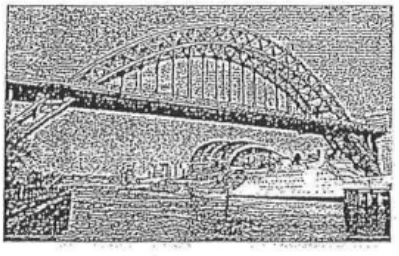
HW Tally ⇒

Create Mathematical Model of a Bridge

A parabolically arched bridge is constructed to span a river that is 50 feet wide. The highest point of the bridge is 30 feet above the road level. Find the equation of a parabola that could model this bridge.



The road level of the bridge is 40 feet above the water.

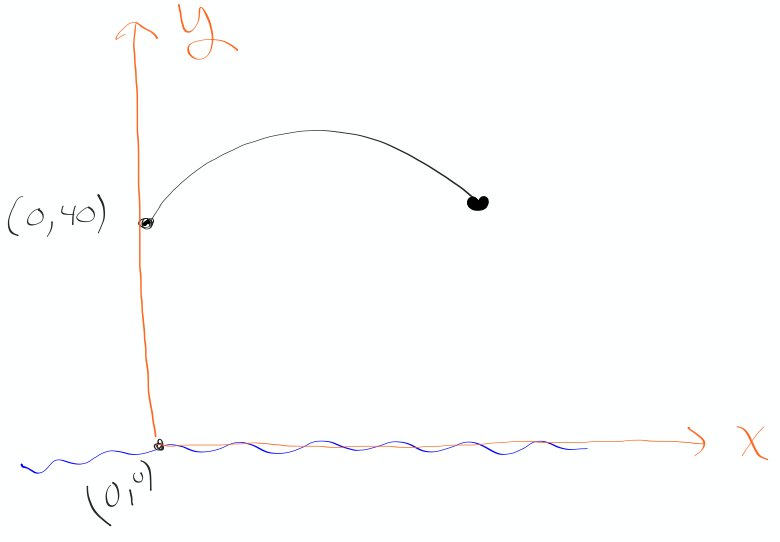
Set up your model so that the start of the bridge is at the point (0,40) which is 40 feet above the water

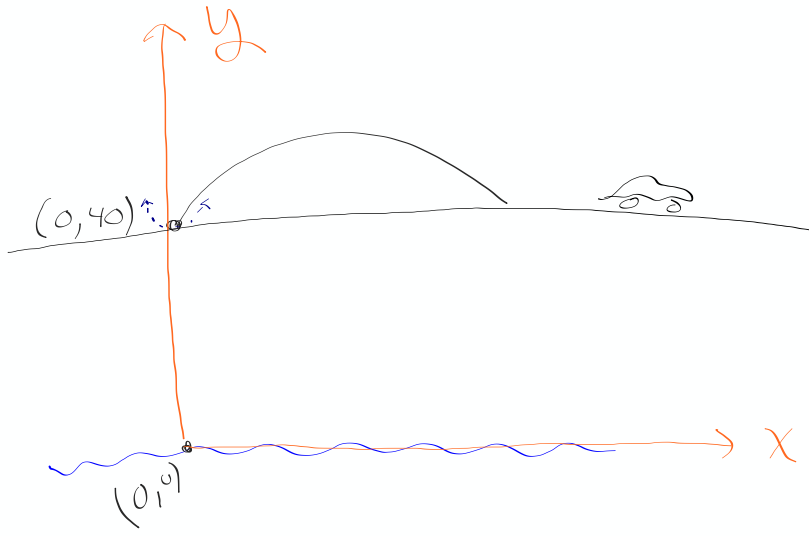
Pick Up the Warm Up

✓ label both axes

✓ label all important points with their coordinates

(,)





HW Questions

128a

$y = 7 + 2x^2 + 4x - 5$

$y = 2x^2 + 4x + 2$

y-int (set $x=0$)

X-intercept

set $y=0$

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

129

$3y - 4x = -1$

$9y + 2x = 4$ ×2

$3y - 4x = -1$

$18y + 4x = 8$

2-127

$(2,3)$ vertex $(0,0)$

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

So one possibility would be

$y = (x-2)^2 + 3$

other possibilities $y = 2(x-2)^2 + 3$, $y = -\frac{3}{4}(x-2)^2 + 3$

129

$3y - 4x = -1 \rightarrow 3y - 4x = -1$

$9y + 2x = 4 \rightarrow +\ 18y + 4x = 8$

12-9

$3y - 4x = -1$

$21y = 7$

$2(9y) + 2(2x) = (4)^2$

$y = \frac{7}{21} = \frac{1}{3}$

$3y - 4x = -1$

$+18y + 4x = 8$

$3\left(\frac{1}{3}\right) - 4x = -1$

$1 - 4x = -1$

$-1 \quad -1$

$-4x = -2$

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

12-128 a) $y = 7 + 2x^2 + 4x - 5$

$y = 2x^2 + 4x + 2$ → y-intercept $f(0) =$ $(0, 2)$

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

$0 = 2(x^2 + 2x + 1)$

$0 = 2(\quad)(\quad)$

$0 = 2(x+1)(x+1)$

Z.P.P.

