Alg. 2 Warm Up # 2-5

Solve:

1) $-3(x + 8) = 8 - (4 - 5x)$

2) $\frac{x + 1}{6} = \frac{1}{x}$

3) $6x - 8 = x^2$

4) $7 - 5(2x + 3) = 8 - (x - 2)$

Classwork: pink WS

1-55. GENERALIZING

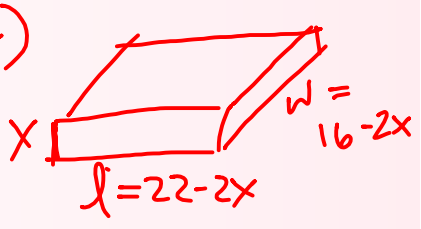
Now you will generalize your results. Generalizing is an important mathematical process. A common way to generalize is to write an equation using algebra.

a. Draw a diagram of one of your boxes. Since this shape is being used to generalize, you want it to represent a relationship between *any* possible input and its output. Therefore, instead of labeling the height with a number, label the height of this box x.

b. Work with your team to calculate the volume (or y-value) for a height of x. It may help you to remember how you calculated the volume when the height was a number and use the same strategy for your new input of x.

$h = x$ $\quad l = 22 - 2x$ $\quad w = 16 - 2x$

$V = x(22 - 2x)(16 - 2x)$



1-57. What graph do you get when you use the graphing calculator to draw the graph of your equation? Explain the relationship between this and the graph you made on ~~your own paper~~. problem #53

$$V = x(22 - 2x)(16 - 2x)$$

distribute to expand...

enter you equation into [y =]

$$V = 4x^3 - 76x^2 + 352x$$

1-57. What graph do you get when you use the graphing calculator to draw the graph of your equation? Explain the relationship between this and the graph you made on your own paper.

$$V = x(22 - 2x)(16 - 2x)$$

$$f(x) = 4x^3 - 76x^2 + 352x$$

window

x-min: -5
x-max: 15
x-scl: 1

y-min: -300
y-max: 600
y-scl: 100

Turn in:

Classwork Week 2

Warm up on top
1- # 26 ---> 30
1- # 41 ---> 44
Pink 1- # 53, 55 - 57

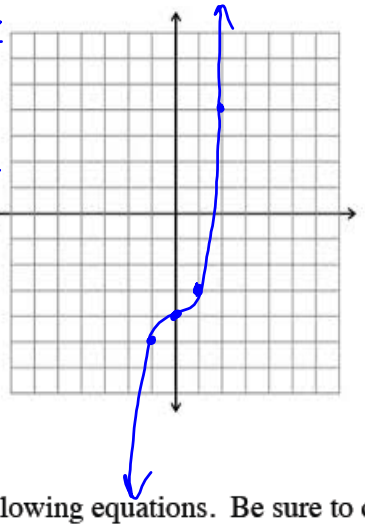
HW Questions:

Preview

1-59. Make a table and graph for $h(x) = x^3 - 4$. Find the domain, range, and intercepts.

x	y
-2	-12
-1	-5
0	-4
1	-3
2	4
3	23

$0 = x^3 - 4$
$4 = x^3$
$\sqrt[3]{4} = x$



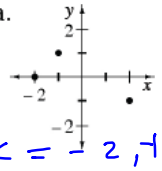
d: $x = \mathbb{R}$
r: $y = \mathbb{R}$
x-int
$(\sqrt[3]{4}, 0)$
y-int
$(0, -4)$

1-64. Solve each of the following equations. Be sure to check your answers.

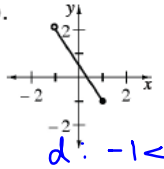
a. $\frac{6}{x} = x - 1$

b. $\frac{9}{x} = x$

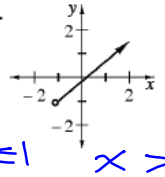
1-68. Find the domain and the range for each of the following functions.

a. 

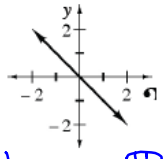
d: $x = -2, -1, 2$
r: $y = -1, 0, 1$

b. 

d: $-1 < x \leq 1$
r: $-1 \leq y < 2$

c. 

