Mastery learning

Two questions from Test 3 - Perfect score & I'll split the difference with you.

Two questions from Test 4 - Perfect score, etc.

Do this one week from today.

5^{1-x} how to deal with it?

vertical shift $f(x) \pm k$

horizontal shift $f(x \pm k)$

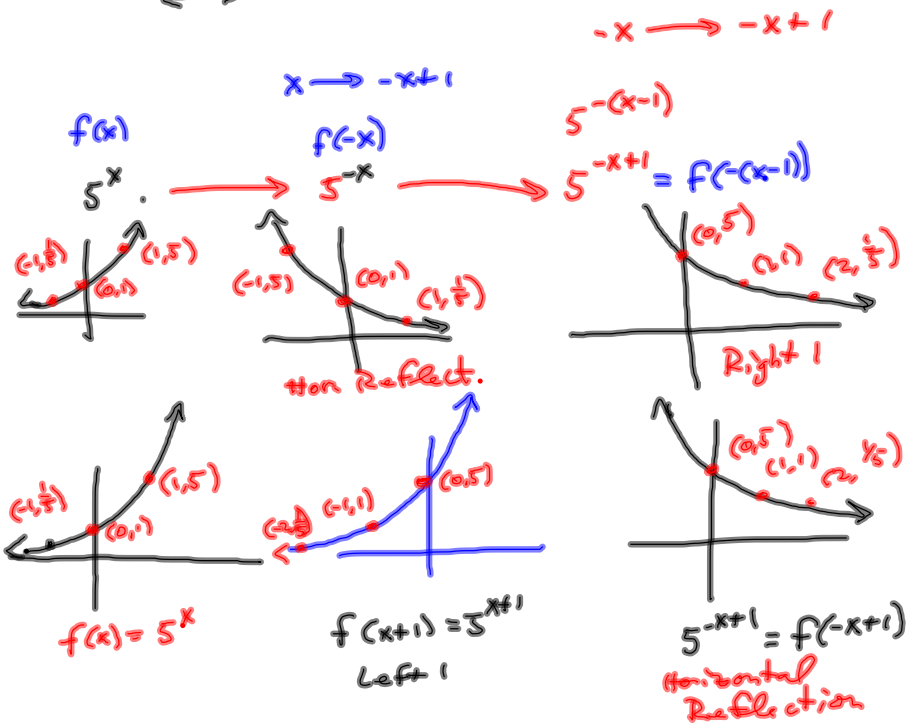
↔ horizontal Reflect $f(-x)$

↕ vertical Reflect $-f(x)$

$x \longrightarrow 1-x$?

① $x \longrightarrow x+1 \longrightarrow -x+1 = 1-x$ (left 1; ↔)

② $x \longrightarrow -x \longrightarrow -(x-1) = 1-x$ (↔; RIGHT 1)



most common screwup:

$f(x) \longrightarrow f(-x) \longrightarrow f(-x+1)$

Horiz. Flip — Left 1

BAD!

I'm not replacing x by x+1

I'm replacing -x by -x+1. within the transformations that are legit, this is replacing x by

$x-1$

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

Last Time, we may've been shaky on systems with infinitely many solutions in the 3-variable case

$$2x - y + z = 7 \quad E1$$
$$y + z = 5 \quad E2$$

I eliminated y in E1 to get x & y in terms of z:

Replace E1 by E1+E2

$$\begin{array}{r} 2x - y + z = 7 \\ y + z = 5 \\ \hline 2x + 2z = 12 \\ x + z = 6 \end{array}$$

More variables than restrictions.

By convention, let z be "free" and x & y depend on z.

New system:

$$x + z = 6$$
$$y + z = 5$$

$$\Rightarrow x = -z + 6$$
$$y = -z + 5$$

Soln set

$$\{(-z+6, -z+5, z) \mid z \text{ is free}\}$$

This is a line.

$2x - y + z = 7$ E1

$y + z = 5$ E2

Solve E2 for y:

$y = -z + 5$

Send it to E1

$2x - (-z+5) + z = 7$

$2x + z - 5 + z = 7$

$2x + 2z - 5 = 7$

$2x + 2z = 12$

$x + z = 6$

Two eq'ns

3 var's

Let z be free.

