Pick Up the
Warm Up.

[I will pass back the LCQ from
last Wed.]

Later in the period you will
See your Ch. 3 Test

① Use the method of x-intercepts to
solve the equation

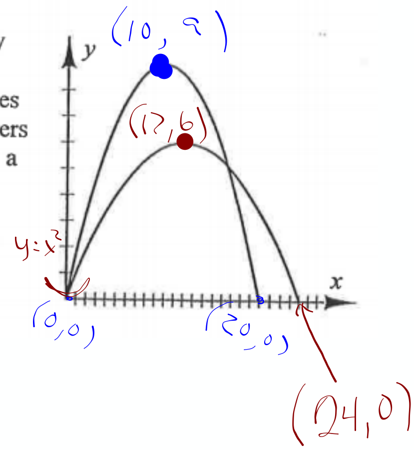
$$x^2 - 8x + 10 = -2\sqrt{3-x}$$

$$\underbrace{x^2 - 8x + 10 + 2\sqrt{3-x}}_{Y_1} = 0$$

$x = 2$

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.



$y = (x)^2$

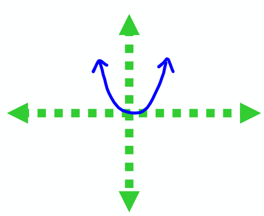
$y = a(x-10)^2 + 9$

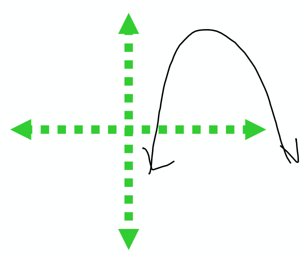
transformed

parabola

$y = x^2$

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





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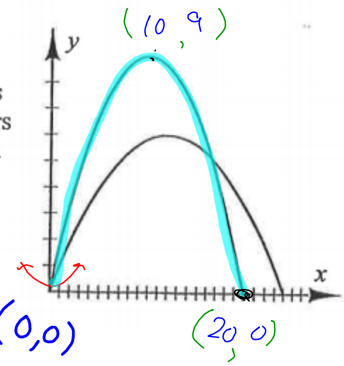

$y = x^2$

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

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

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

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

$0 = 100a + 9$

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

$= -.09$

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

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

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

$0 = 100a + 9$

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

$= -.09$

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

$(20,0)$

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

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

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

$0 = 100a + 9$

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

$= -.09$

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

$(20,0)$

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

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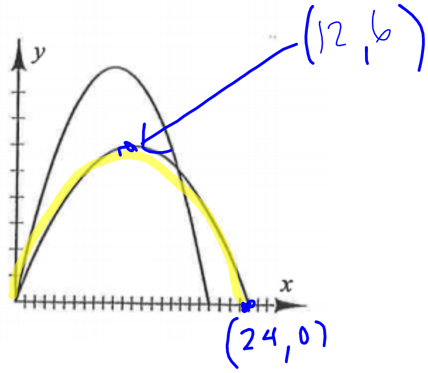

$$y = \frac{-1}{24}(x-12)^2 + 6$$

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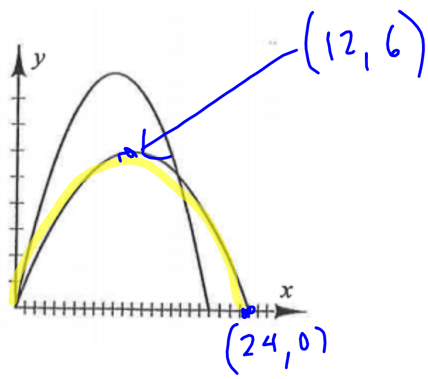


$$y = \frac{-1}{24}(x-12)^2 + 6$$

HW Questions

I will be passing out the LCQ solutions

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 ✎

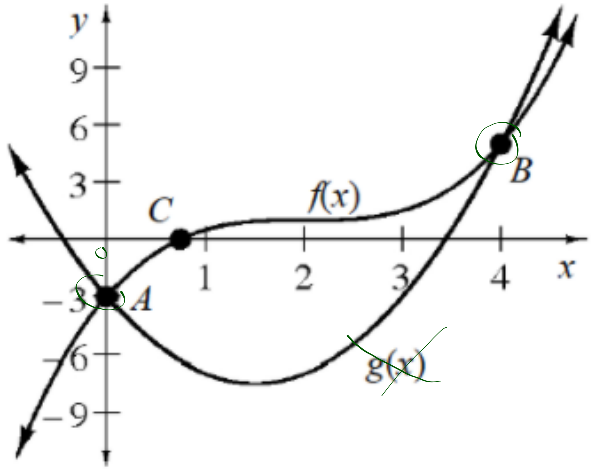
a. Write an equation that you could solve using points A and B. What are the solutions to your equation? Substitute them into your equation to show that they work.