$x > -1$
$y > -1$

d. 

$x = \mathbb{R}$
$y = \mathbb{R}$

1-69. Write one or two equations to help you solve the following problem.

A rectangle's length is four times its width. The sum of its two adjacent sides is 22 cm. How long is each side?

$l = 4W$

$4W + W = 22$

$5W = 22$

$W = \frac{22}{5}$ cm

1-71. Consider $f(x) = x^2 - 2x + 6$ and $g(x) = 2x + 11$.

a. Use any method to find the points of intersection of $f(x)$ and $g(x)$.

b. Calculate $f(x) + g(x)$.

c. Calculate $f(x) - g(x)$.

$x^2 - 2x + 6 = 2x + 11$
$-2x - 11 \quad -2x - 11$

$x^2 - 4x - 5 = 0$
$(x - 5)(x + 1) = 0$
$x = 5, -1$

$(5, \quad)$
$(-1, \quad)$

Plug into one of the original equations.

Methods

Algebra: = Values Method

or

Graphing

① Use the calculate function to find intersections on graphing calculator

② Use the table and look for same outputs.

1-76. What value of x allows you to find the y-intercept? Where does the graph of each equation below cross the y-axis? Write each answer as an ordered pair.

$x=0$

a. $y=3x+6$

b. $x=5y-10$

c. $y=x^2$

d. $y=2x^2-4$

e. $y=(x-5)^2$

f. $y=3x^3-2x^2+13$

$0=5y-10$

$10=5y$

$y=2$

$y=3(0)^3-2(0)^2+13$ → $(0,2)$

$y=13$ → $(0,13)$

e) $y=(0-5)^2$

$=(-5)^2$

$=25$

$(0,25)$

CP: 1-78, 79 (Green, revised) p. 33

1.2.2 How can I investigate a function?

Function Investigation

What does it mean to describe a function completely? In this lesson you will graph and investigate a family of functions with equations of the form $f(x)=\frac{1}{x-h}$. As you work with your team, keep the multiple representations of functions in mind.

1-78. INVESTIGATING A FUNCTION, Part One

Your team will investigate functions of the form $f(x)=\frac{1}{x-h}$, where h can be any number.

As a team, choose a value for h between –10 and 10. For example, if $h=7$, then $f(x)=\frac{1}{x-7}$.

Your Task: On a piece of graph paper, write down the function you get when you use your value for h. Then make an $x \to y$ table and draw a complete graph of your function. Is there any more information you need to be sure that you can see the entire shape of your graph? Discuss this question with your team and add any new information you think is necessary.

Discussion Points

How can we be sure that our graph is complete?

How can we get output values that are greater than 1 or less than –1?

Further Guidance

1-79. This function is different from others you have seen in the past. To get a complete graph, you will need to make sure your table includes enough information.

Let h=3 and use x-values from -2 to 8.

a. Make an $x \to y$ table with integer x-values from 5 less than your value of h to 5 more than your value of h. For example, if you are working with $h = 7$, you would begin your table at $x = 2$ and end it at $x = 12$. What do you notice about all of your y-values?

b. Is there any x-value that has no y-value for your function? Why does this make sense?

c. Plot all of the points that you have in your table so far.

d. Now you will need to add more values to your table to see what is happening to your function as your input values get close to your value of h. Choose eight input values that are very close to your value of h and on either side of h. For example, if you are working with $h = 7$, you might choose input values such as 6.5, 6.7, 6.9, 6.99, 7.01, 7.1, 7.3, and 7.5. For each new input value, calculate the corresponding output and add the new point to your graph.

e. When you have enough points to be sure that you know the shape of your graph, sketch the curve.

Further Guidance section ends here.

Back side: Investigating Hyperbolas

$$y = \frac{1}{x - h}$$

Remember, to completely describe means:

Shape: curved or straight.

Does it have a special name? { Line, Parabola, Hyperbola, Square Root, Step }

Special points: x & y-intercepts

Vertex or starting point

Continuous, not continuous or discrete (just points)

Domain & Range

Symmetry

Asymptotes

HW: 1- # 84 ---> 91

(Use graph paper)