**SURVEYS**

* **Population**: people you want to survey
* **Sample:** representative group of the population (smaller version of population)
* You would use a sample not the entire US population when finding the average # of kids in a family in the US
* **Biased** = Bad
* **Unbiased** is the best type
* Should be random. Surveyor doesn’t hand pick which people to survey. Must represent an entire population not just part (ex. 8th graders don’t represent whole school).

**SCATTER PLOTS**

* **Relationships:**
	+ Positive: goes from bottom left to top right, both variables increase (the time you spend studying and your grade… the MORE you study the HIGHER your grade)
	+ Negative: goes from top left to bottom right, as one variable goes up the other variable goes down (Amount of gas in car, # of miles you drive your car… the MORE you drive, the LESS gas you have in your car)
	+ No Relationship: random dots (phone number, math average)
* **Variables:** Example of variables that show a relationship- AC bill, temperature outside
	+ Independent: can’t be changed by other variable. Temperature is independent b/c the AC bill can’t change it
	+ Dependent: can be influenced by the other variable. AC bill is the dependent b/c it will DEPEND on the temperature
* **Line of Best Fit:** Allows you to make predictions with a scatter plot. Must run through at least 2 points. Line should split the points into half (same # of each side of L of BF).
* **Correlation:** positive, negative, strong (close together), weak (spread out), none (random)

**PYTHAGOREAN THEOREM**

* Used only for right triangles
* $a^{2}+b^{2}=c^{2}$
* A and B represent the sides of a triangle that make up the right angle and C is the diagonal. C is called the hypotenuse.
* Pythagorean Triple: 3-4-5 Rule where 3 and 4 are the sides and 5 is the hypotenuse

**INDIRECT MEASUREMENT:** used when comparing similar objects/figure… ex. 2 similar triangles, shadows of flagpole to shadow of a person… USE A PROPORTION TO SOLVE

**MEASUREMENT (answers never cubed)**

* **Area of square**:
s2 or lw
* **Area of rectangle**:
lw
* **Area of triangle**:
½bh
* **Area of circle**:
πr2
* **Perimeter:**add all sides up
* **Circumference:**2πr or πd

**VOLUME (answers = cubed)**

* **Cube**: s3 or lwh
* **Rect. Prism**: lwh
* **Triangular Prism**: ½lwh
* **Cylinder**: $πr^{2}h$
* **Cone**: 1/3$πr^{2}h$
* **Pyramid**: 1/3Bh

**SURFACE AREA (answers = squared)**

* **Cube**: 6s2 or 6lw
* **Rect. Prism**: 2(lw+lh+wh) or 2lw+2lh+2wh
* **Triangular Prism**: 2B+Perimeter of the base \*height
* **Cylinder**: $2πr^{2}+2πrh$ or $2πr^{2}+πdh$
* **Cone**: $πr^{2}$+$ πr\*slant$
* **Pyramid**: B + # of sides \* ½bh

**TYPES OF NUMBERS**

* **Natural**: counting #s except 0 (1, 2, 3…)
* **Whole**: counting #s including 0 (1, 2, 3…)
* **Integers**: whole #s and their opposites
(… -2, -1, 0, 1, 2…)
* **Rational**: all #s that can be expressed as a fraction (can be positive, negative, whole, fractions, but not all decimals will be one). Repeating decimals (decimals that repeat the same numbers) and terminating decimals (decimals that end) are rational.
* **Irrational**: can’t be written as a fraction (will always be a decimal that keeps going without repeating)
* **Real**: any number

**STATISTICAL MISUSES**

* Altering data/graphs to make something appear differently than it really is
* Ex: skipping from 0 to a larger # on a scale, changing how you count with the intervals, using objects instead of bars that change in both width and height (not just height)

**GRAPHS**

* **Line Graph:** shows change over time (Ex. show change in temperature over time)
* **Histograms:** a type of bar graph that uses intervals. The intervals must be the same and a number can’t be in more than 1 set (Ex. All the following have 4 numbers in the interval: 1-4, 5-8, 9-12, and so on and the number 8 is only in one interval set)
* **Circle:** used to compare parts to a whole. 360 degrees in a circle… to figure out measurement of an angle use the proportion: # of degrees = # of specific topic
 360 degrees total # of all

**SLOPE INTERCEPT FORM**

* y = mx+b
* m is the slope, b is the y-intercept, and x and y are coordinates of a point
* If you don’t see a b then your y-intercept is 0 and if you don’t see a # in front of x then it has a slope of 1
* If you don’t see a x then the line is horizontal, slope = 0. If you don’t see a y then the line is vertical, has no slope. Think of treadmill (0 incline means it’s flat and if it’s vertical you can’t run on it).

**STANDARD 🡪 Y=MX+B**

* ax+by=c
* Steps: 1. Move your x’s to the other side by doing the opposite. 2. Get y by itself if it isn’t already. 3. Make sure it’s in y= mx+b

**DILATIONS**

* Scale Factor of 1 stays the same
* Reduction: SF less than 1, shrinks
* Enlargement: SF greater than 1, gets bigger
* SF of 0 doesn’t exist, anything x 0 = 0
* To get new points of new figure multiply SF to each #.
* To get SF using 2 sets of points, do new divided by old

**INTERCEPTS**

* **Y-intercept:** where line crosses the y axis, x = 0, is known as the constant
* **X-intercept:** where line, crosses the x axis, y = 0

**QUADRANTS**



**INEQUALITIES**

* <, >, <, >
* Treat problems the same way as in standard form or y=mx+b except when dividing or multiplying by a negative number then you flip the sign so it faces the other direction
* **Graphing the line:** SOLID line if sign is =, >, or < and use DOTTED line if sign is < or >
* **Shading:** 1. Pick a point not on or real close to your line. 2. Using the coordinates of the point (x,y), put them into the slope intercept equation you have and solve. 3. If the statement is TRUE shade the side of the line that the point you picked was on, but if it is NOT TRUE shade the other side of the line in.

**SLOPE (m)**

**Slope =** Rise = y1-y2
 Run x1-x2

Use 2nd one when given 2 points

**WORDS TO KNOW**

* **Variable:** a letter that’s holding the place of a number
* **Substitution:** when you plug a number into an equation where a variable is
* **Linear:** a straight line
* **Nonlinear**: not a straight line

**TEST TIPS**

* Get plenty of rest the night before
* Eat a good breakfast the morning of the test
* RELAX!!
* As soon as you’re allowed to start, quickly write down helpful formulas and notes on your scrap paper so you don’t forget during the test
* Use process of elimination
* You can write in your test book so WRITE ALL OVER IT. Cross out wrong answers, highlight/underline/circle important words.
* Circle your correct answer in the test book so if you get off on your bubble sheet you can easily go back and fix things
* **BELIEVE IN YOURSELF!!**

**FUNCTION**

* Looks like f(x) = an equation with x in it
* Often put in table to represent x and what the function will equal
* Example: If f(x) = 4x-5 then what’s f(3)?
f(3) = 4\*3 - 5 🡪 f(3) = 12 – 5 🡪 f(3) = 7

|  |  |  |
| --- | --- | --- |
| **x** | **4x-5** | **f(x)** |
| 1 | 4\*1-5 | -1 |
| 2 | 4\*2-5 | 3 |
| 3 | 4\*3-5 | 7 |

* The x CANNOT repeat (sideways U)