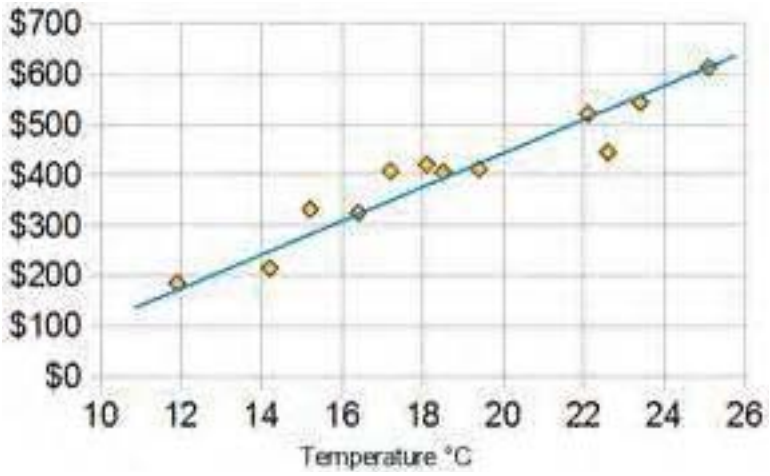
Unit 9 Notes

Statistics



Tentative Schedule

Day	Classwork	Assignment
Fri. 3/20 Mon. 3/23	Quest #8	Video #9.1: Scatter Plots and Line of Best Fit
Tues. 3/24	P.S. #9.1	Video #9.2: Two-Way Tables
Wed. 3/25 Thurs. 3/26	P.S. #9.2	Video #9.3: Two-Way Tables Day 2
Mon. 4/6 Tues. 4/7	P.S. #9.3	Catch-up on Checklist Optional Review Sheet
Wed. 4/8	**Quiz #9**	TBA

Name: _____

Notes 9.1 - Scatter Plots and Lines of Best Fit

Vocabulary

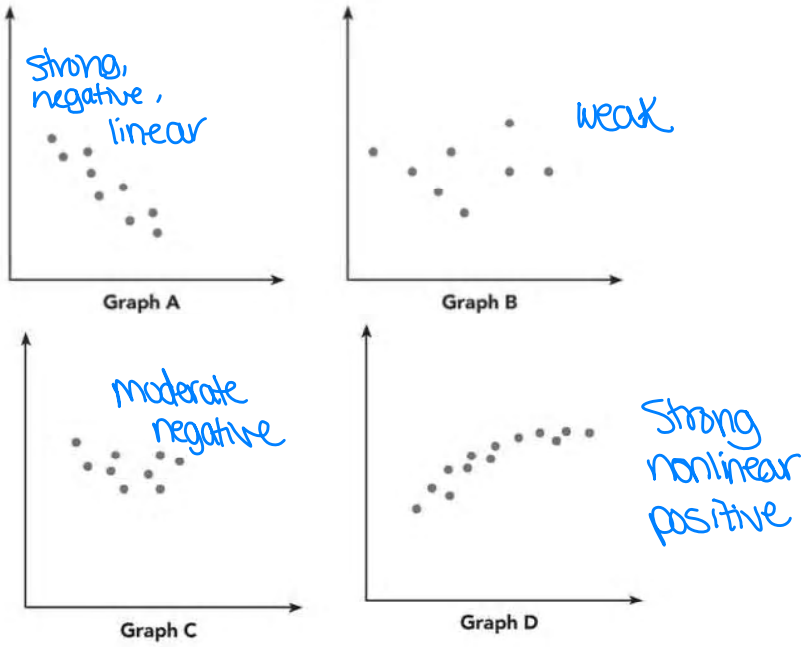
Qualitative/Categorical:
Data based on descriptions

Quantitative:
Data based on numbers

Bivariate:
Two variables (Ex. height and weight)

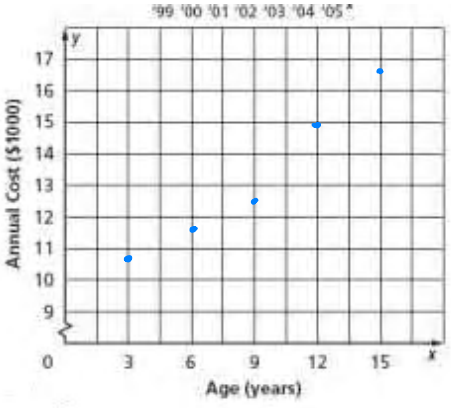
Outlier:
a value that is far away from remaining data

