LINEAR REGRESSION & TREND LINES

AGENDA

Warm-Up
Class Reminders
Set up Unit 5
Notes p. 63
HW: #1-5

REMINDERS

Bathroom passes are +5 each on a test!

HW Help is posted at twitter.com/mskmath

ESSENTIAL QUESTION

How do I use my calculator to find the best fit equation for a set of data?

WARM-UP TUESDAY

Find your new seat!

On the Tuesday box, write one exciting (school appropriate!) thing your shoulder partner did over break!

mskmath.com

LINEAR REGRESSION & TREND LINES

REMINDERS

- Bathroom passes are +5 each on a test!
- HW Help is posted at twitter.com/mskmath
- Tutoring
- Procedures

UNIT 5: STATISTICS

- On page 61 or the next blank right hand page, set up unit 5!
- Your vocabulary will go on page 62!
- Your "5" tab will go on page 61.
- You may start a new notebook - BUT it must be at the start of a new unit.

UNIT 5 TITLE: Statistics

Page #	Page Title
62	WWK
63	Linear Regression

LINEAR REGRESSION & TREND LINES P.63

ESSENTIAL QUESTION How do I use my calculator to find the best fit equation for a set of data?

Fold your paper in half - glue on page 63!

TIME FOR A GUESSING GAME!!

LINEAR REGRESSION & TREND LINES P.63

ESSENTIAL QUESTION How do I use my calculator to find the best fit equation for a set of data?

Name	Actual (Age)	Guess (Age)
Ariana Grande	22	
Denzel Washington	61	
Beyoncé	34	
Cruz Beckham	10	
Rihanna	27	
George Clooney	54	
Jennifer Lopez	46	
North West	2	
Christiano Ronaldo	30	
Angelina Jolie	40	
Justin Timberlake	34	
Miley Cyrus	23	
Kayne West	38	

LINEAR REGRESSION & TREND LINES P.63

ESSENTIAL QUESTION How do I use my calculator to find the best fit equation for a set of data?

1. Create a scatterplot of the data on the graph.

shows the relationship between a set of data with two variables, graphed as ordered pairs on a coordinate plane

2. Draw a trend line on your scatterplot.

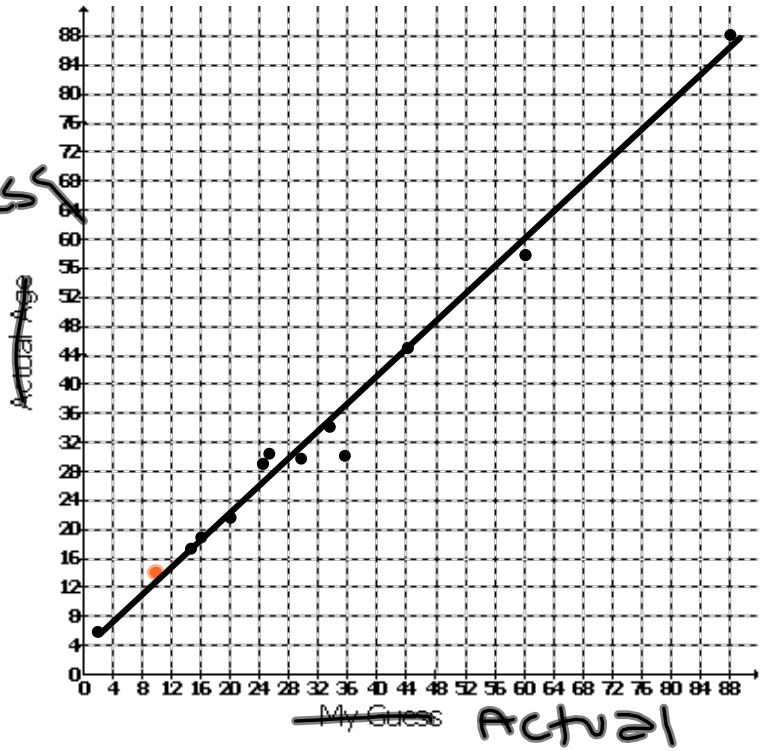
a line that describes the trend of the data in a scatter plot

