

Name: \_\_\_\_\_

FO-4313/6313 Spatial Technologies in Natural Resource Management  
**First Hour Exam, 2003**

Formula:

$$RF = \frac{1}{S} = \frac{d}{D} = \frac{f}{(H-h)}$$

1. Scale is defined as: \_\_\_\_\_ (5)  
\_\_\_\_\_
2. In the scale equation above, define, in your words, the following items:
  - d is \_\_\_\_\_ (3)
  - D is \_\_\_\_\_ (3)
  - f is \_\_\_\_\_ (3)
  - (H-h) is \_\_\_\_\_ (3)
3. Describe the primary differences between a map and an aerial photograph:
  - Map: \_\_\_\_\_ (4)  
\_\_\_\_\_
  - Photo: \_\_\_\_\_ (4)  
\_\_\_\_\_
4. The characterization, description, and/or analysis of images without physical contact is called \_\_\_\_\_ (5)
5. Spatial data or geographic entities are represented (in a GIS or with a GPS) as:
  - A. \_\_\_\_\_ (3)
  - B. \_\_\_\_\_ (3)
  - C. \_\_\_\_\_ (3)
6. Explain why clear water appears dark/black on black and white infrared (positive/print) imagery:  
\_\_\_\_\_  
\_\_\_\_\_ (4)
7. The 8 object attributes for interpretation are: (8)

4 S's: \_\_\_\_\_

2 T's: \_\_\_\_\_

7,8: \_\_\_\_\_

8. After printing a draft of your GIS map using ARC/View, you see that the scale bar is not a standard scale bar with 1 inch graduations and you wish to compute a Representative Fraction for the graphic scale bar. If one graduation on the scale bar is 67.5/60 inches in length and this graduation is labeled as 2,250 feet on the ground, the computed RF is 1:\_\_\_\_\_ (5)

9. If an object located at 500 ft.(a.g.l.) elevation measures 0.27 inches in length on an aerial photograph taken with a 152.4mm focal length and the same object is 495 ft. in length on the ground:

a. The RF scale of the photo at 500 ft (a.g.l) is: \_\_\_\_\_ (5)

b. If the aircraft maintained the same altitude, the RF scale of the photo at m.s.l. (mean sea level) would be 1:\_\_\_\_\_ (4)

c. If the same object (0.27 in.), was located at m.s.l., it would have a **ground length** of \_\_\_\_\_ ft. (4)

10. You obtain a photo from a friend but don't know the scale. Using your engineer's scale, you measure a known distance on the photo as 150/60 inch and the same distance on a 1:24,000 quad sheet as 75/60 inches.

A. The calculated R.F. scale of the photo is : \_\_\_\_\_ (5)

If the focal length of the camera (f) is 152.4 mm and the height of an object (h) is 500 ft (m.s.l.),

B. The height (H) of the camera, above m.s.l., is: \_\_\_\_\_ ft (5)

11. Your boss wants you to contract for new imagery that will allow him to see and measure wood duck boxes that are 10 x 12 inches in size. From your Spatial Technologies course you recall that the human eye can detect and measure objects that are 0.001 inches in size. Note the rectangular size; which side is the limiting size?

A. The smallest scale allowed for the project will be \_\_\_\_\_ . (4)

B If the focal length of the aircraft camera is 203.2 mm and the average terrain elevation is 800 ft (m.s.l.), the aircraft altitude required to achieve the desired scale will be \_\_\_\_\_ . (4)

12. You have a photograph with an average RF scale of 1/16,000 that was taken with a 152.4mm focal length camera at an average elevation of 1,000 feet.

If Stand A is located at 1250 ft elevation and contains 5,745 trees per square inch;

a. the RF scale of the photograph **at 1250** ft elevation is \_\_\_\_\_ (5)

b. the area scale at the 1250 ft elevation is 1 square inch = \_\_\_\_\_ acres (4)

c. the stand density in terms of trees per acre for stand A is \_\_\_\_\_ (4)