

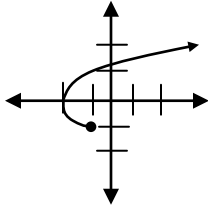
F.S.T.
Chapter 2 Review

Name _____
Block ____ **Date** _____

Non-Calculator!

For each relation, state a.) the domain, b.) the range, and c.) tell whether the relation is a function or not.

1.)



2.) $y = -|7x - 1|$

3.) $R = \{(0, -2), (-2, 2), (-1, 2), (5, -2)\}$

4.) Use the table below listing the heights and shoe sizes for 13 men in an office.

Ht	70	73	68	69	72	68	74	71	69	66	71	70	73
Size	10.5	9.5	7	10	10	9	12	12	9	8.5	9	10	11.5

- Draw a scatter plot of the data and a line of fit.
- Use the ordered pairs (68, 7) and (71, 12) to find the equation of your line.
- Use your equation to predict the shoe size of a man 72 inches tall. Then find the error in your prediction.

5.) Sketch the graph of $f(x) = 3(0.5)^x$. Identify whether this function shows exponential growth or exponential decay.

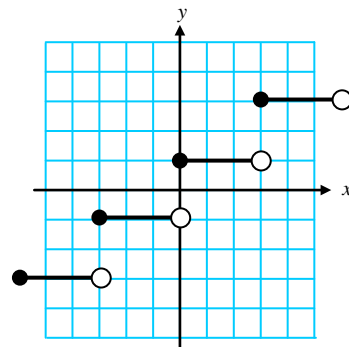
6.) Find an exponential model that passes through the points (2, 20) and (4, 80).

7.) Given the quadratic function: $f(x) = -2x^2 + 6x + 20$

- Find the y-intercept.
- Find the x-intercept(s).
- Find the vertex.
- Tell whether the vertex is a maximum or a minimum.

8.) Given the graph of the step function shown at the right:

- State the domain and range of the function.
- Name 3 values of x that are points of discontinuity.
- Write an equation for the graph.



Calculator!

1.) Evaluate each of the following for $f(x) = 3x^2 - 7$.

- $f(2)$
- $f(-4)$

2.) Use the table below. It gives the percent of the U.S. population who had completed at least four years of high school for selected years. Let x = the number of years since 1900.

Year	1910	1920	1930	1940	1950	1960	1970	1980	1990	1994
Percent	13.5	16.4	19.1	24.5	34.3	41.4	55.2	68.6	77.6	80.9

- Find an equation for the line of best fit for the data above.
- Use your line of best fit to predict the percent of US population for 1985.
- For part b, is this interpolation or extrapolation. Explain your answer.
- Find the center of gravity.
- Show that the center of gravity is on the line of best fit.

3.) The Population of Tanzania in 1995 was about 28.5 million, with an annual growth rate of 3.0%.

- Give a model for the population n years after 1995.
- Predict the population in 2005.
- Predict when the population doubles.

4.) A *wind chill* number is an index of how cold it feels when the wind is blowing on a cold day. The following data give the wind chills for actual temperatures of 30 degrees F at various wind speeds. Wind speeds greater than 45 mph have little additional chilling effect.

Wind Speed (mph)	5	10	15	20	25	30	35	40	45
Wind Chill (F)	27	16	9	4	1	-2	-4	-5	-6

- Identify the independent and dependent variables.
- Use your calculator to find the best quadratic model.
- What is the minimum number of data values needed to find a quadratic model?

5.) A toy rocket is launched off a cliff over the sea from a height of 310Ft with an initial velocity of 110ft/sec. Use Newton's formula: $h = -16t^2 + v_0t + h_0$.

- Write a model that gives the rockets height h feet above sea level as a function of time t seconds after it is launched.
- How long after the rocket is launched will it splash down?

