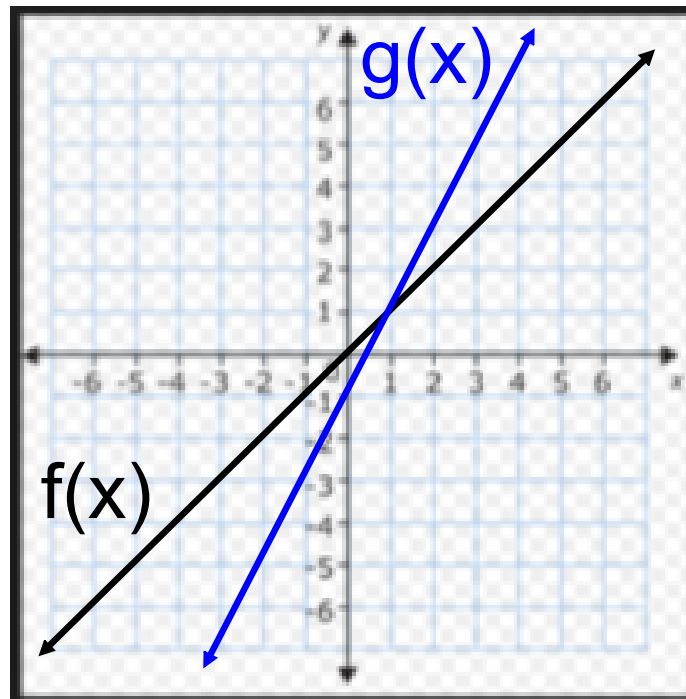


Describe the transformations that occurred from the parent function  $\{f(x)\}$  to the new function  $\{g(x)\}$ .



Topic: Linear Regression

EQ: How can I predict for the future with information from the present?

# RECALL!

## Writing an Equation of a Line

Given slope  $m$  and  $y$ -intercept  $b$

Use slope-intercept form:

$$y = mx + b$$

Given slope  $m$  and a point  $(x_1, y_1)$

Use point-slope form:

$$y - y_1 = m(x - x_1)$$

Given points  $(x_1, y_1)$  and  $(x_2, y_2)$

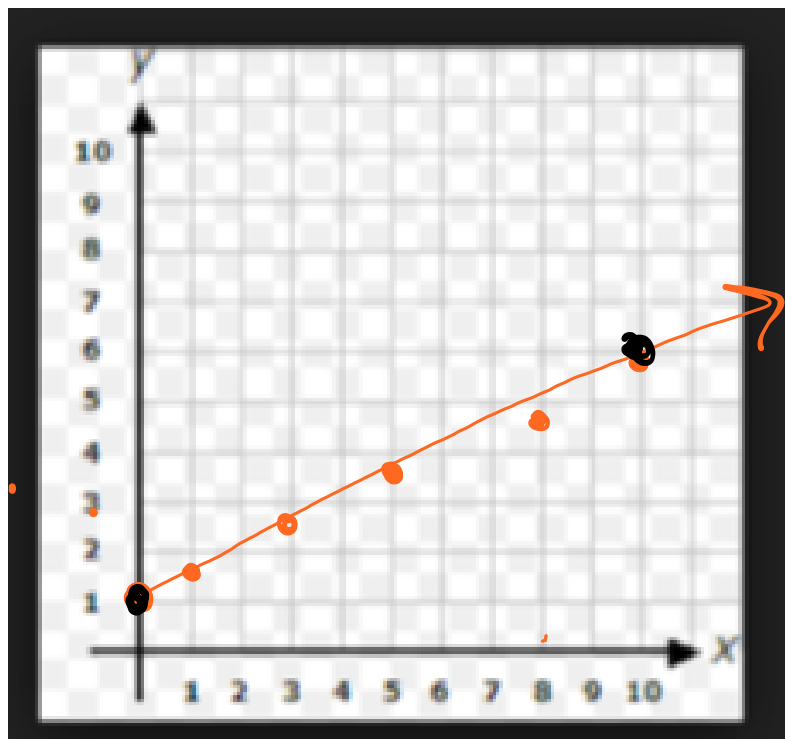
First use the slope formula to find  $m$ .  
Then use point-slope form with either given point.