Describe the association between the bivariate data shown in each scatter plot.
An association can be **strong or weak**, **positive or negative**, and **linear or non-linear**



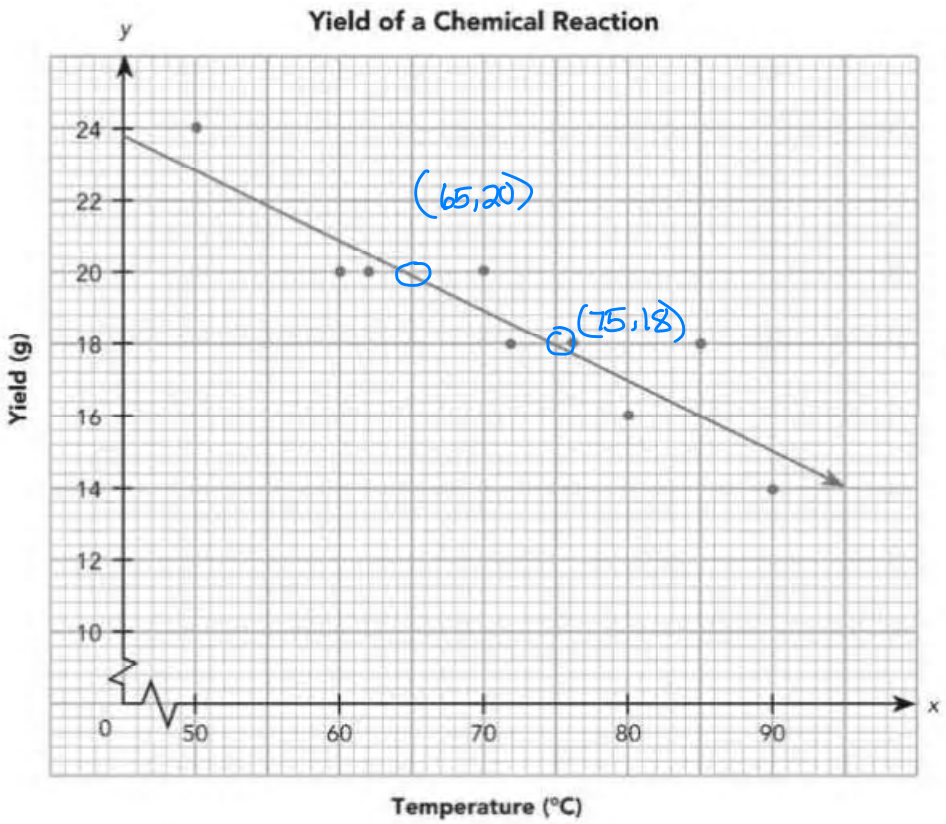
FAMILY The table below shows the predicted annual cost for a middle income family to raise a child from birth until adulthood. Draw a scatter plot and describe what relationship exists within the data.

Cost of Raising a Child Born in 2003					
Child's Age	3	6	9	12	15
Annual Cost ($)	10,700	11,700	12,600	15,000	16,700



Line of Best Fit:

A line that best represents a set of quantitative bivariate data



1.) Write an equation for a line of best fit.

$m = \frac{18-20}{75-65} = \frac{-2}{10} = -\frac{1}{5}$

$y = -\frac{1}{5}x + b$

$20 = -\frac{1}{5}(65) + b$

$20 = -13 + b$

$33 = b$

$y = -\frac{1}{5}x + 33$

2.) Use your equation to estimate the yield, in grams, of a chemical reaction when the temperature is 90°.

$x = 90$

$y = -\frac{1}{5}x + 33$

$y = -\frac{1}{5}(90) + 33$

$y = -18 + 33$

$y = 15\text{g}$

3.) Use your equation to estimate the temperature when the yield of a chemical reaction is 20 g.

$y = 20$

$y = -\frac{1}{5}x + 33$

$-5 \cdot 20 = -\frac{1}{5}x \cdot (-5) + 33 \cdot (-5)$

$-100 = x - 165$

$65 = x$

Notes 9.2 - Two-Way Tables Day 1

A two-way table represents frequencies for two sets of categorical data, or qualitative data such as gender, sport, flavor, color or shape.

