

X	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7 <td>14</td> <td>21</td> <td>28</td> <td>35</td> <td>42</td> <td>49</td> <td>56</td> <td>63</td> <td>70</td> <td>77</td> <td>84</td>	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

METRIC		U.S.		EQUAL MEASURES	
LENGTH		LENGTH		LENGTH	
mm	– millimeter	in	– inch	1 cm	≈ 10 mm
cm	– centimeter	ft	– foot	1 m	≈ 100 cm
m	– meter	yd	– yard	1 m	≈ 1,000 mm
km	– kilometer	mi	– mile	1 km	≈ 1,000 m
LIQUIDS		LIQUIDS		LIQUIDS	
ml	– milliliter	tsp	– teaspoon	1 L	≈ 1,000 mL
l	– liter	tbsp	– tablespoon	1 tsp	≈ 3 tsp
WEIGHT		WEIGHT		WEIGHT	
g	– gram	oz	– ounce	1 kg	≈ 1,000 g
kg	– kilogram	lb	– pound	1 metric ton	≈ 1,000 kg
TEMPERATURE		TEMPERATURE		TEMPERATURE	
°C	– degrees Celsius	°F	– degrees Fahrenheit	0 °C	≈ 32 °F
EACH MARK IS 1 DEGREE		EACH MARK IS 2 DEGREES		EACH MARK IS 2 DEGREES	

PRIME NUMBERS											
11	12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33	34
35	36	37	38	39	40	41	42	43	44	45	46
47	48	49	50	51	52	53	54	55	56	57	58
59	60	61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80	81	82
83	84	85	86	87	88	89	90	91	92	93	94
95	96	97	98	99	100						

Order of Mathematical Operations											
B Brackets		O Orders		D Divide		M Multiply		A Add		S Subtract	
()	$\sqrt{\quad}$	$\sqrt{x^2}$	$\frac{\quad}{\quad}$	\times	\times	\times	\times	+	+	-	-
P Power		E Exponents		M Multiply		D Divide		A Add		S Subtract	

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Probability and Statistics:

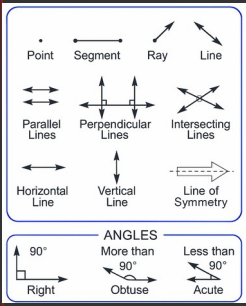
Mean: $\frac{\text{Sum of all values}}{\text{Total number of observations}}$

Median: Middle value when numbers are arranged in order.

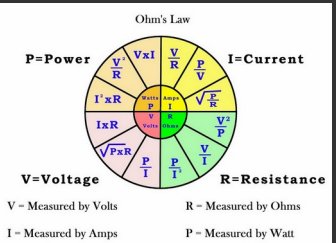
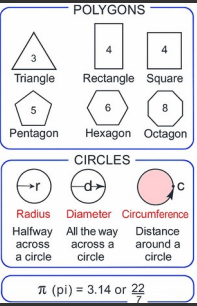
Mode: Most frequently occurring value in a set.

And Proportions:

Ratio: Comparison of two quantities.



- Area of a rectangle or square: $A = \ell \times w$
- Area of a triangle: $A = \frac{1}{2}bh$
- Area of a circle: $A = \pi r^2$
- Circumference of a circle: $C = 2\pi r$
- Volume of a rectangular prism (box): $V = lwh$
- Volume of a cylinder: $V = \pi r^2 h$
- Pythagorean Theorem: $a^2 + b^2 = c^2$
- Slope of a line: $m = \frac{y_2 - y_1}{x_2 - x_1}$
- Simple Interest: $I = PRT$
- Distance (Rate × Time): $D = RT$



- AC vs. DC: Alternating Current (AC), Direct Current (DC)
- Basic Electrical Concepts: Voltage (V), Current (I), Resistance (R)
- Electrical Units of Measurement: Amperes, Volts, Ohms, Watts
- Basic Components: Resistors, Capacitors, Inductors, Diodes, Transistors
- Electrical Safety: Grounding, Fuses and Circuit Breakers
- Circuit Types: Series Circuits, Parallel Circuits
- Electrical Measurements: Multimeter, Oscilloscope
- Electrical Units: Coulomb (C), Hertz (Hz)

- 1. Basic Automotive Components: Engine, Transmission, Braking System, Suspension System
- 2. Engine Components: Piston, Crankshaft, Camshaft, Valves, Spark Plug
- 3. Fuel System: Fuel Tank, Fuel Pump, Fuel Injector
- 4. Electrical System: Battery, Alternator, Starter Motor
- 5. Cooling System: Radiator, Water Pump, Thermostat
- 6. Tires and Wheels: Tire Types, Tire Pressure, Tread Depth
- 7. Shop Tools and Equipment: Hand Tools, Power Tools

- Multimeter: Measures voltage, current, and resistance in electrical circuits.
- Oscilloscope: Visualizes electrical signals and waveforms over time.
- Screwdriver: Turns screws; available in various types (e.g., flathead, Phillips).
- Pliers: Grips, twists, bends, and cuts wire or other materials.
- Wire Strippers: Removes insulation from electrical wires without damaging the wire.
- Wrench: Tightens or loosens nuts and bolts; available in various types (e.g., adjustable, socket).
- Hammer: Drives nails into wood or other materials; can also be used for demolition.
- Tape Measure: Measures length or distance; typically flexible and retractable.
- Level: Determines if a surface is horizontal (level) or vertical (plumb).
- Chisel: Carves or cuts hard materials like wood, stone, or metal.
- Drill: Creates holes in various materials; can be manual or powered.
- Saw: Cuts wood or other materials; types include hand saws, circular saws, and jigsaws.
- Caliper: Measures the distance between two opposite sides of an object; can measure internal and external dimensions.
- Soldering Iron: Melts solder to join electrical components together.
- Heat Gun: Applies heat to materials for purposes like shrinking tubing or removing paint.
- Flashlight: Illuminates dark areas; essential for working in low-light conditions.
- Safety Goggles: Protects eyes from debris, chemicals, or other hazards while working.
- Gloves: Protects hands from cuts, abrasions, or chemicals.
- Crowbar: Pries, lifts, or breaks apart materials.
- Stud Finder: Locates framing studs behind walls for securely hanging items.
- Utility Knife: Cuts through various materials; often retractable for safety.
- Socket Set: Contains various sizes of sockets for turning nuts and bolts.
- Torpedo Level: A small level used for checking horizontal and vertical surfaces in tight spaces.
- Pipe Wrench: Grips and turns pipes and fittings; adjustable for different sizes.
- Nail Gun: Drives nails into wood or other materials quickly and efficiently.
- Angle Grinder: Used for cutting, grinding, and polishing metal and other materials.
- Jigsaw: Cuts curves and intricate shapes in wood, metal, or plastic.
- Claw Hammer: A hammer with a split end for removing nails.
- Ruler: A straight tool used for measuring length or drawing straight lines.
- Pry Bar: Used for pulling apart materials or removing nails.