New System

$x + z = 6$

$y + z = 5$

$\{(-z+6, -z+5, z) \mid z \text{ is real}\}$

See previous page.

Perimeter of triangle is 60 ft.

$x + y + z = 60$

Sum of two shorter sides is 2 ft more than the long side.

$y + z = x + 2$

Longest side is 11 ft more than shortest side.

$x = z + 11$

Find the lengths of each side

Let x = length of longest side (in feet)
y = " " medium " " "
z = " " shortest " " "

System in standard form

$$x + y + z = 60$$
$$-x + y + z = 2$$
$$x - z = 11$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 60 \\ -1 & 1 & 1 & 2 \\ 1 & 0 & -1 & 11 \end{array}\right]$$

Augmented Matrix for this system.

(65) Burger, fries & coke cost $3.80 last yr.

$x + y + z = 3.8$ E1

Price of burger rose 10%

" " fries " 20%

" " coke " 25%

Same meal costs $4.49 this year.

Solutions outline missed this.

Price of coke is NOW 7¢ less than burger

What was the price of each last year?

x = price of burger LAST year (in $)

y = " " fries " " "

z = " " coke " " "

Same meal costs $4.49 this year.

$1x + .1x = 1.1x$ = cost of burger this year.

$1y + .2y = 1.2y$ = " " fries " " "

$z + .25z = 1.25z$ = " " coke " " "

$1.1x + 1.2y + 1.25z = 4.49$ E2

$1.25z = 1.1x + .07$ E3

Nathan says "less"

↑ should be "−"

$x + y + z = 3.80$

$1.1x + 1.2y + 1.25z = 4.49$

$-1.1x \quad +1.25z = -.07$

↑ Should be a minus.

§5.3 Systems of Nonlinear Eq'ns.

$y = y$

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

$y = 3x$

$-x^2 - 3x = 0$

$x^2 + 3x = 0$

$x(x+3) = 0$

$x = 0$ or $x = -3$

$y = 0$ from $y = 3x$

$y = -9$ from $y = 3x$

$\{(0,0), (-3,-9)\}$

$2x^2 - y = 8 \Rightarrow 2x^2 - 8 = y$

$7x + y = -4$

ONE WAY

$7x + (2x^2 - 8) = -4$

$2x^2 + 7x - 8 = -4$

$2x^2 + 7x - 4 = 0$

Another way

$y = -7x - 4$

$2x^2 - (-7x - 4) = 8$

$2x^2 + 7x + 4 = 8$

$2x^2 + 7x - 4 = 0$

etc.

$(2x - 1)(x + 4) = 2x^2 + 8x - 1x - 4$ ✓

$2x - 1 = 0$

$2x = 1$

$x = \frac{1}{2}$

$y = 2x^2 - 8$

$= 2(\frac{1}{2})^2 - 8$

$= 2(\frac{1}{4}) - 8$

$= \frac{1}{2} - 8$

$= \frac{1 - 16}{2} = -\frac{15}{2}$

$(\frac{1}{2}, -\frac{15}{2})$

$x + 4 = 0$

$x = -4$

$y = 2x^2 - 8$

$= 2(-4)^2 - 8$

$= +32 - 8$

$= 24$

$(-4, 24)$

$y = x^2$

$x = y^2$

§5.3 #s 5, 7, 11, 23, 33, 37, 41, 45

① Send $y = x^2$ to E2:

$x = (x^2)^2$

$x = x^4$

$x^4 - x = 0$

$x(x^3 - 1) = 0$

$x = 0$ OR $x^3 - 1 = 0$

$y = 0$

$x^3 = 1$

$x = \sqrt[3]{1} = 1$

$y = 1$

$\{(0,0), (1,1)\}$

② Send $x = y^2$ to E1

$y = (y^2)^2$

$y = y^4$

$\vdots$

$y = 0$ OR $y = 1$

$x = 0$ OR $x = 1$