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WS Assessment

Target 11:

Automobile insurance

**I can:**

* Compute the insurance costs and claim payments
* Compute depreciation equation in order to determine time, original price and depreciation value

**Unit 5 Math Topics:**

* Circles (radius, diameter, chord)
* Distance Formula
* Exponential growth and decay
* Linear equations and inequalities
* Linear and exponential functions
* Measures of central tendency
* Metric System
* Natural logarithm
* Percent and Proportions
* Piecewise functions
* Range
* Read and interpret data: frequency tables, stem-and-leaf plots, box plots
* Quartiles
* Straight line equations (depreciation)
* Slope, slope-intercept form
* Square root equations
* Spreadsheets and formulas
* Systems of linear equations and inequalities in two variables

Drivers purchase **automobile insurance** because most drivers cannot afford the costs that could result from an auto accident. An automobile insurance policy is a contract between a driver and an insurance

company. The driver agrees to pay a fee (called the **premium**) and the company agrees to cover certain accident-related costs when the driver makes a **claim** (a request for money). States set minimum liability requirements. Several types of coverages are available.

**Bodily Injury Liability** (BI) paying the medical expenses of anyone injured in the accident.

**Property Damage Liability** (PD) pays for damage to other people’s property.

**Personal Injury Protection** (PIP) “mandatory” pays for any physical injuries you or your passengers

sustain while in the vehicle, regardless of who is at fault.

**Uninsured/Underinsured Motorist Protection** (UMP) pays for injuries to you or your passengers caused by a driver who has no insurance or does not have enough insurance to cover your medical losses.

**Comprehensive Insurance** covers the repair or replacement of parts of your car damaged by vandalism, fire, flood, wind, earthquakes, falling objects, riots, hail, damage from trees, and other

disasters. It also covers your car if it is stolen.

**Collision Insurance** pays you for the repair or replacement of your car if its damaged in a collision with another vehicle or object, or if it overturns, no matter who is at fault.

**Car-Rental Insurance** pays you for part of the cost of a rented car if your car is disabled because of a collision or comprehensive-covered repair.

**Emergency Road** **Service Insurance** pays for towing or road service when your car is disabled. Only the road service fee is covered. Gas, oil, part, and labor are not covered.

Auto insurance companies are in business to make a profit. The company loses money if a high percentage of insured drivers get into accidents. Insurance companies classify drivers according to their age, sex, marital status, driving record, and locality. Statisticians called **actuaries** predict how often customers, based on these criteria, will submit claims.

When you purchase an automobile insurance policy, you must choose a **deductible** amount that will be part of the policy. The deductible is the amount that the policy owner must pay before the insurance policy pays any money. Once an owner has paid the deductible amount, the insurance company pays the rest of the cost to get the repairs done.

What does 50/100/25 mean?

Numbers like 50/100/25 are the dollar limits (in thousands) for auto liability insurance coverage:

The first number is the amount of Bodily Injury liability coverage you have for injuring or killing an individual in an accident.

The second number is also for Bodily Injury, but it represents the total coverage for all injuries or deaths in an accident.

The third number is the amount of Property Damage liability coverage you have.

Why does a driver under age 25 pay more for auto insurance than a driver over 25?

Statistically, young drivers cause more accidents and more damage than drivers over age 25. Also based on statistics, married people and women are responsible for fewer accidents than singles and men. Insurance companies use these statistics as factors in determining how much of a risk you are. The greater the risk, the higher the insurance costs.

What can I do to keep my auto insurance costs down?

First and foremost, avoid moving violations and accidents. Here are a few more suggestions for how you may be able to reduce the cost of your auto insurance:

* Get good grades. Some insurance companies give discounts to students with a b average or better. Increase your deductibles. When you agree to pay a higher amount, you agree to pay out of pocket in case of a claim, you’ll pay a lower amount for this portion of your insurance premium.
* Choose your wheels carefully. Statistics show sports cars and convertibles are riskier to insure than sport utility vehicles, for example.
* Consider the age and condition of your vehicle. Physical Damage coverage may not be worth it if you have an older vehicle that has lost most of its value.
* Consider letting your parents insure you on their policy. Being listed as a driver on your parents’ insurance policy with a vehicle titled in their names will result in cheaper rates than if you paid for insurance on your own. However, your parents’ insurance premiums will likely go up, and a lot!

Mollie has 100/300/50 liability insurance and $50,000 PIP insurance with $500 deductible. She drives through a stop sign and hits a telephone pole and bounces into a minivan with 8 people inside. Some are seriously hurt and sue her. Others have minor injuries. Three passengers in Mollie’s car are also hurt.

a. The pole will cost $7,000 to replace. Mollie also did $6,700 worth of damage to the minivan and $3,000 to her own car. What insurance will cover this, and how much will the company pay?

b. The minivan’s driver was a concert violinist. The injury to his hand means he can never work again. He sues for $4,000,000 and is awarded that money in court. What type of insurance covers this, and how much will the insurance company pay?

c. The minivan’s driver had medical bills totaling $60,000 from his hospital trip and physical therapy after the accident. What type of insurance covers this, and how much will the insurance company pay?

d. The three passengers in Mollie’s car are hurt and each requires $12,000 worth of medical attention. What insurance covers this, and how much will the company pay?

Felix Madison has $10,000 worth of property damage insurance and a $1,000 deductible collision insurance policy. He had a tire blowout while driving and crashed into a $1,400 fire hydrant. The crash

caused $1,100 in damages to his car.

Which insurance covers the damage to the fire hydrant? How much will the insurance company pay for the fire hydrant?

Which insurance covers the damage to the car? How much will the insurance company pay for the damage to the car?

