QUESTIONS 3, PART A

1. What is the SI unit for measuring:

a. Distance? meter (m)

b. Temperature? degrees Kelvin (K)

2. Why might geoscientists not use SI Units in working with some maps produced in the United States?
Most of the maps produced in the USA in the past used English units (i.e., feet, miles).

3. Give the value in words and numbers for the following numbers, which are given in scientific notation (the first is given for you).

b. 4,120 four thousand one hundred and twenty

c. 5,800,000,000 five billion eight hundred million

d. 2,200,000,000,000,000 two quadrillion two hundred trillion

e. 100,000 one hundred thousand

4. Consult Appendix I to determine the value and name for the following prefixes in the International System of Units:

b. 10^{9} giga

c. 10^{6} mega

d. 10^{3} kilo

e. 10^{-2} centi

f. 10^{-3} milli

g. 10^{-6} micro

h. 10^{-9} nano

5. Complete the blanks in the columns to provide the name and equivalent values in meters.

b. 5.5 centimeters = 5.5×10^{-2} meters

c. 5.5 kilometers = 5.5×10^{3} meters

d. 1 millimeter = 0.001 meter

6. Write in long form and scientific notation the equivalent of 4.7 Gyr?

4,700,000,000 years, 4.7×10^{9} years

7. Give the significant figures for the following:

a. 2.2×10^{2} 2

b. 1500 2

c. 0.028 or 2.8×10^{-2} 2

d. 0.0440 3

e. 125.00 5

8. Complete the sentence. The number of significant figures in a number is an indication of the _____; the more significant figures, the more _____ is the value.

precision precise

QUESTIONS 3, PART B

1. You had 23 questions incorrect on an exam that had a total of 96 questions. What was your percentage score? (Show how you set up the relationship.)
96 – 23 = 73 questions correct. 73 ÷ 96 = 76% of questions correct
Or 23/96 x 100% = 24% of questions wrong (= 76% correct)

2. You had a 10 percent deduction in the price of a book that had a list price of $22.50. What was your cost, before taxes? (Show how you set up the relationship.)
10% of $22.50 = 10/100 x $22.50 = $2.25
$22.50 - 2.25 = $20.25 is your cost
Or 90/100 x $22.59 = $20.25

3. Ozone levels increased from 250 to 275; what was the percentage increase? (Show how you set up the relationship.)
275
-250
= 25 point increase from the original of 250. Therefore 25/250 x 100 = 10% increase.

4. Ozone levels decreased from 400 to 300; what was the percentage decline? (Show your work.)
400 – 300 = 100 points of change. The decrease as a percentage is:
$\frac{100}{400}$ x 100 = 25%

5. What is the slope between two points on a map, B and S, given that B has an elevation of 150 feet and S has an elevation of 100 feet above sea level and they are 1 mile apart?
a. In feet per mile?
50 ft/mile or 50 feet per mile

b. In feet per feet (or without dimensions)?
$\frac{50 \text{ ft}}{5280 \text{ ft}}$ = 0.01 ft/ft or 0.01

c. In percent?
$\frac{50 \text{ ft}}{5280 \text{ ft}}$ x 100% = 0.95% or 0.9%

d. In degrees?
Take the arc tan (or inverse tan) of 50/5280 = 0.54°

6. What is the gradient or slope of the following?
a. Slope of 5°?
tan of 5° = 0.087

b. Slope of 50%?
$\frac{50}{100}$ = 0.5

7. Convert the following, showing your work using a dimensional relationship.

a. 12 miles to feet

$$12 \text{ miles} \times \frac{5280 \text{ ft}}{1 \text{ mile}} = 63{,}360 \text{ ft}$$

b. 15 m to cm

$$15 \text{ m} \times \frac{100 \text{ cm}}{1 \text{ m}} = 1500 \text{ cm}$$

c. 10 km to miles

$$10 \text{ km} \times \frac{1 \text{ mile}}{1.609 \text{ km}} = 6.2 \text{ miles}$$

d. 5 miles to kilometers

$$5 \text{ miles} \times \frac{1 \text{ km}}{0.621 \text{ mile}} = 8.1 \text{ km}$$

e. 12 cubic feet/sec to m^3/sec

$$\frac{12 \text{ ft}^3}{1 \text{ sec}} \times \frac{0.028 \text{ m}^3}{\text{ft}^3} = 0.34 \text{m}^3/\text{sec}$$

f. 60 miles per hour to km/hr

$$\frac{60 \text{ miles}}{\text{hr}} \times \frac{1.609 \text{ km}}{1 \text{ mile}} = 96.5 \text{ km/hr}$$

g. gm/cc to lbs/ft^3

$$\frac{1 \text{gm}}{1 \text{cc}} \times \frac{1 \text{cc}}{0.061 \text{ in}^3} \times \frac{1728 \text{ in}^3}{1 \text{ ft}^3} \times \frac{0.002205 \text{ lbs}}{1 \text{g}} = 62.5 \text{ lbs/ft}^3$$

QUESTIONS 3, PART C

1. On the two types of graph paper provided here, plot the number of landslides by year, using the data in Table 3.1. Add captions.

See Figures X and Y below.

2. From the data in Table 3.1, determine the following for the number of landslides per year.

a. Mean (the arithmetic average; divide total number of landslides by number of years)

20

b. Median (the middle value; with equal number of values above and below)

12

c. Mode (the most common; what value occurred most frequently)

10

Note: The plots and calculations could also be done using Excel.