Superheroes have been popular characters in movies, television, books, and comics for many generations. Superman was one of the most popular series in the 1950's while Batman was a top rated series in the 1960's. Each of these characters was also popular in movies released from 1990 to 2013. Other notable characters portrayed in movies over the last several decades include Captain America, She-Ra, and the Fantastic Four. What is special about a superhero? Is there a special superhero power that makes these characters particularly popular?

High school students in the United States were invited to complete an online survey in 2010. Part of the survey included questions about superhero powers. More than 1,000 students responded to this survey that included a question about a student's most favorite superhero power. 450 of the completed surveys were randomly selected. A rather confusing breakdown of the data by gender was compiled from the 450 surveys:

- 100 students indicated their favorite power was "to fly." 49 of those students were females.
- 131 students selected the power to "freeze time" as their favorite power. 71 of those students were males.
- 75 students selected "invisibility" as their favorite power. 48 of those students were females.
- 26 students indicated "super strength" as their favorite power. 25 of those students were males.

And finally, 118 students indicated "telepathy" as their favorite power. 70 of those students were females.

1.) Complete the table below by determining a frequency count for each cell based on the summarized data.

	To Fly	Freeze time	Invisibility	Super Strength	Telepathy	Total
Females	49	131-71 = 60	48	26-25 = 1	70	228
Males	100-49 = 51	71	75-48 = 27	25	118-70 = 48	222
Total	100	131	75	26	118	450

2.) Complete the table below by determining the relative frequency count for each cell based on the summarized data.

	To Fly	Freeze Time	Invisibility	Super Strength	Telepathy	Total
Females	$\frac{49}{450} \approx 0.109$	$\frac{60}{450} \approx .133$	$\frac{48}{450} \approx .107$	$\frac{1}{450} \approx .002$	$\frac{70}{450} \approx .156$	$\frac{228}{450} \approx 0.507$
Males	$\frac{51}{450} \approx .113$	$\frac{71}{450} \approx .158$	$\frac{27}{450} \approx .060$	$\frac{27}{450} \approx 0.060$ .056	$\frac{48}{450} \approx .107$	$\frac{222}{450} \approx .48$
Total	$\frac{100}{450} \approx .222$	$\frac{131}{450} \approx 0.291$	$\frac{75}{450} \approx .167$	$\frac{26}{450} \approx .058$	$\frac{118}{450} \approx 0.262$	$\frac{450}{450} = 1.000$

Notes 9.3 - Two-Way Tables Day 2

Recall the two-way table from the previous lesson:

	To fly	Freeze time	Invisibility	Super Strength	Telepathy	Total
Females	49	60	48	1	70	228
Males	51	71	27	25	48	222
Total	100	131	75	26	118	450

1.) Use the frequency counts from the table to calculate the missing row conditional relative frequencies. Round the answers to the nearest thousandth.

	To Fly	Freeze Time	Invisibility	Super Strength	Telepathy	Total
Females	$\frac{49}{228} \approx .215$	$\frac{60}{228} \approx .263$	$\frac{48}{228} \approx .211$	$\frac{1}{228} \approx .004$	$\frac{70}{228} \approx .307$	$\frac{228}{228} = 1.000$
Males	$\frac{51}{222} \approx .230$	$\frac{71}{222} \approx .320$	$\frac{27}{222} \approx .122$	$\frac{25}{222} \approx .113$	$\frac{48}{222} \approx .216$	$\frac{222}{222} = 1.000$

2.) Use the frequency counts from the table to calculate the missing column conditional relative frequencies. Round the answers to the nearest thousandth.

	To Fly	Freeze Time	Invisibility	Super Strength	Telepathy
Females	$\frac{49}{100} = .490$	$\frac{60}{131} \approx .458$	$\frac{48}{75} \approx .640$	$\frac{1}{26} \approx .038$	$\frac{70}{118} \approx .593$
Males	$\frac{51}{100} = .510$	$\frac{71}{131} \approx .542$	$\frac{27}{75} \approx .360$	$\frac{25}{26} \approx .962$	$\frac{48}{118} \approx .407$
Total	$\frac{100}{100} = 1.000$	$\frac{131}{131} = 1.000$	$\frac{75}{75} = 1.000$	$\frac{26}{26} = 1.000$	$\frac{118}{118} = 1.000$