Name Key HW#_____ Date_____

Unit 11- Miscellaneous Topics Review

1. Some banks charge a fee on savings accounts that are left inactive for an extended period of time. The equation $y = 5000(0.98)^x$ represents the value, y, of one account that was left inactive for a period of x years. What is the y-intercept of this equation and what does it represent?

1) 0.98, the percent of money in the account initially

2) 0.98, the percent of money in the account after x years

3) 5000, the amount of money in the account initially

4) 5000, the amount of money in the account after x years

$y = ab^x$ → common ratio; y-int

2. Rowan has \$50 in a savings jar and is putting in \$5 every week. Jonah has \$10 in his own jar and is putting in \$15 every week. Each of them plots his progress on a graph with time on the horizontal axis and amount in the jar on the vertical axis. Which statement about their graphs is true?

1) Rowan's graph has a steeper slope than Jonah's.

2) Rowan's graph always lies above Jonah's.

3) Jonah's graph has a steeper slope than Rowan's.

4) Jonah's graph always lies above Rowan's.

Rowan $y = 5x + 50$ $m = \frac{5}{1}$

Jonah $y = 15x + 10$ $m = \frac{15}{1}$

3. If the graph shown below is a transformation of the parent function $y = \sqrt[3]{x}$, which choice is a possible equation for this function?

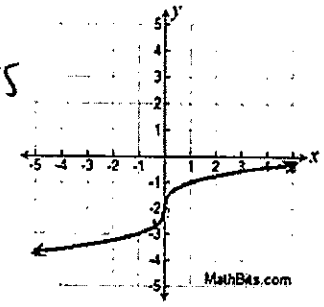
1) $y = \sqrt[3]{x} + 2$

2) $y = \sqrt[3]{x} - 2$

3) $y = \sqrt[3]{x+2}$

4) $y = \sqrt[3]{x-2}$

down 2 units



4. Function $h(x)$ is a transformation of function $f(x)$. The function $h(x)$ can be expressed as:

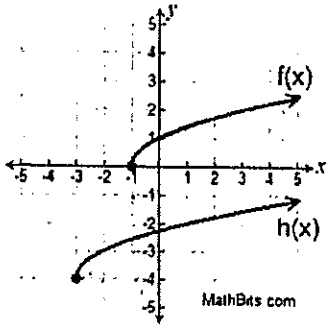
1) $h(x) = f(x) - 4$

2) $h(x) = f(x - 2) - 4$

3) $h(x) = f(x + 2) - 4$

4) $h(x) = f(x - 3) - 4$

down 4
left 2



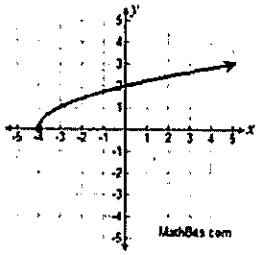
5. If the graph shown below is a transformation of the parent function $y = \sqrt{x}$, what is the domain of this function?

1) $(-4,\infty)$

2) $(0,\infty)$

3) $[-4,\infty)$

4) $[4,\infty)$



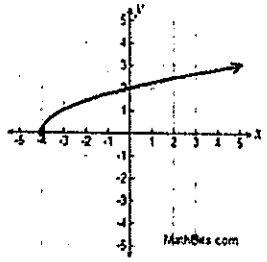
6. If the graph shown below is a transformation of the parent function $y = \sqrt{x}$ What is the range of this function?

1) $(-\infty,\infty)$

2) $(-\infty, 0)$

3) $[0,\infty)$

4) $[-\infty,\infty)$



7. The table below shows the year and the number of households in a building that had high-speed broadband internet access. For which interval of time was the average rate of change the *smallest*?

1) 2002 - 2004

2) 2003 - 2005

3) 2004 - 2006

4) 2005 – 2007

Number of Households	11	16	23	33	42	47
Year	2002	2003	2004	2005	2006	2007

$\frac{\Delta y}{\Delta x}$ $\frac{y_2 - y_1}{x_2 - x_1}$ $\frac{\text{y}}{\text{x}}$ $\frac{2}{23-11}$

① $\frac{23-11}{2} = 6$ ② $\frac{33-16}{2} = 8.5$ ③ $\frac{42-23}{2} = 9.5$ ④ $\frac{47-33}{2} = 7$

8. Multiply: $(x+3)(x^2+3x+4)$

box method or triple distribute

	x^2	$+3x$	$+4$
x	x^3	$3x^2$	$4x$
$+3$	$3x^2$	$9x$	12

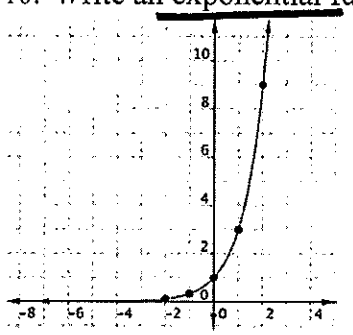
$x^3+6x^2+13x+12$

9. Simplify $(x+5)(2x^2+4x-7)$

	$2x^2$	$+4x$	-7
x	$2x^3$	$4x^2$	$-7x$
$+5$	$10x^2$	$20x$	-35

$2x^3+14x^2+13x-35$

10. Write an exponential function based on the graph shown below. Justify your answer.



x	y
0	1
1	3
2	9

use stat key!

