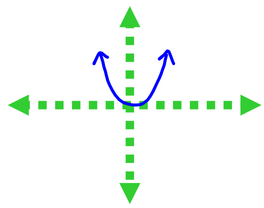
Pick Up the Warm Up

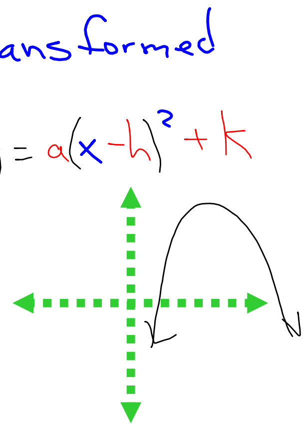
parabola

$y = x^2$

transformed

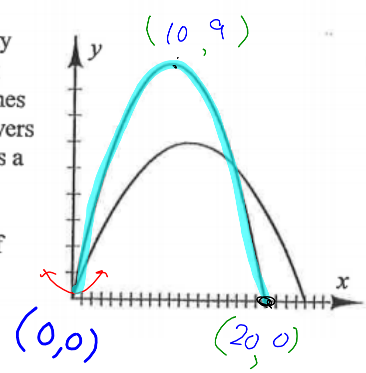
$y = a(x-h)^2 + k$





Consider the parabolic paths of two soccer penalty kicks, represented in the graph at right. One kick covers a horizontal distance of 20 yards and reaches a maximum height of 9 yards. The other kick covers a horizontal distance of 24 yards, but only reaches a maximum height of 6 yards.

Find an equation that describes the path of each kick.



$y = x^2$

$y = a(x-h)^2 + k$

$y = a(x-10)^2 + 9$

$y = a(x-10)^2 + 9$

$0 = a(20-10)^2 + 9$

$0 = 100a + 9$

$a = -\frac{9}{100}$

$= -.09$

Substitute in a point on the curve (not the vertex)

$(20, 0)$

$$\boxed{y = -\frac{9}{100}(x-10)^2 + 9}$$

$y = a(x-10)^2 + 9$

$0 = a(20-10)^2 + 9$

$0 = 100a + 9$

$a = -\frac{9}{100}$

$= -.09$

Substitute in a point on the curve (not the vertex)

$(20, 0)$

$y = -.09(x-10)^2 + 9$

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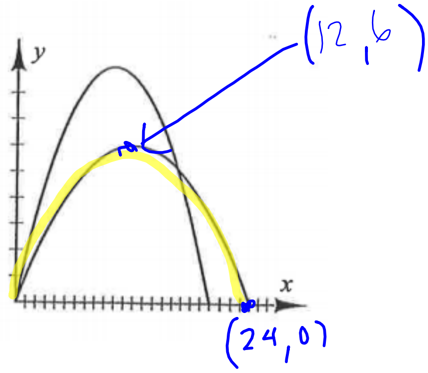

$$y = \frac{-1}{24}(x-12)^2 + 6$$

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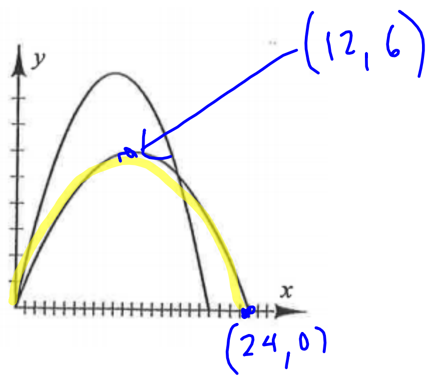


$$y = \frac{-1}{24}(x-12)^2 + 6$$

$4m^5 \cdot 3m^{-7} = 12m^{-2} = \boxed{\frac{12}{m^2}}$

$4 \cdot 3 \cdot m^5 \cdot m^{-7}$

$\frac{\cancel{x^2}\,x^1}{w^{-7}} \cdot \frac{x^3 w^2}{\cancel{x}\;1} = \frac{x^4 w^2 w^7}{1} = x^4 w^9$

