Name: __ncy__

Date: _____

UNIT 4

LESSON 8

Do Now: Determine if the correlation is positive, negative, or zero:

a) The weight of gold and the value its worth. __positive__

b) The number of people that attend Calhoun's "Spring Fling" and the cost of its admission __zero__

c) The number of partners in a business and the profit each partner receives. . __negative__

Do Now: The following scatter plot would most likely have which correlation coefficient? $(-1 \le r \le 1)$

(a) -1   (b) -0.54   (c) 0.87   (d) 1
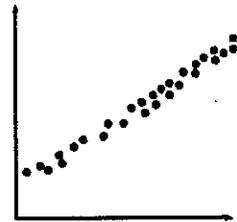
AIM: LINEAR REGRESSION (Day 2)

Interpolation: Looking for values that fall __inside (within)__ the given data.

Extrapolation: Looking for values that fall __outside__ the given data. The further away from the plotted values you go the less reliable your prediction is.

1. The chart below shows the amount of active ingredients, m, in milligrams, of blood pressure medication present in a person's bloodstream h hours after the medicine is consumed.

h	.5	1	1.5	2	2.5	3
m	112	86	53	41	27	19

X → h
Y → m

a) Determine a linear regression for h (hours) versus m (amount of medication) based on the given data. (Round values to the nearest thousandth.)

$$y = ax + b$$
$$y = -37.371x + 121.733$$

→ does this value fall inside or outside the given values.

b) Determine the amount of medication in the bloodstream at 1.75 hours. (Round to the nearest integer)

$$y = -37.371(1.75) + 121.733$$
$$y = 56 \text{ mg}$$

↓ x

} interpolation (w/in given data

c) If this linear relationship continues, after how many hours is this medication completely removed from the bloodstream? $y = 0$

$$0 = -37.371x + 121.733$$
$$-121.733 \qquad -121.733$$

$$\frac{-121.733}{-37.371} = \frac{-37.371x}{-37.371}$$

$$x = 3.2574 \rightarrow \text{round up}$$

d) Find the correlation coefficient to the nearest ten thousandth and explain its meaning.

$$r = -.971099$$
$$r = -.971$$

→ close to -1, so correlation is strong and negative

4. a) Find the line of best fit for the given data. (Round values to the nearest tenth.)

$$y = ax + b$$

$$y = 11.7x + 193.9$$

Sandwich	Total Fat (g)	Total Calories
Hamburger	9	260
Cheeseburger	13	320
Quarter Pounder	21	420
Quarter Pounder with Cheese	30	530
Big Mac	31	560
Arch Sandwich Special	31	550
Arch Special with Bacon	34	590
Crispy Chicken	25	500
Fish Fillet	28	560
Grilled Chicken	20	440
Grilled Chicken Light	5	300

b) Predict the total calories based upon 40 grams of fat. (Round to the nearest integer.)

$$y = 11.7(40) + 193.9$$

$$y = 662 \text{ calories}$$

c) Were you interpolating or (extrapolating) data for part b? Explain.

We were looking for values that fall outside the given values.

d) Predict the total grams of fat based upon 400 calories. (Round to the nearest integer.)

$$400 = 11.7x + 193.9$$
$$-193.9 \qquad\qquad -193.9$$
$$\frac{206.1}{11.7} = \frac{11.7x}{11.7}$$

$x = 18$ ↗ calories

$$x = 17.615$$

e) Were you (interpolating) or extrapolating data for part d? Explain.

We were looking for a value that falls inside the given value.

f) Find the correlation coefficient to the nearest thousandth and explain its meaning.

$$r = .9746 \to .975$$ close to 1 ↓ strong positive

g) Is there a causal relationship for both examples #3 and #4? Explain.

Yes b/c one variable affects the other

h) Graph the scatter plot and sketch the line of best fit.

mcdonalds

total calories (y-axis: 260, 300, 400, 500, 600)

total fat (x-axis: 10, 20, 30, 40)