Final Exam Review

Unit 5 – Buying a Car

Buy or Sell a Car

- Measures of central tendency are single numbers designed to represent a "typical" value for the data.
  - Examples: mean, median, & mode

- Measures of spread describes how spread out the data set is.
  - Examples: range, quartiles, inter-quartile range (IQR)

Buy or Sell a Car

Example:

Hours Slept				
8.5	6	8.25	6.25	5.25
7.25	7	6.75	7.25	7.75

Find the mean, median, mode, range, Q_1, Q_3, & IQR of the data set.

5.25 6 6.25 6.75 7 7.25 7.25 7.75 8.25 8.5

Mean: $70.25 \div 10 = 7.025$

Median: $7 + 7.25 = 14.25 \div 2 = 7.125$

Mode: 7.25

Range: $8.5 - 5.25 = 3.25$

Q_1: 6.25 Q_3: 7.75

IQR: $7.75 - 6.25 = 1.5$

Frequency Distributions

To the right is a frequency distribution table of the list of car prices below.

$540 $550 $550 $550 $550 $600 $600 $600 $675
$700 $700 $700 $700 $700 $700 $700 $750 $775
$775 $800 $870 $900 $900 $990 $990 $990 $990
$990 $990 $1000 $1200 $1200 $1200

Price, *p* ($)	Frequency, *f*
540	1
550	4
600	3
675	1
700	7
750	1
775	2
800	1
870	1
900	2
990	6
1000	1
1200	3
Total	**33**

Stem-and-Leaf Plot

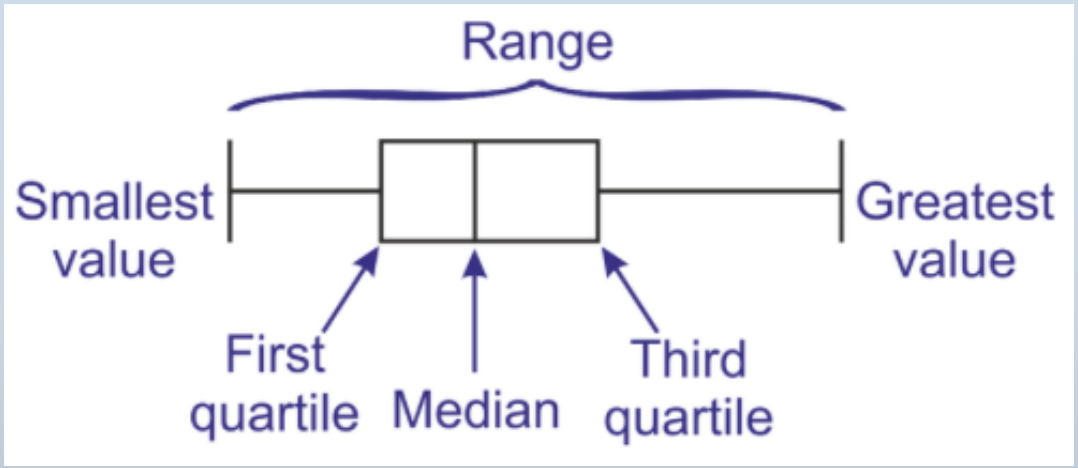
stem	leaf
0	1, 1, 2, 2, 3, 4, 4, 4, 4, 5, 8
1	0, 0, 0, 1, 1, 3, 7, 9
2	5, 5, 7, 7, 8, 8, 9, 9
3	0, 1, 1, 1, 2, 2, 2, 4, 5
4	0, 4, 8, 9
5	2, 6, 7, 7, 8
6	3, 6

Key: 6|3 = 63 years old

stem	leaf
0	5 7
1	1 3 5 9
2	0 4
3	5
4	0 3

Key: 1|7 means 1.7

Box-and-Whisker Plot



Car Insurance

- Bodily Injury Liability (BI): covers bodily injury. If you are at fault in an accident, you are responsible for paying the medical expenses of anyone injured. You can purchase as much BI as you want.

  - (max per accident company will pay any *one person*)/(max per accident company will pay *everyone total*)

  - Ex: I have 100/500 BI. If I get in an accident with Andrew, Tayler, and Sean (and it's my fault), the most my company would pay any of them is $100,000. The most they would spend on Andrew, Tayler, & Sean all together is $500,000.

Car Insurance

Example:

Stan has $25,000 worth of property damage liability insurance. He caused an accident that damaged a $2,000 fire hydrant and did $5,600 worth of damage to another car. How much of the damage must Stan pay?

Sum of the damages: 2,000 + 5,600 = 7,600

Since the total damages (7,600) is less than the amount for the liability insurance (25,000), the insurance company will pay the entire amount and Stan will not have to pay for anything.

Car Insurance

Example:

Peter has $1000 deductible collision insurance. Peter backs his car into his garage and causes $4300 worth of damage to the car. How much will his insurance company have to pay?

$$4{,}300 - 1{,}000 = 3{,}300$$

The company must pay $3,300.

Car Insurance

Example:

Bob was in an auto accident caused by his negligence. He has 100/300 bodily injury insurance. The three people injured in the accident sued. One person was awarded $140,000, and each of the other two was awarded $75,000. How much does the insurance company pay?

Bob has a 100/300 BI, so the company pays a maximum of $100,000 to any one person, and $300,000 total to all people.