$(m^5)^{-2}$

$\left(\frac{m^5 \cdot n^{-3}}{y}\right)^{-2} \quad \frac{m^{-10}\, n^6}{y^{-2}} = \boxed{\frac{n^6 y^2}{m^{10}}}$

If your HW recording sheet is out

and you have a pen, then

check your solutions

let me know if there are questions afterwards

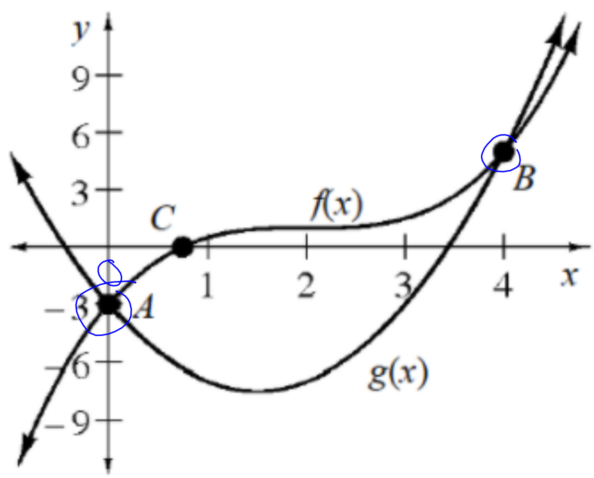
4-30. Consider the graphs of $f(x) = \frac{1}{2}(x-2)^3 + 1$ and $g(x) = 2x^2 - 6x - 3$ at right. Homework Help ✎

a. Write an equation that you could solve using points *A* and *B*. What are the solutions to your equation? Substitute them into your equation to show that they work. $\frac{1}{2}(x-2)^3+1 = 2x^2-6x-3$

b. Are there any solutions to the equation in part (a) that do not appear on the graph? Explain.

c. Write an equation that you could solve using point *C*. What does the solution to your equation appear to be? Again, substitute your solution into the equation. How close was your estimate? $\frac{1}{2}(x-2)^3+1 = 0$

d. What are the domains and ranges of $f(x)$ and $g(x)$?



✓ HW

7

$(x-2)^2 - 3 = 1$

10b

10c

AIMS

✓ Validate solutions

because sometimes "good" solutions are "bad"

✓ Approximate solutions when an algebraic solution is not possible.

All
Calculators
upside down / off

Use algebraic strategies to solve

$$\left(\sqrt{2x+3}\right)^2 = (x)^2$$

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

$$0 = x^2 - 2x - 3$$

$$x = -1 \quad x = 3$$

$x = 3$

$x = -1$

We should have got two apparent solutions

$x = -1$

$x = 3$

now do an algebraic check in the original equation

$$\sqrt{2x+3} = x$$

check $x=-1$

$$\sqrt{2(-1)+3} = (-1)$$

check $x = 3$

$$\sqrt{2(3)+3} = (3)$$

$$\sqrt{6+3}$$

$$\sqrt{9}$$

$$3 \quad | \quad 3 \checkmark$$

ex

$$\sqrt{2x+3} = x \qquad \sqrt{1}$$

check $x=-1$

$$\sqrt{2(-1)+3} = (-1)$$

$$\sqrt{1} = (-1)$$

$$1 \neq -1$$

$x=-1$ is extraneous

check $x=3$

$$\sqrt{2(3)+3} = (3)$$

$$\sqrt{9} = 3$$

$$3 = 3$$

✓

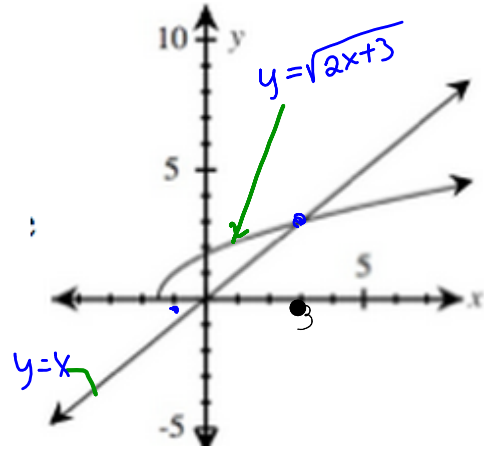
$x=3$ is a solution

$x = 3$

$x = -1$ (extraneous)

