Worksheet
Practice on "Powers of 10"

Name: ___KEY_____

Date: _____

Lengths to Memorize:
(units of meters)

10^0 Human

10^7 Earth diam

10^9 Sun diam

10^{11} Sun dist

10^{13} Neptune

10^{16} Light year/

      Dist to stars

10^{24} Supercluster

10^{26} Cosm Micro-

      Wave Bkgd

1) The mass of the Sun is 2,000,000,000,000,000,000,000,000,000,000 kg.
   a) Express this mass in scientific notation. ____2.0×10^{30}_kg_____
   b) Express the Sun's mass to the nearest power of 10. ___10^{30}_kg____
   c) What is the Sun's mass in units of solar masses ($M_\odot$)? __1_$M_\odot$____

2) If the mass of the Earth is 10^{24} kg, how much more massive is the Sun than the Earth?
   a) The Sun is _6_____ orders of magnitude more massive than the Earth.
   b) The Sun is _a million_____ times more massive than the Earth.

Multiplication with powers of 10: $10^A \times 10^B = 10^{(A+B)}$

Division with powers of 10: $10^A \div 10^B = 10^{(A-B)}$

3) The distance from the Earth to the supermassive black hole at the center of our Milky Way Galaxy is about 28,000 LY. How many meters is this, to the nearest power of 10?

   $2.8 \times 10^4 \times 10^{16} = 10^{4+16} = 10^{20}$ m

4) How many Sun diameters fit between the Earth and the nearest star about 4 light years away? (Again, to the nearest power of 10.)

   $4 \times 10^{16} / 10^9 = 10^{17-9} = 10^8$ Sun diameters

5) If 1 Astronomical Unit is the average distance between the Earth and the Sun, how many AU are in a Light Year (LY)? (Nearest power of 10.)

   $10^{16} / 10^{11} = 10^{16-11} = 10^5$ AU/LY