STRAIGHT

3. Does the data show a positive correlation, negative correlation, or no correlation?

CORRELATION: a relationship between a set of data with two variables

positive



4. Calculate the line of best fit equation.

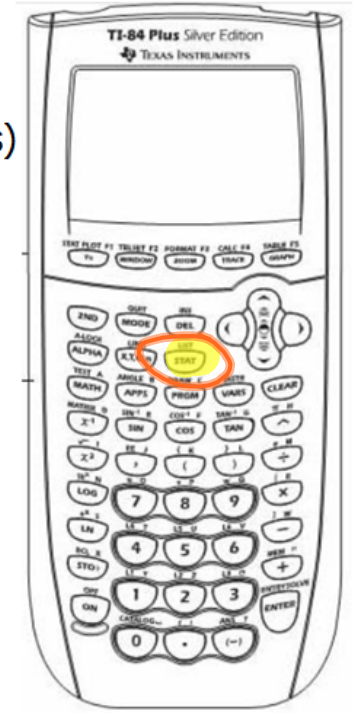
Line of Best Fit – a trend line

Linear Regression – an algorithm to find a precise line of fit for a set of data

LINEAR REGRESSION & TREND LINES P.63

ESSENTIAL QUESTION How do I use my calculator to find the best fit equation for a set of data?

Student Notes – Linear Regression



1. Press STAT, 1:Edit
2. X values (independent variables) go in L_1 and Y values (dependent variables) go in L_2.
3. Press STAT, go RIGHT to CALC, and select 4: LinReg (ax+b)
4. Make sure your screen looks like below. To store your equation in Y1, press ALPHA TRACE and select Y1.

```
LinReg(ax+b)
Xlist:L1
Ylist:L2
FreqList:
Store RegEQ:Y1
Calculate
```

5. Now Calculate! Make sure you replace a and b with the numbers the calculator gave you.

LINEAR REGRESSION & TREND LINES P.63

ESSENTIAL QUESTION How do I use my calculator to find the best fit equation for a set of data?

5. The table shows the dosage of a particular medicine as related to a person's weight. Using your calculator, create a scatterplot of the given data. Calculate the line of best fit and predict the dosage for a person weighing 240 pounds.

Weight (lb)	90	100	110	125	140	155	170	180	200
Dosage (mg)	20	25	30	35	40	53	60	66	75

L1 X
L2

LinReg
y=ax+b
a=.5079441502
b=-26.78767453

A) What is the equation of the line of best fit (approximated to the nearest hundredth)?

$Y = .51X - 26.79$

B) Predict the dosage for a person weighing 240 pounds.

$X = 240$ ~95 mg

X	Y1
240	95.119
241	95.627
242	96.135
243	96.643
244	97.151
245	97.659
246	98.167

Press + for ΔTbl

LINEAR REGRESSION & TREND LINES P.63

ESSENTIAL QUESTION How do I use my calculator to find the best fit equation for a set of data?

6. The table shows the price of a stock over an 8-month period. Using your calculator, create a scatterplot of the given data.

Month	1	2	3	4	5	6	7	8
Price ($)	32	35	37	41	46	50	54	59

LinReg
y=ax+b
a=3.904761905
b=26.67857143

A. Calculate the line of best fit

$y = 3.9x + 26.68$

B. Predict what the price of one share of stock will be in the twelfth month.

$x = 12$

$\$73.50$

TABLE SETUP
TblStart=12
ΔTbl=1
Indpnt: Auto Ask
Depend: Auto Ask

X	Y1
12	73.536
13	77.44
14	81.345
15	85.25
16	89.155
17	93.06
18	96.964

Press + for ΔTbl

Algebra I Unit 5- Using Linear Regression to Estimate Solutions and Make Predictions

Student Practice–Using Linear Regression to Estimate Solutions and Make Predictions

Name _____ Date_____ Period _____

Read and answer the following questions. Round your answer to the nearest hundredth.

1. As a science experiment, Keith recorded the percent humidity and the number of stars he could see at 10:00 P.M. each evening.

Star Counting Experiment										
Humidity (%)	84	76	79	88	95	82	87	88	75	82
Number of Visible Stars	12	22	25	15	11	19	13	18	20	22

a. Write the equation of the line of best fit_____

b. Using the equation above, estimate the number of stars visible at 100% humidity.

c. Using the equation above, estimate the humidity when Keith sees 40 stars.