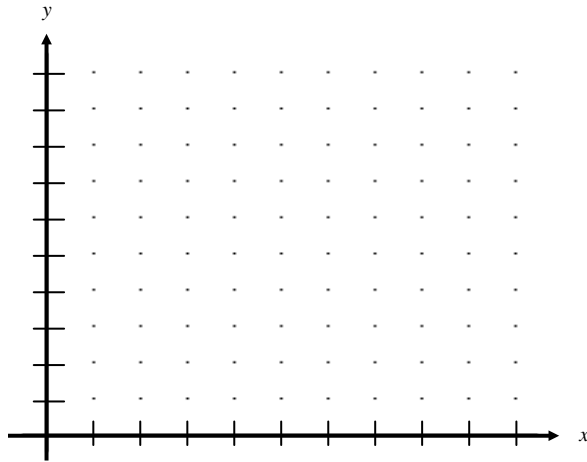
6.) A cereal manufacturer offers a free pound of bananas for every 6 coupons cut from their boxes of breakfast cereal. If each box has one coupon, write a formula for p, the number of pounds of bananas given away, as a function of b, the number of boxes of cereal.

7.) Evaluate: $\lceil 2.5 - 3 \lfloor 2.1 - 17 \rfloor \rceil$

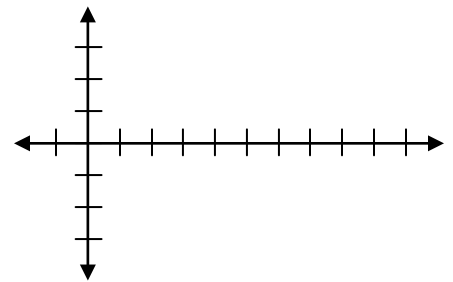
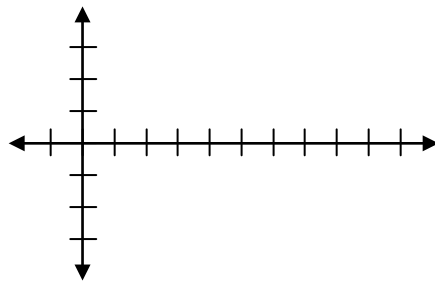
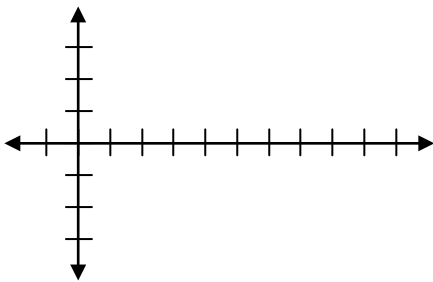
8.) The data at the right appear in the *Statistical Abstract of the United States, 1995*.

- Make a scatterplot of the data.
- Find a linear model, an exponential model, and a quadratic model for these data.
- Which model do you think is most appropriate? Explain.
- Use the model you chose to predict the number of households with VCR's in 1997.

VCRs in U.S. Households	
Year	Millions
1980	1
1985	18
1988	51
1989	68
1990	63
1991	67
1992	69
1993	72
1994	74



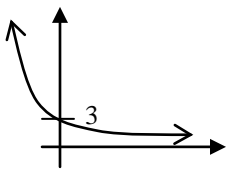
Years (since 1980)	VCRs (millions)	Linear Predicted	Linear Error	Exponential Predicted	Exponential Error	Quadratic Predicted	Quadratic Error
0	1	1.443		2.479		-3.270	
5	18	30.102		10.733		32.819	
8	51	47.298		25.858		50.582	
9	68	53.03		34.664		55.854	
10	63	58.762		46.469		60.803	
11	67	64.493		62.295		65.427	
12	69	70.225		83.51		69.727	
13	72	75.957		111.951		73.703	
14	74	81.689		150.077		77.355	