$y=ab^x$

$y=1(3)^x$

$y=3^x$

Directions for #'s11- 13:

(a) Identify which type of function best models the data in each table. Justify your answer.

(b) Using your calculator, write an equation to model the data. Stat Key!

11.

x	y	
−4	32	
−3	16	$\cdot\frac{1}{2}$
−2	8	$\cdot\frac{1}{2}$
−1	4	$\cdot\frac{1}{2}$
0	2	$\cdot\frac{1}{2}$

(a) Exponential Decay - common ratio

(b) $y=ab^x$ $y=2(.5)^x$ 0 in calc

12.

x	y	
0	−7	+6
1	−1	+6
2	5	+6
3	11	+6
4	17	+6

(a) Linear - common dif

(b) $y=ax+b$ $y=6x-7$ 4 in calc

13.

x	y		
0	−12	+1	+2
1	−11	+3	
2	−8	+5	+2
3	−3	+7	
4	4		

(a) Quadratic 2nd set of differences is constant

(b) $y=ax^2+bx+c$ $y=x^2-12$ 5 in calc

14. Gregory plans to purchase a video game player. He has $500 in his savings account and plans to save $20 per week from his allowance until he has enough money to buy the player. He needs to figure out how long it will take. *What type* of function should he use to model this problem?

Linear $m=20$ $b=500$ $y=20x+500$

15. One of the highlights in a car show event is a car driving up a ramp and flying over approximately five cars placed end-to-end. The ramp is 8 ft. at its highest point, and there is an upward speed of 88 ft/sec before it leaves the top of the ramp. *What type* of function can best model the height, h, in feet, of the car t seconds after leaving the end of the ramp?

Quadratic

16. Margie got $1,000 from her grandmother to start her college fund. She is opening a new savings account and finds out that her bank offers a 2% annual interest rate, compounded monthly. *What type* of function would best represent the amount of money in Margie's account?

Exponential

17. Greg plans to purchase a video game player. He has $500 in his savings account, and plans to save $35 per week from his allowance until he has enough money to buy the player.

a. Write an equation that models this situation.

$Y = 35x + 500$

b. How much money will Greg have saved in 10 weeks? $x = 10$

$Y = 35(10) + 500$

$Y = 850$

c. If the player costs $1,200, how many weeks will it take Greg to save up for it?

$Y = 1200$

$1200 = 35x + 500$

$-500 \quad -500$

$\frac{700}{35} = \frac{35x}{35}$

$x = 20$ weeks

18. Eisenhower Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is tripled in length, while the other side is decreased by two meters. The new rectangular garden will have an area that is 30% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden. Explain how your equation models the situation.
****EXTRA CREDIT: Determine the area, in square meters, of the new rectangular garden.**

Original

x

$A = x^2$ x

New

$3x$

$A = 1.3x^2$ $x - 2$

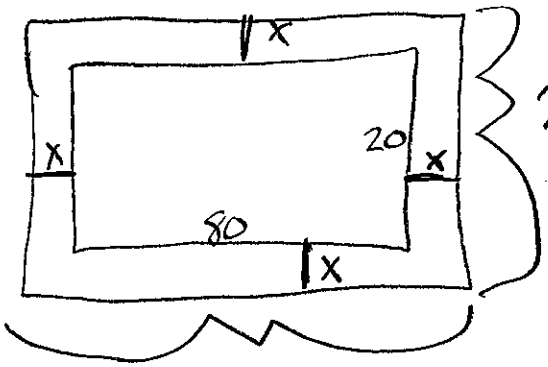
100% area + 30% more = 130% = 1.3

$l \cdot w = A$

$3x(x - 2) = 1.3x^2$

19. A cement walkway of uniform width has been built around an in-ground rectangular pool. The area of the walkway is 2,944 square feet. The pool itself is 80 feet long by 20 feet wide. What is the width of the walkway?

+ pool



$(2x+20)(2x+80)=2944$

$4x^2+160x+40x+1600=2944$

$4x^2+200x+1600=2944$

$-2944 \quad -2944$

$4x^2+200x-1344=0$

$4(x^2+50x-336)=0$

$4 \mid (x+56)(x-6)=0$

$4 \neq 0 \mid x+56=0 \mid x-6=0$

$x=-56 \quad x=6$

Width = 6 ft.