$x + 1 = 0 \quad x + 1 = 0$

$x = -1$ → x-intercept only is $(-1, 0)$ ←

this must also be the vertex

can factor or use quadratic formula

	x	1
x	x^2	x
1	x	1

x^2, x, x, $2x$

graphing form $y = 2(x+1)^2 + 0$

a) $y = 7 + 2x^2 + 4x - 5$

$y = 2x^2 + 4x + 2$ → y-intercept $+(0)-$

$(0, 2)$

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

$0 = 2(x^2 + 2x + 1)$

$0 = 2(\quad)(\quad)$

$0 = 2(x+1)(x+1)$

↓ Z.P.P. ↓

$x + 1 = 0 \quad x + 1 = 0$

$x = -1$ → x-intercept is $(-1, 0)$ only

this must also be the vertex

can factor or use quadratic formula

	x	1
x	x^2	x
1	x	1

x^2, x, x, $2x$

graphing form $y = 2(x+1)^2 + 0$

2-129

$3y - 4x = -1$

$9y + 2x = 4$

a) both linear so parent of each is: $y = x$ ✓✓

b) $3y - 4x = -1$

$2(9y) + 2(2x) = 2(4)$

$3y - 4x = -1$

$+ \quad 18y + 4x = 8$

$21y = 7$

so $y = \frac{7}{21} = \frac{1}{3}$

$3y - 4x = -1$ $\quad 3(\frac{1}{3}) - 4x = -1$

$1 - 4x = -1$

$-4x = -2$

$x = \frac{2}{4} = \frac{1}{2}$

$(\frac{1}{2}, \frac{1}{3})$

c) the two graphs must intersect at $\left(\frac{1}{2}, \frac{1}{3}\right)$

d) The solution to the system is the point of intersection of the two lines.

2-130 a) 10, 2.5, .625,

multiplier is $\frac{2.5}{10} = \frac{1}{4}$

$t(n) = 40(.25)^n$ or $t(n) = 10(.25)^{n-1}$

b) $-2, -8, -14 \ldots$

difference is -6

$t(n) = -6n + 4$ or

$t(n) = -6(n-1) - 2$

2-131

a) $y = |x-4|-2$

$y = a|x-h|+k$

↓

Vertex $(4,-2)$

domain $-\infty < x < \infty$

range: $y \geq -2$

(or $2 \leq y < \infty$)

y-intercept

$y = |0-4|-2$

$= |-4|-2$

$= 4-2 = 2$

→ $(0,2)$

x-intercept(s)

$0 = |x-4|-2$

$2 = |x-4|$

reverse

$|x-4| = 2$

$x-4=2$ $\quad x-4=-2$

$x=6$ and $x=2$

$(2,0)$

$(6,0)$

2-139

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

$y + 12.25 = x^2 + 3.5x + 3.5x + 12.25 - 8$

	x	3.5
x	x^2	$3.5x$
3.5	$3.5x$	12.25

$y + 12.25 = (x+3.5)^2 - 8$

$y = (x+3.5)^2 - 20.25$

2-146 Find Parabola, vertex (3,5) contains (0,0)

2-146 Find Parabola, vertex (3,5) contains (0,0)

a) $y = a(x-3)^2 + 5$ (0,0)

$0 = a(0-3)^2 + 5$

$0 = a(-3)^2 + 5$

$0 = 9a + 5$

$a = -\frac{5}{9}$

$y = a(x-h)^2 + 5$

2-166 $y = x^2 - 5x + 7$

$y = x^2 - 2.5x + 7$ (−2.5x)

$y = x^2 - 2.5x + 7 - 6.25$ (x, −2.5; −2.5x, 6.25)

$y = (x-2.5)^2 + .75$ → Vertex (2.5, 0.75)

Before the Test Tomorrow

turn in Ch. 2 HW packet which will include

Ch. 2 Review - Part 1 (handout)

8 assignments → 32

Agenda (to Review)

✓ (1) ~~Pairs~~ - Modeling Problem

(2) Ch. 2 Review Part 1
- hopefully you can finish this in class
- check your answers
- Staple in your HW packet ← BB

(3) Ch. Review - Part 2
- You won't be turning this in, but be smart.... do it and check answers

Start

Ch. 2 Review - Part 1

- Check answers as you work
- Attach to HW packet when finished

When finished - Start Part 2 →

Ch. 2 Review Part 2

2.... 147, 170-171, 174, 175a,

177ab, 178-179, 181

answers (not solutions) are in your book for all but 147

I hope to post solutions for the rest

Ch. 2 Review - Part I Name _____ Per. __

① Write a transformation equation, T(x), for each situation

a) $y = \sqrt{x}$ after it has been translated 2 left, 5 down, and compressed vertically by 0.2 _____

b) $y = 5^x$ after it has been translated 16 right, 3 down, and stretched vertically by 4. _____

c) $y = \frac{1}{x}$ after it has been translated down 100 and 200 up.

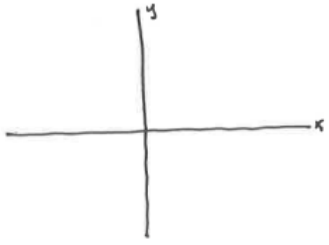
② What is the domain of $y = \frac{1}{x-4}$? _____ range _____

③ Factor the quadratic expression (not solve anything. Just factor). $10x^2 + 11x - 6$

(4) Triangulum (M33) wants to find the exponential function that passes through the points $(2, 75.6)$ and $(6, 97977.6)$. Assuming that the graph has an asymptote at $y = 0$, what is the equation of the function? *Show all of your work!*

(5) Convert to graphing form $[y = x^2 + 2x - 15]$
(Practice both methods .... Completing the square and by Averaging the x-intercepts

(6) Sketch $y = \frac{1}{x+4} + 5$. Then specify any asymptotes and their equations. Use "HA" for horizontal and VA for vertical



(7) Solve the system of linear equations

$4x - y = -13$
$3x + 2y = 4$