Validate Graphically

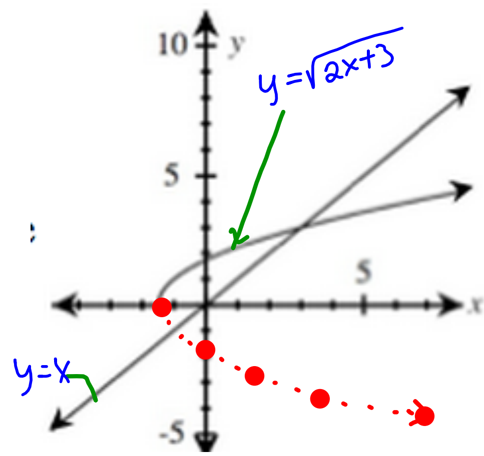
$$\underbrace{\sqrt{2x+3}}_{Y_1} = \underbrace{x}_{Y_2}$$



Why did the extraneous solutions appear?

If the sideways parabola is completed, it would itersect at $x = -1$

The graph of $y=\sqrt{2x+3}$ did not intersect because $\sqrt{2x+3}$ has no negative values



Equations with radicals

called radical equations,
commonly have solutions that
have extraneous solutions

$5 = \sqrt{x-2}$

Every group needs a ●

Leader
Runner
Player (1 or 2)

Start with

$\boxed{4-19}$

a+b

Runners

Be prepared to show proof on part a

Leaders

Get a consensus answer on part b and be prepared to share it with the class.

$$20x + 1 = 3^x$$

a

what were the solutions ?

How did you prove they were solutions?

$x = 0$

$20(0) + 1 = 3^0$

$x = 4$

$20(4) + 1 = 3^4$

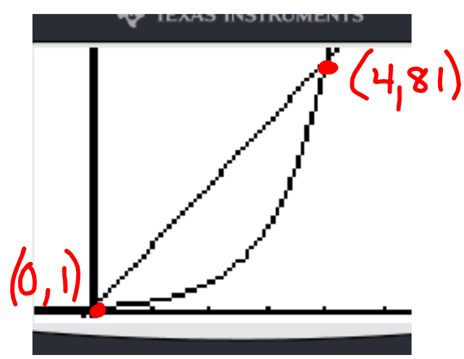
$80 + 1$

$81 = 81$ ✓

(b) Are the solutions a single number?

or

or be the coordinates of a point?



$20x + 1 = 3^x$

$x=0$ ~~$x=4$ (0, 1)~~ (4,81)

The original equation $20x + 1 = 3^x$ only has one variable so the solutions are the x-coordinates of the points of intersection.

$x = 0$ $x = 4$

move on to C

$20x + 1 = 3^x$

(c)

$20x = 3^x - 1$

$x = 0$ $x = 4$

B.B.

6 LCQ's so far

Your 2 worst were dropped

6 d

Monday	Tuesday	Wednesday	Thursday	Friday
13 Ch. 4 (4.1.2 Day 2) Equations with Extraneous solutions	**14** Ch. 4 (4.1.3) Multiple Solutions	**15** Ch. 4 (4.1.4) Use Systems to Solve Problems	**16** Ch. 4 (4.2.1) Day 1 Inequalities	**17** Ch. 4 (4.2.1) Day 2 Inequalites
20 Ch. 4 (4.2.2) Solving Problems using Systems	**21** Review Ch. 4 Turn in Notebook today	**22** Test on Ch. 4 ~~Turn in all Logic Assignments~~	**23** No School Thanksgiving	**24** No School
27 Final Exam Review Day #1	**28** Final Exam Review Day #2 Turn – in textbooks today	**29** Final Exam Part 1 (Showing work)	**30** Final Exam Part 2 (multiple choice) Today is the last day of the Trimester	No School

Trimester 2 starts Tuesday, Dec 5

1 question LCQ

You will be given one equation to solve graphically with your calculator. (it will be unsolvable algebraically)

4 .... 22 -25, 27-28

26 a an optional problem, not for extra credit.... just for the challenge (fun) of it.

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