7.1B Graphing Square Root Functions

Section 7.1B

Activity 1

1) Crime Scene Investigators need to know how fast a car was going when it began to slam on the brakes. Investigators use the skid distance to determine this information. An equation that might model the speed of a car given the skid distance could be

$$V = 4\sqrt{d-3}+5$$

4√-1-3 + 5 =

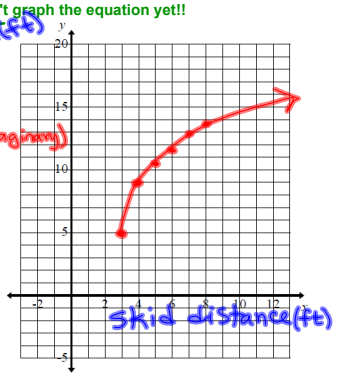
where V is the speed (miles per hour) when brakes were applied and d is the skid distance (feet).

don't graph the equation yet!!

- Fill in the table below for this equation.
- Plot your points on the graph to the right.
- Graph the equation in your calculator to check that you are correct.

d = skid distance(ft)

(d)	(V)
−1	error (imaginary)
0	error
1	error
2	error
3	5
4	9
5	10.6
6	11.9
7	13
8	13.9



a) Explain what "$d = 8$" means in the context.

The skid distance is 8ft

b) Are there restrictions on what values d can assume? Explain.

No negative values because distance can't be neg.

c) If $d = 8$, explain what "V" means in the context.

The speed of the car (was 13.9 mph) when the brakes were applied

d) Are there restrictions on what values V can assume? Explain.

No negative values because speed can't be neg.

e) State the domain and range of the function, paying attention to context.

D: x ≥ 3ft R: y ≥ 5mph

f) Does removing the context of the problem change the domain and /or range? Explain.

no... just the labels

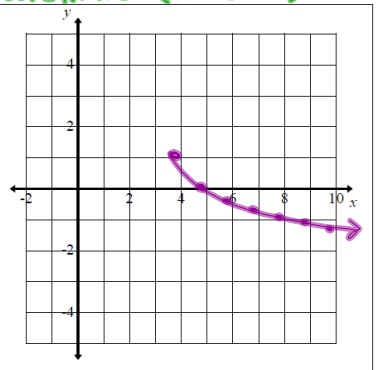
2) Use a graphing utility to help you make the graphs of the following equations. For each equation identify the significant features of the graph. Pay close attention to how the graph, equation and table of values relate to one another.

a) $y = -\sqrt{x-4}+1$

the 1st real coordinates (no error)

x	4	5	6	7	8	9	10
y	1	0	-.4	-.7	-1	-1.2	-1.4

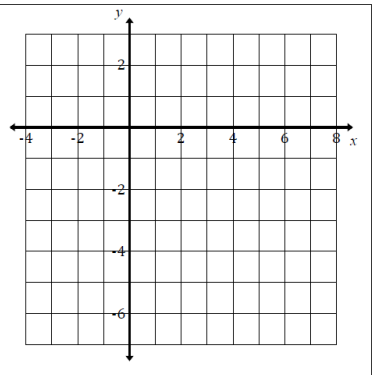
- increasing or decreasing? (Circle one) (neg. in front of √)
- Domain: x ≥ 4
- Range: y ≤ 1
- x-intercept: (5,0) x = 5
- y-intercept: none



b) $y = -\sqrt{x+3}$

x							
y							

- increasing or decreasing? (Circle one)
- Domain:
- Range:
- x-intercept:
- y-intercept:



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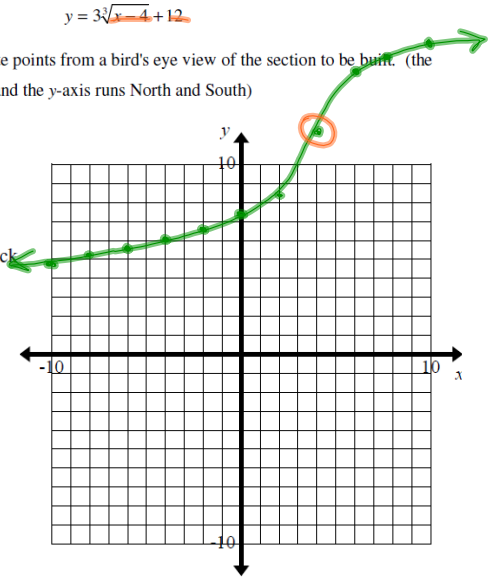
Section 7.1C

1) Designers of a new highway used the following equation to model a curve in the road:

$$y = 3\sqrt[3]{x-4}+12$$

where x and y are coordinate points from a bird's eye view of the section to be built. (the x-axis runs East and West and the y-axis runs North and South)

- Fill in the table below for this equation
- Plot your points on the graph below
- Graph the equation in your calculator to check that you are correct.



x	y
−10	4.8
−8	5.1
−6	5.5
−4	6
−2	6.5
0	7.2
2	8.2
4	12
6	15.8
8	16.8
10	17.5

inflection point →

a) State the domain and range of the function, paying attention to context.

D: ℝ R: ℝ

b) Does removing the context of the problem change the domain and /or range? Explain.

Nope . . . there were no restrictions

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2) Look at the following function in its different forms.

$$y = \sqrt[3]{x+3}+6$$

a) Are there any domain restrictions?

NO

How do you know?

table shows both large pos. & neg. values

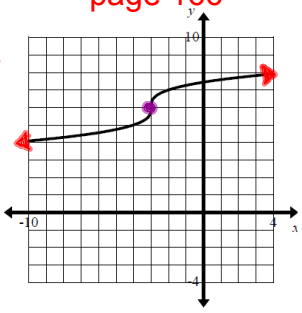
b) Are there any range restrictions?

NO

How do you know?

arrows on graph going both up & down

x	y
−30	3
−11	4
−4	5
−3	6
−2	7
5	8
24	9



c) What is the point of inflection?

(-3, 6)

d) How can we tell what the point of inflection is by looking at the equation?

graph

this is the turning point OR middle point

switch the x # under ∛ and use y # after ∛

e) Is the graph increasing or decreasing? How can you tell from the equation?

the # in front of ∛ is pos. (a = 1)

3) Use the given information to explain what the domain and range for each function given below. Explain your reasoning.

a) Equation

$$y = \sqrt[3]{x+9}-4$$

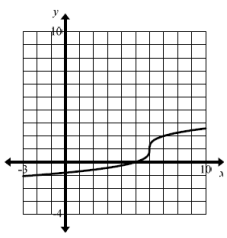
Increasing or Decreasing?
(Circle one)

Domain_____

Range_____

Point of inflection_____

b) Graph



Increasing or Decreasing?
(Circle one)

Domain_____

Range_____

Point of inflection_____

4) When given the function $f(x) = \sqrt[3]{x-2}+5$, Mia says that the point of inflection is $(-2,5)$ and Dylan says the point of inflection is $(5,2)$. Who is correct? What could you say to help them understand their mistake?

HOMEWORK:

$y = a\sqrt{x - m} + n$

#1, 7, 8, 18 (P-139)

#1, 6, 7, 19 (P-143)

$y = a\sqrt[3]{x - m} + n$