20. Buying a house is expensive, especially when there is a plumbing issue. Merrick Plumbing charges $80 for a plumber to come to your house. They then charge $60 per hour. Bellmore Plumbing charges $100 for a plumber to come to your house plus $50 per hour.

a) Write a function to represent the cost of having a repair person from Merrick Plumbing and Bellmore Plumbing to come to your house and work for x hours.

Merrick: $y = 60x + 80$

Bellmore: $y = 50x + 100$

b) If you need 5 hours of work done, which company would it be cheaper to use? Justify your answer.

$y = 60(5) + 80$

$y = \$380$

$y = 50(5) + 100$

$y = \$350$

Bellmore plumbing

c) If you paid Bellmore Plumbing $400, how many hours of work did they do at your house?

$y = 400$

$400 = 50x + 100$

$-100 \quad -100$

$\frac{300}{50} = \frac{50x}{50}$

$x = 6$ hrs

d) For how many hours of work would the cost for using either company be the same? Show how you arrived at your answer.

$60x + 80 = 50x + 100$

$-50x \quad -50x$

$10x + 80 = 100$

$-80 \quad -80$

$10x = 20$

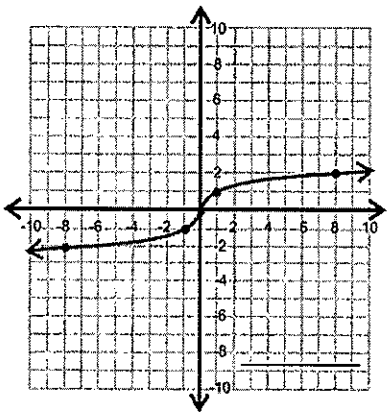
$\frac{10x}{10} = \frac{20}{10}$

$x = 2$ hrs

X	Y_1	Y_2
1	140	150
2	200	200
3	260	250

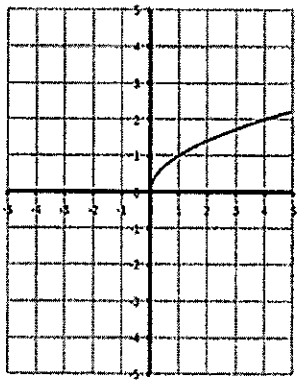
21. Use the word-box below to write the name of the graph on the line below it.

Cubic	**Linear**	**Quadratic**	**Exponential**
Absolute Value	**Cubed Root**	**Square Root**	



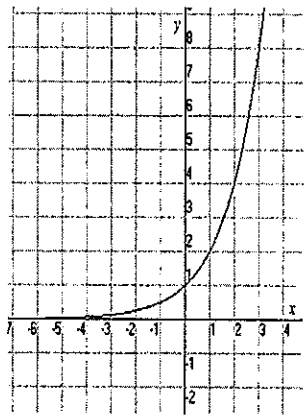
Cubed root

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



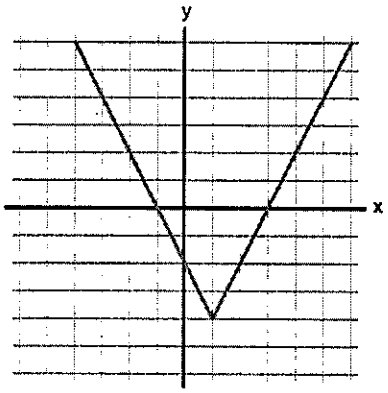
Square Root

$y = \sqrt{x}$



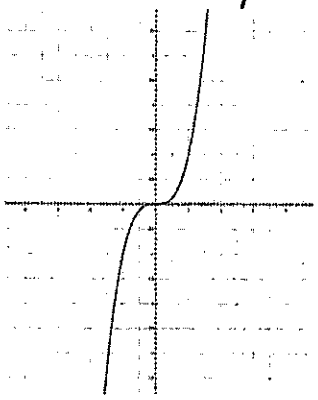
Exponential

$y = 2^x$



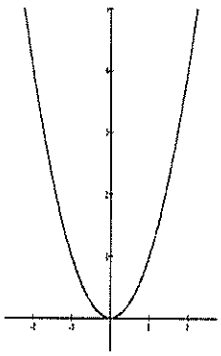
Absolute Value

$y = |x|$



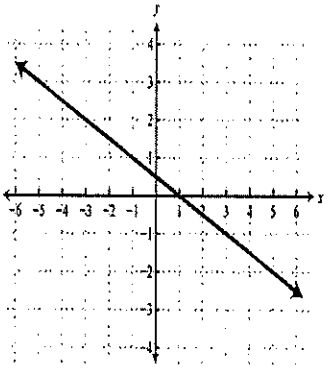
Cubic

$y = x^3$



Quadratic

$y = x^2$



Linear

$y = x$