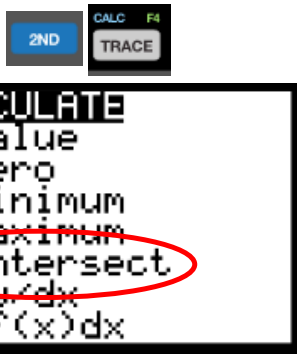
x	y
-2	5
-1	0
0	-3
1	-4
2	-3
3	0
4	5

vertex



Examples:

Use your calculator to determine the solutions to each question below.



f(x)=g(x) Notation:

this is saying "when y=y"

THEREFORE solve for "x" only

If $f(x) = 3|x| - 1$ and $g(x) = 0.03x^3 - x + 1$, an approximate solution for the equation $f(x) = g(x)$ is

1) 1.96
2) 11.29
3) (−0.99, 1.96)
4) (11.29, 32.87)

To the *nearest tenth*, the value of x that satisfies $2^x = -2x + 11$ is

Y_1 Y_2

1) 2.5
2) 2.6
3) 5.8
4) 5.9

2.55

YOU TRY- REGENTS QUESTION- Example:

Which value, to the nearest tenth, is NOT a solution of $p(x) = q(x)$ if $p(x) = x^3 + 3x^2 - 3x - 1$ and $q(x) = 3x + 8$?

y = y

what x-value?

1) -3.9

2) -1.1

3) 2.1

4) 4.7

More Examples:

Use your calculator to determine the solutions to each question below.

The flight paths of two Thunderbird jets are plotted on a Cartesian coordinate plane, and the equations of the jets' flight paths are represented by $y = 2^x + 3$ and $y = 0.5^x$. The best approximation of the intersection of the flight paths is

1) $(-1.72, 3.3)$
2) $(0, 1)$
3) $(-1.50, 2.82)$
4) $(-2, -1)$

---

y_1 y_2

How many solutions exist for $\frac{1}{1-x^2} = -|3x-2| + 5$?

1) 1
2) 2
3) 3
4) 4

Given: $h(x) = \frac{2}{9}x^3 + \frac{8}{9}x^2 - \frac{16}{13}x + 2$

$k(x) = -|0.7x| + 5$

State the solutions to the equation $h(x) = k(x)$, rounded to the *nearest hundredth*.

Sketch the graphs of $r(x) = \frac{1}{x}$ and $a(x) = |x| - 3$ on the set of axes below. Determine, to the *nearest tenth*, the positive solution of $r(x) = a(x)$.