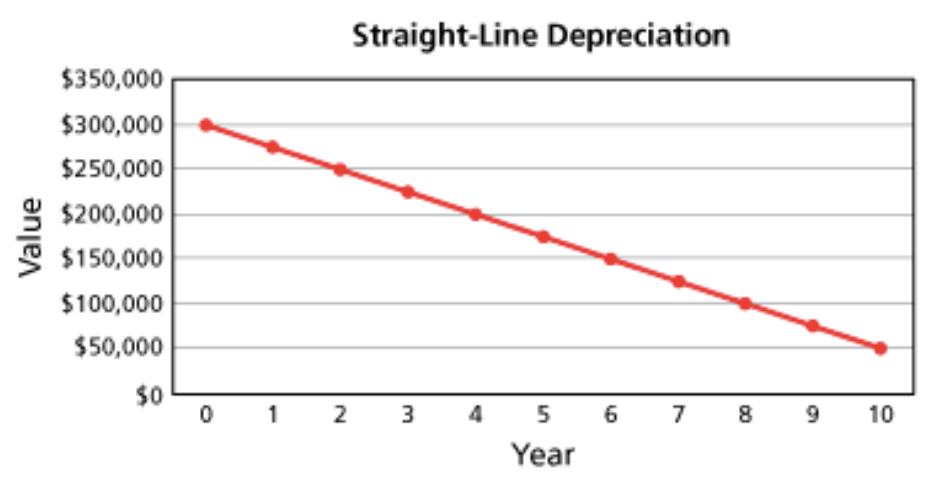
The insurance company will pay $250,000 (and Bob will pay $40,000).

Person 1:
Insurance: $100,000 Bob: $40,000

Person 2:
Insurance: $75,000 Bob: $0

Person 3:
Insurance: $75,000 Bob: $0

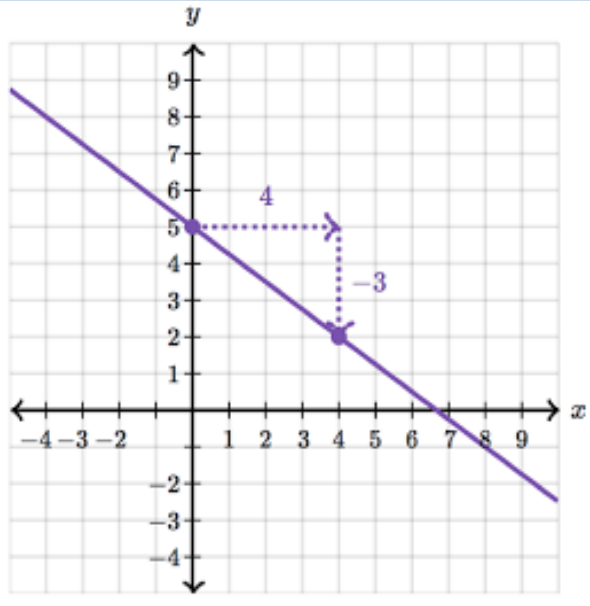
Auto Depreciation



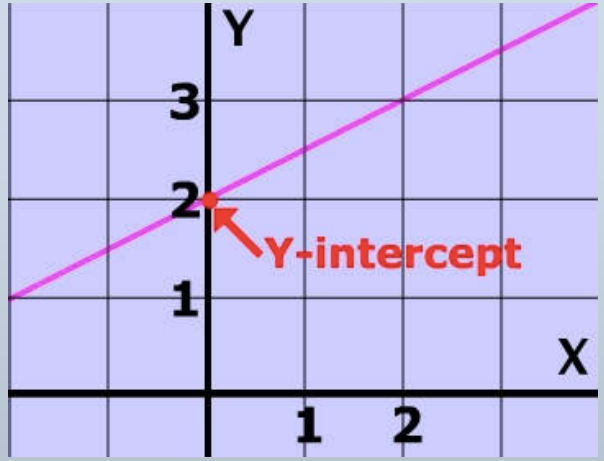
- The slope-intercept form of a linear equation is $y = mx + b$

Auto Depreciation

m = slope



b = y-intercept



Auto Depreciation

Example:

If a certain car has a depreciation equation of $y = -2{,}055x + 18{,}495$, what is its value after 3 years?

$$y = -2{,}055x + 18{,}495$$

$$y = -2{,}055(3) + 18{,}495$$

$$y = \$12{,}330$$

Auto Depreciation

What if you know the starting value of the car (the y-intercept) but not the exact slope? How could you find the slope?

If there are 2 different years when you know the value of the car, you can calculate the slope.

1st known year & value: (x_1, y_1)

2nd known year & value: (x_2, y_2)

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x}$$

Auto Depreciation

Example:

When you first bought your car, it was worth $27,000. 12 years later, it depreciated to a value of zero dollars. What is the rate of depreciation of your car (aka, the slope)?

Point 1: (time, value) = (0, 27,000)

Point 2: (time, value) = (12, 0)

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - 27{,}000}{12 - 0} = \frac{-27{,}000}{12} = -2{,}250$$

Each year, the car's value goes down by $2,250.

Auto Depreciation

Now, what is the depreciation equation of your car?

Starting value (y-intercept) = \$27,000

Depreciation rate (slope) = \$-2,250

$$y = mx + b$$

$$y = -2250x + 27{,}000$$

Driving Safety

- The reaction time is the time it takes the driver to switch from the gas pedal to the brake pedal.
- The reaction distance is the distance the car travels while the person is reacting.
  - about one foot for each mile per hour of speed
- The braking distance is the distance the car travels while braking to come to a complete stop.

$$D = \frac{s^2}{20}$$

- Total stopping distance = reaction distance + braking distance

Driving Safety

Example:

Rachel is driving at 48 mi/h. She sees an accident directly ahead of her at 200 feet away. Will she be able to stop in time?

Total stopping distance = reaction distance + braking distance

$$= 48 + \frac{48^2}{20}$$

$$= 48 + 115.2$$

$$= 163.2$$

Yes, she should be able to stop in time.