Chapter 2 Review Answer Key

Non-Calculator

1. D: $x \geq -2$; R: $y \geq -1$
Not a function
2. D: $x = \mathbb{R}$; R: $y \leq 0$
Function
3. D: $x=0, -2, -1, 5$; R: $y = -2, 2$
Function
- 4.a. graphs vary ... be sure to draw the line!
- b. $y = \frac{5}{3}x - 106\frac{1}{3}$... OR ... $y - 7 = \frac{5}{3}(x - 68)$...
- OR $y - 12 = \frac{5}{3}(x - 71)$

- c. size 14, error = -4
5.  Decay

6. $y = 5(2)^x$
- 7.a. 20
- b. 5, -2
- c. $\left(\frac{3}{2}, \frac{49}{2}\right)$
- d. Maximum
- 8.a. D: $x = \mathbb{R}$; R: $y = -3, -1, 1, 3, \dots$
- b. answers vary: $x = -3, 0, 3$
- c. $y = 2\left[\frac{x}{3}\right] + 1$

Calculator

- 1.a. 5
- b. 41
- 2.a. $y = .8630398843x - 3.799369704$
- b. 69.559
- c. interpolation, 1985 is within the given data
- d. (54.4, 43.15)
- e. $y = .8630398843(54.4) - 3.799369704 = 43.15$
- 3.a. $y = 28.5(1.03)^n$
- b. 38.3 million
- c. 23.45 years from 1995 ... ≈ 2018
- 4.a. independent = wind speed
dependent = wind chill
- b. $y = .02x^2 - 1.99x + 34.69$
- c. 3 points

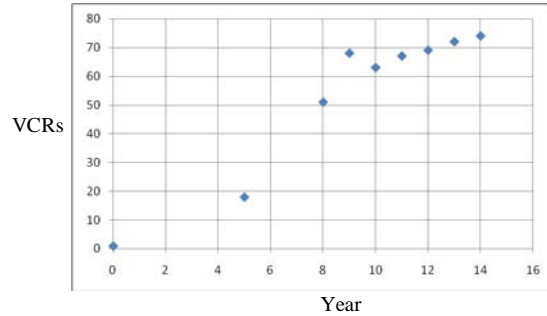
5.a. $h = -16t^2 + 110t + 310$

b. 9.02 seconds

6. $p = \left\lfloor \frac{b}{6} \right\rfloor$

7. 48

8. a.



b. linear: $y = 5.732x + 1.443$ $r = .95$

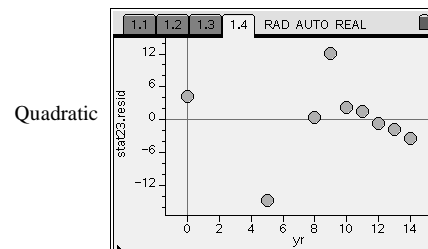
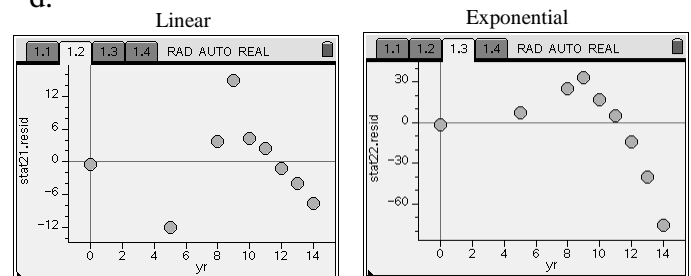
exponential: $y = 2.479(1.341)^x$

quadratic: $y = -.162x^2 + 8.028x - 3.270$

c.

Years	VCRs	Linear Error	Exp. Error	Quad. Error
0	1	-0.443	-1.479	4.27
5	18	-12.102	7.267	-14.819
8	51	3.702	25.142	0.418
9	68	14.97	33.336	12.146
10	63	4.238	16.531	2.197
11	67	2.507	4.705	1.573
12	69	-1.225	-14.510	-0.727
13	72	-3.957	-39.951	-1.703
14	74	-7.689	-76.077	-3.355

d.



- e. Quadratic is best. The graph goes closest to the scatterplot. Residuals are smallest and clustered around x-axis.
- f. 86.365 million