Name _____ **Date** _____

West Islip Technology Department **Period** _____

Introduction to Energy

- _____ is force applied over a distance. It is expressed in units such as foot-pounds (ft.-lb) or inch-pounds (in.-lb).
    - The formula for work is: _____. In the formula, **F** is the _____ in pounds, and **D** is the _____ in feet.
        - Example: If a 10-pound weight is lifted one foot, the work accomplished equals _____.
            - 10 lb. x 1 ft. = 10 ft. lb
- _____is the amount of work done based on a time period such as seconds or minutes. Power is the time rate of doing work.
    - The formula for power is:

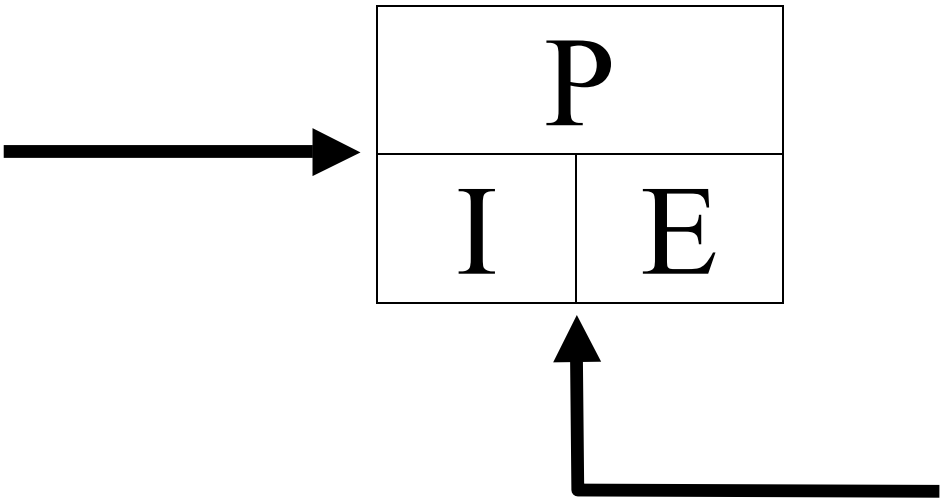
$$\text{_____} = \frac{\text{_____}}{\text{_____}}$$

    - Continuing with the example from above, if a 10 pound weight was moved one foot in ½ (.5) second, the power expended would equal ***20*** foot-pounds per second.

$$\text{_____} = \frac{\text{_____}}{\text{_____}}$$

- _____ is used for stating mechanical power. Electrical machines such as motors are rated in horsepower.
    - _____ is defined as a work rate of 550 ft.-lb/second. In addition, 33,000 ft.-lb/minute equals one horsepower.
- The unit of power is the _____. It was named in honor of James Watt, who is credited with the invention of the steam engine.
    - The formula for electrical power is: _____.

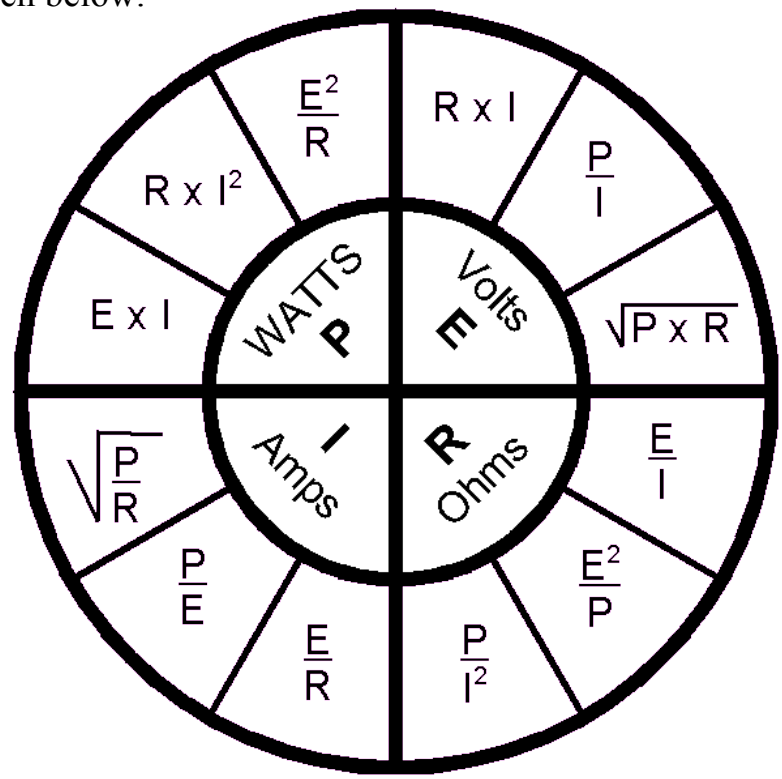
- In order to convert electrical power, in watts, into mechanical power, in horsepower, you can use the following conversion factor.
  - _____
- The power formula is sometimes called _____, and it can be arranged algebraically. If two quantities are known, the third unknown can be found using the guide below.



  - Example 1: A circuit with an unknown load has an applied voltage of 120 volts. The measured current is 8 amperes. How much power is consumed?
    - _____
    - _____
    - _____
  - Example 2: A coffee pot, rated at 200 watts, is connected to a 120 volt source. How much current will this appliance use?
    - _____
    - _____
    - _____

- It is possible to combine _____ and _____ to produce simple formulas that allow you to solve for current, voltage, resistance, or power if any two of those quantities are unknown.
  - The formulas that relate to Ohm's law and Watt's law can be arranged in a wheel-shaped guide for you to use as a reference. When you look at the guide, you will see two circles, an inner circle, and an outer circle. You will need to use the _____ to solve for your unknown quantity, and use the _____ to plug in your known quantities.

- The wheel shaped guide that incorporates Ohm's law and Watt's law can be seen below.



  - Example 1: Using the guide above, solve the following problem. A circuit has 60 volts and a resistance of 15 ohms. How many amps and watts are involved in this circuit?
    - _____
    - _____
    - _____
    - _____
    - _____
    - _____
  - Example 2: Using the guide above, solve the following problem. A circuit has 5 amps and 50 watts. How many volts and ohms are involved in this circuit?
    - _____
    - _____
    - _____
    - _____
    - _____
    - _____