Test Review- Chapter 2 Sections 2.1-2.5

Test Date Wednesday 9/13 (1,3,5) Thursday 9/14 (2,4,6)

Always review ALL NOTES AND ALL HOMEWORK.

Students who score below a 70% on the test may do test corrections up to a week after the test to raise their test score to a maximum score of 70% IF all corrections are made accurately. **In order to be eligible for test corrections, you MUST turn in a completed review assignment (which is outlined below) on the test day. There are NO EXCEPTIONS. Reviews will not be accepted for this courtesy after the test has been taken. If the review is not completed prior to taking the test, then the grade earned is the grade deserved.** ALL WORK SHOULD BE DONE NEATLY ON LINED PAPER AND SHOULD BE CLEARLY LABELED. This review assignment is being given one week before the test so that you will have ample time to break it up into smaller, more manageable chunks.

The **NON CALCULATOR** portion of the test will be similar to the following problems.

Chapter 2 Review Exercises: #1-12, 13-16 describe end behavior using limits, 25-26,29-32,37-38,61-66 (See separate handout for these exercises)

The **CALCULATOR** portion of the test will be similar to the following problems.

53. **Fuel Economy** Table 2.6 shows the average U.S. fuel economy for "light duty" vehicles (passenger cars and small trucks) for several years. Let x be the number of years since 1985, so that $x = 5$ stands for 1990 and so forth.

Table 2.6 Light Duty Vehicles

Year	Fuel Economy (mpg)
1990 (5)	20.3
1995 (10)	21.1
2000 (15)	21.9
2005 (20)	22.1
2010 (25)	23.5

Source: National Transportation Statistics 2012, U.S. Department of Transportation.

(a) **Writing to Learn** Find the linear regression model for these data. What does the slope in the regression model represent?

(b) Use the linear regression model to predict the average U.S. fuel economy for light duty vehicles in the year 2015.

53)

a) x = # of yrs after 1985

$y = 0.148x + 19.56$

↓

avg fuel economy of light duty vehicles increases 0.148 mpg per year

b) $x = 30 \leftarrow 2015$

$y = 0.148(30) + 19.56$ **24 mpg**

58. **Management Planning** The Welcome Home apartment rental company has 1600 units available, of which 800 are currently rented at $300 per month. A market survey indicates that each $5 decrease in monthly rent will result in 20 new leases.

(a) Determine a function $R(x)$ that models the total rental income realized by Welcome Home, where x is the number of $5 decreases in monthly rent.

(b) Find a graph of $R(x)$ for rent levels between $175 and $300 (that is, $0 \le x \le 25$) that clearly shows a maximum for $R(x)$.

(c) What rent will yield Welcome Home the maximum monthly income?

58)

a) $R(x) = (800+20x)(300-5x)$

b) max (10, 250 000)

c) $250.00

(For more detailed work - see hw #58, 65, 67, 68 in Sec 2.1)

59. **Group Activity Beverage Business** The Sweet Drip Beverage Co. sells cans of soda pop in machines. It finds that sales average 26,000 cans per month when the cans sell for 50¢ each. For each nickel increase in the price, the sales per month drop by 1000 cans.

(a) Determine a function $R(x)$ that models the total revenue realized by Sweet Drip, where x is the number of $0.05 increases in the price of a can.

(b) Find a graph of $R(x)$ that clearly shows a maximum for $R(x)$.

(c) How much should Sweet Drip charge per can to realize the maximum revenue? What is the maximum revenue?

59)

a) $R(x) = (26000 - 1000x)(0.50 + 0.05x)$

b) Graphing calc

c) 90 cents per can

$16,200

65. **Patent Applications** Create a quadratic regression model using the data in Table 2.7, letting $x = 0$ stand for 1980, $x = 10$ for 1990, and so on. In what year does this model predict the number of patent applications to have first exceeded 350,000?

Table 2.7 U.S. Patent Applications

Year	Applications (thousands)
1980	112.4
1990	176.3
1995	228.2
2000	315.0
2005	417.5
2008	485.3
2010	520.3
2012	576.8

Source: U.S. Patent Statistics Table, U.S. Patent and Trademark Office, 2012.

65)

$y_1 \approx 0.372x^2 + 2.697x + 111.264$

$y_2 = 350$

2002 intersect At

$x \approx 22$ yrs after 1980

67. A group of female children were weighed. Their ages and weights are recorded in Table 2.8.

Table 2.8 Children's Ages and Weights

Age (months)	Weight (pounds)
19	22
21	23
24	25
27	28
29	31
31	28
34	32
38	34
43	39

(a) Draw a scatter plot of the data.

(b) Find the linear regression model.

(c) Interpret the slope of the linear regression equation.

(d) Superimpose the regression line on the scatter plot.

(e) Use the regression model to predict the weight of a 30-month-old girl.

67)

a) G.C.

b) $y \approx 0.68x + 9.01$

c) children gain about 0.68 pounds per month.

d) G.C.

e) $y \approx 0.68(30) + 9.01$

≈ 29.41 lb.

68. Table 2.9 shows the median U.S. income of women (in 2011 dollars) for selected years. Let x be the number of years since 1940.

Table 2.9 Median Income of Women in the United States (in 2011 dollars)

Year	x	Median Income ($)
1950	10	7,771
1960	20	8,380
1970	30	11,563
1980	40	12,786
1990	50	16,799
2000	60	21,000
2010	70	21,430

Source: Historical Income Tables, U.S. Census Bureau, 2012.

(a) Find the linear regression model for the data.

(b) Use it to predict the median U.S. female income in 2020.

68)

a) $y \approx 255.19x + 4039.43$

b) $x = 80$ ← year 2020

$y \approx 255.19(80) + 4039.43$

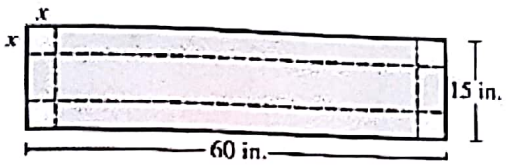
$\approx \$24,455$

66. **Volume of a Box** Dixie Packaging Co. has contracted to manufacture a box with no top that is to be made by removing squares of width x from the corners of a 15-in. by 60-in. piece of cardboard.

(a) Show that the volume of the box is modeled by $V(x) = x(60 - 2x)(15 - 2x)$.

(b) Determine x so that the volume of the box is at least 450 in.^{3}

any value of x betw. approx $x = 0.550$ in and $x = 6.786$ in.



67. **Volume of a Box** Squares of width x are removed from a 10-cm by 25-cm piece of cardboard, and the resulting edges are folded up to form a box with no top. Determine all values of x so that the volume of the resulting box is at most 175 cm^3.

$y = x(10 - 2x)(25 - 2x)$

$y = 175$

$(0, 0.929]$ and $[3.644, 5)$

1) Sally's distance D from a motion detector is given by the data in the following table.

t (sec)	D (m)	t (sec)	D (m)
0.0	3.36	4.5	3.59
0.5	2.61	5.0	4.15
1.0	1.86	5.5	3.99
1.5	1.27	6.0	3.37
2.0	0.91	6.5	2.58
2.5	1.14	7.0	1.93
3.0	1.69	7.5	1.25
3.5	2.37	8.0	0.67
4.0	3.01		

a) Find a cubic regression model, and graph it together with a scatter plot of the data

b) Describe Sally's motion.

c) Use the cubic regression model to estimate when Sally changes direction. How far is she from the motion detector when she changes direction?

See WS sec 2.5 # 1 classwork

(also on website)