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?

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

X=0 x=4



=

32 a

5x - 3y = 12

solve for y

32b

$$\frac{Gm_1 m_2}{r^2} = F$$

Solve for m_2

32 c

$$E = \frac{1}{2} mv^2$$

Solve for m

$$2E = mv^2$$

$$m = \frac{2E}{\cancel{x}v^2}$$

32 d

$(x-4)^2+(y-1)^2=10$ Solve for y

$\sqrt{(y-1)^2}=\sqrt{10-(x-4)^2}$

$y-1=\pm\sqrt{10-(x-4)^2}$

32d

✓ HW

7 $(x-2)^2 - 3 = 1$

Aims

✓ Validate solutions

because sometimes "good" solutions are "naughty"

All

Calculators

upside down / off

Use algebraic strategies to solve

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

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

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

$2x+3 = x^2$

$\boxed{+}\ x$

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

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

$x=3 \quad x=-1$

$x=3$

$x=-1$

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

$\underbrace{x^2-2x+1} = 3+1$

$\sqrt{(x-1)^2} = \sqrt{4}$

$x-1 = \pm 2$

$x-1=2 \qquad x-1=-2$
$\qquad\qquad\quad\ \ +1 \quad +1$

$x=3 \qquad x=-1$

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 $x=-1$

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

$$\sqrt{-2+3}$$

$$\sqrt{1}$$

$$1 \neq -1$$

check $x=3$

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

$$\sqrt{6+3}$$

$$\sqrt{9}$$

$$3 = 3 \checkmark$$

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

check $x=-1$

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

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

$$1 \neq -1$$

$x=-1$ is extraneous

check $x=3$

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

$$\sqrt{9} = 3$$

$$3 = 3$$

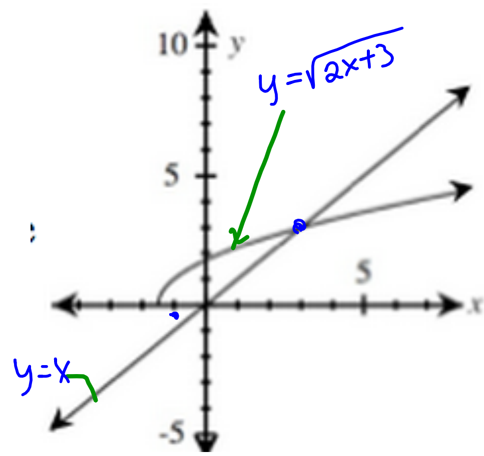
✓

$x=3$ is a solution

Validate Graphically

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

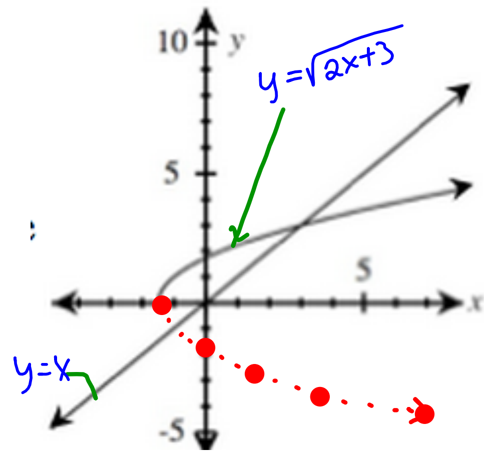
$$\underbrace{\sqrt{2x+3}}_{Y_1} = \underbrace{x}_{Y_2}$$



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

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

a

what are the solutions?

How did you prove they are solutions?

$x=0$ $x=4$

$x = 0$

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

$0 + 1$

$1 = 1$ ✓

$x = 4$

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

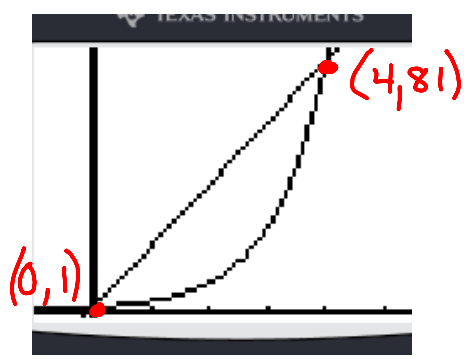
$80 + 1$

$81 = 81$ ✓

(b) Are the solutions a single number?

or

or be the coordinates of a point?



$20x + 1 = 3^x$

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

$x = 0$ $x = 4$

© START AGain

$20x + 1 = 3^x$

$20x = 3^x - 1$

$x = 0$ $x = 4$

B.B.

See your
Test

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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