Linear Regression uses data collection to create an equation that predicts for the future!

A line of best fit (LSRL) is a line that represents the data on a scatterplot. The line may pass through ALL, Some, or none of the points.

## Example 1:

Create a scatterplot for the following data showing the growth of a plant:



$b = 1$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{60 - 1}{10 - 0} = \frac{59}{10}$

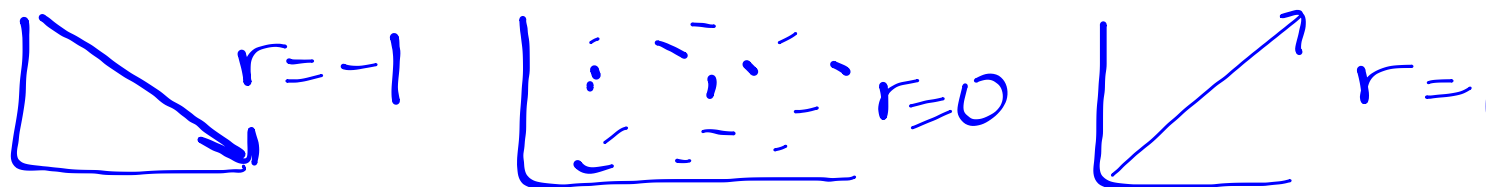
$(10, 60)$   
 $(0, 1)$

Age	1	5	8	10	3
Height	18	33	47	54	25

Write the equation ( $y = mx + b$ ) for your line of best fit:

$y = \frac{59}{10}x + 1$

$y = 4.102x + 13.252$



# CALCULATOR INSTRUCTIONS

$$-1 < r < 1$$

$r = \text{correlation}$  →

```
LinReg  
y=ax+b  
a=4.101503759  
b=13.2518797  
r²=.9974901029  
r=.998744263
```

1. STAT
2. EDIT, L1- x's & L2- y's
3. STAT, CALC, 4. LINREG (ax+b), VARS, Y-VARS, Enter 3x
4. Given m(a), b, and r. If not r Catalog Diagnostics ON.

$$y = 4.102x + 13.252$$

## Example 2:

Find a linear equation to represent the relationship between total fat grams and the total calories in fast food.

```

LinReg
y=ax+b
a=13.1386008
b=144.7335103
r2=.9974463332
r=.9987223504
  
```

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

$$y = 13.138x + 144.733$$

### 1.3 Modeling Linear Functions with answers

## Example 3:

The table shows the number of active red-cockaded woodpecker clusters in a part of the De Soto National Forest in Mississippi. Write a linear equation that models the number of active clusters as a function of *the number of years since 1990*.

$y = mx + b$

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000
Active clusters	22	24	27	27	34	40	42	45	51

Use your calculator to find the equation:

$$y = 3.7x + 12.467$$

year 2020

$$x = 30$$

$$= 3.7(30) + 12.467$$

$$= 123.467$$

123

```
LinReg
y=ax+b
a=3.7
b=12.46666667
r^2=.9686320755
r=.9841910767
```

# Column 2

**ACTUAL  
AGES**



Oprah Winfrey



62

# Pharrell



43

Helen Mirren



71

Pitbull



36

Michael Jordan



53

42

Leonardo DiCaprio



Natalie Portman



36

# Channing Tatum



36



LeBron James



31

# George W. Bush



71

Miley Cyrus



25

Tom Hanks



60

47

# Brett Favre



Penelope Cruz



42

Mark Wahlberg

46



# Donald Trump

71





Julia Roberts



48

Jennifer Lopez



47

Ronaldo



32