2. Hummingbird wing beat rates are much higher than those in other birds. Estimates for various species are given in the table.

Hummingbird Wing Beats

Mass (g)	3.1	2.0	3.2	4.0	3.7	1.9	4.5
Wing Beats	60	85	50	45	55	90	40

a. Write the equation of the line of best fit_____

b. Using the equation above, estimate the wing beat rate of a 6.5 gram hummingbird.

c. Predict the wing beat rate for a Giant Hummingbird with a mass of 9 grams. Does your answer make sense?

3. The table below represents the age of a person, x, and their normal systolic blood pressure, y.

Age	Systolic Blood Pressure
10	115
30	125
50	135
70	145

a. What equation could be used to determine a person's normal systolic blood pressure?

b. What is the age of a person when his Systolic Blood Pressure is 161?

Algebra I Unit 5- Using Linear Regression to Estimate Solutions and Make Predictions

4. As scuba divers descend, the pressure of the water increases. Scuba divers can determine their depth by the pressure. Pressure can be expressed in atmospheres. An atmosphere is equivalent to 14.7psi (pounds per square inch) of pressure. The table below shows the relationship between atmospheres of pressure and ocean depth.

Depth of Ocean (feet)	0	33	66	99	132
Pressure (atmosphere)	1	2	3	4	5

a. What equation could represent this situation?

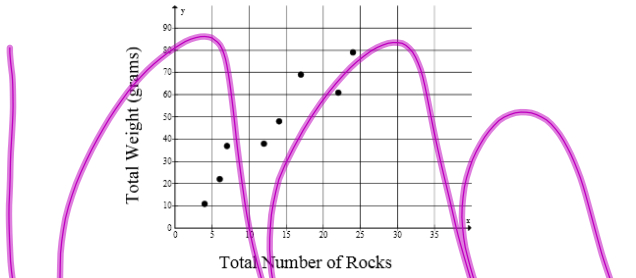
b. What is the atmospheric pressure when the depth of the ocean is 500 feet?

5. The table below lists corresponding *x*-and *y*-values of a linear function.
What is the value of *y* when *x* = 5?

x	***y***
0	3
1	12
2	21
3	30

A 39
B 40
C 48
D 50

6. A science class recorded the weight of different bags of rocks. Their results are displayed in the scatterplot.



a. Write the equation of the line of best fit for this data and sketch it on the graph above.

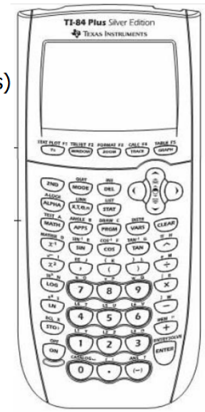
b. If the bag had 45 rocks, what would be a reasonable estimate of its weight?

HW HELP: LINEAR REGRESSION

HOPE YOU HAVE YOUR CALCULATOR! IF YOU NEED TO BORROW ONE, I WILL BE IN MY ROOM AT 8:15 OR DURING LUNCH

Student Notes – Linear Regression

1. Press STAT, 1:Edit
2. X values (independent variables) go in L_1 and Y values (dependent variables) go in L_2.
3. Press STAT, go RIGHT to CALC, and select 4: LinReg (ax+b)
4. Make sure your screen looks like below. To store your equation in Y1, press ALPHA TRACE and select Y1.




```
LinReg(ax+b)
Xlist:L1
Ylist:L2
FreqList:
Store RegEQ:Y1
Calculate
```

5. Now Calculate! Make sure you replace a and b with the numbers the calculator gave you.

1.
   a. y= -0.59x+67.16
   b. Use the calculator table (2nd GRAPH) to find x=100
   c. Where does y=40?

2.
   a. y= -19.14x + 121.97
   b. x = 6.5, what is y?
   c. x = 9, what is y? Can you have a negative wing beat?

3. a. y = 0.5x + 110
   b. If y = 161, what is x according to your model?

4. a. y = 0.03x + 1
   b. x = 500, what is y?

5. You try!

6. OMIT

Attachments

SN Construct Scatter Plots.pptx