I need help with five Astronomy calculations. Please show calculations.

1. The Schwarzschild radius of a black hole containing 7.65 x 10^28 kg is \_\_\_\_\_meters. Only enter your numerical answer below – do **not** include units.

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. It takes a star with 22 times the mass of the sun, 3 years to orbit a black hole. If the average distance between the star and the center of the black hole is 9 AU, then the mass contained inside the black hole is \_\_\_\_\_\_\_Msun. Only enter your numerical answer below – do **not** include units. Report your answer to 2 decimal places. Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. The distance to a type I Cepheid that has a period of 8 days and a measured brightness of (8.20x10^-10) W/m^2 is \_\_\_\_\_ meters. Report your answer to 2 decimal places using scientific notion in the **textboxes** below. Only **one** number should be to the left of the decimal point!

n.nn x 10^n

**Note:** Your answer is assumed to be reduced to the highest power possible

 Answer: \_\_\_\_\_\_\_

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x10

1. Light is gathered from a distant galaxy and one of the spectral lines is observed at 560 nm when it should be 400 nm. The velocity of this galaxy is \_\_\_\_\_\_\_\_ km/s. Only enter your numerical answer below – do **not** include units. If your answer is negative, be certain to include a minus sign in your answer.

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The distance to a galaxy with a recessional velocity of 54.000 km/s is \_\_\_\_\_\_\_\_ Mpc. Only enter your numerical answer below – do **not** include units. Report your answer to 2 decimal places.

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_