Most cars will not be worth their purchase prices as they get older. Most cars **depreciate**; that is, they lose value over time. Some collectible cars increase in value over time, or **appreciate**

Examine the data of used car prices for a Chevrolet Corvette 2-door Coupe in good condition. The table shows the age of the car in years and the value of the car at that time. The prices quoted are for cars with similar usage for their age and offered for sale in the same geographic location.

Create a scatter plot as shown and the equation of the exponential regression line (stamp) 

y = abx

What is the depreciation percentage?

Eamon purchased a four-year-old car for $16,400. When the car was new, it sold for $23,000. Find the depreciation rate to the nearest tenth of a percent.

A car originally sells for D dollars. After A years, the value of the car has dropped exponentially to P dollars. Write an algebraic expression for the exponential depreciation rate expressed as a decimal.

A car originally sold for $26,600. It depreciates exponentially at a rate of 5.5% per year. When purchasing the car, Richard put $6,000 down and pays $400 per month to pay off the balance. After how many years will his car value equal the amount he paid to date for the car?

A car exponentially depreciates at a rate of 6% per year. Beth purchased a 5-year-old car for $18,000. What was the original price of the car when it was new?

Leah and Josh bought a used car valued at $20,000. When this car was new, it sold for $24,000. If the car depreciates exponentially at a rate of 8% per year, approximately how old is the car?

**Assessment Target 11**

**I can …**  can calculate the depreciation value of ca **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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The historical prices of a car are recorded for 17 years as shown. (Stamp)  
Construct a scatterplot for the data.

Determine the exponential depreciation formula that models this data.

y = abx =

Determine the depreciation rate

Predict the value of this car after 140 months. (convert to year)

Laura’s new car cost her $21,000. She was told that this make and model depreciates exponentially, after 5 years its value would drop to $18,000. Find the depreciate rate and how much will her car be worth after 100 months?

Raphael purchased a 3-year-old car for $16,000. He was told that this make and model depreciates exponentially at a rate of 5.45% per year. What was the original price of the car when it was new?

Amber bought a used car valued at $16,000. When this car was new, it was sold for $28,000. If the car depreciates exponentially at a rate of 9% per year, approximately how old is the car?

Jazmine’s car originally sold for $46,600. It depreciates exponentially at a rate of 10.3% per year. Jazmine put $12,000 down and pays $800 per month to pay off the balance. After how many years will her car value equal the amount she paid to date for the car? What will that value be? (Sketch and show me for stamp)

**Assessment Target 11**

**I can…** compute insurance cost and claims payment

On the way to the lake last weekend, Sam & Ann Smith were towing their 20-foot boat on the back of their pickup truck. While approaching the green traffic light, Ann could see that another car, driven by Tom Jones, was going to run his red light and was not going to stop. Ann slammed on her breaks to attempt to stop before the intersection, but slid into the middle of the intersection anyway. Needless to say, you can imagine the impact that the Jones's car caused when it slammed into the side of the Smith's pickup truck. In a hurry, John & Jane Doe might have been traveling too close behind the Smiths'. The Doe's ended up running into the back of the Smith's boat. Since the boat trailer wasn't quite hitched properly, the accident unhitched the Smith's boat trailer from the back of the pickup. The good news is that the boat only slid 20 feet away and didn't hit the video rental store. The bad news is that it knocked over a pedestrian named Mr. Bullwinkle.

PROPERTY DAMAGE:

Smith's Pickup - $28,500 Smith's Boat - $30,000 (totaled) Doe's Car - $5,000

BODILY INJURIES:

* Ann Smith: minor bumps & bruises, one broken arm, ER visit = $1,200
* Sam Smith: broken arm, broken leg, punctured lung, concussion, loss of vision in right eye, ambulance, ER visit, 2 nights hospital stay, 26 rehabilitation visits, and "Pain & Suffering" = $75,680
* Tom Jones: minor bumps & bruises, concussion = $900
* John Doe: broken leg, ambulance, concussion = $3,500
* Jane Doe: Stitches in forehead, dislocated shoulder, 12 rehabilitation visits = $12,000
* Mr. Bullwinkle: broken leg, broken back, hospital stay, 26 rehabilitation visits, "Pain & Suffering" = $100,000

Determine what each person and company will pay how much, given the following info





***IMPORTANT NOTE****: Generally, when a boat is attached and being pulled by a vehicle, liability coverage*

*extends from the vehicle to the trailer being pulled. For this exercise, please assume that the insurance*

*company takes this same general liability approach. To be certain, you will want to check with your insurance*

*company prior to towing a trailer.*

***IMPORTANT NOTE****: "Pain & Suffering" is not a bodily injury that can specifically be proven. Some insurance*

*companies will negotiate "pain & suffering" with a claimant. Other insurance companies will not settle and*

*will leave "pain & suffering" up to the determination of a jury. For this exercise, please assume that these*

*insurance companies will negotiate and settle "pain & suffering".*

* *Tom Jones's insurance company accepted liability for Mr. Jones's part of the accident. They are willing*

*to pay for repairs to the Smith's pickup and bodily injuries sustained by the Smiths'. Also, repairs to*

*Mr. Jones's car.*

* *John & Jane Doe's insurance company agreed with the Smith's insurance company that the Doe's are*

*75% liable for the damage to the boat. Yes, the Doe's ran into the Smith's boat, which caused a lot of*

*the damage, but the Smiths' didn't hitch the boat up correctly. Therefore, part of the damage for the*

*trailer becoming unhitched is the Smiths' fault.*

* *Sam & Ann Smith's insurance company accepted liability for 25% of the damage to the boat. The*

*Smiths' insurer also accepted liability for Mr. Bullwinkle's bodily injury.*