

Name: _____

FO-4313/6313 Spatial Technologies in Natural Resource Management
First Hour Exam, 2002

Formula:

1. Scale is defined as: _____ (5)

2. Explain in words or a combination of words and geometry the relationship between the classic definition of scale (question 1 above) and the geometry of an aerial image; i.e. how can the geometry of an aerial image result in the formula given above? (10)

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. Distinguish between active and passive sensors and give an example of each.
Active sensor: _____ (2)
example: _____ (2)

(2) Passive sensor: _____
example: _____ (2)

6. Match the correct statements below with

Image Sharpness	_____	(3)
Tonal Contrast	_____	(3)
Green wavelength	_____	(3)
Haze	_____	(3)

- a. The minimum image size that be visually detected on an aerial photo..
- b. The actual difference in density between high lights and shadows on a negative or print.
- c. The result of Raleigh scattering of random blue light.
- d. The number of tones of grey on a negative or print.
- e. A subjective value that refers to the fineness of detail that is recorded and can be detected on a negative or print.
- f. The color that the human eye and ektachrome film are most sensitive to.

7. Explain why clear water appears dark/black on black and white infrared (positive/print) imagery:

_____ (4)

8. Explain why hardwoods appear in light tones of grey and conifers in dark(er) tones of grey on black and white imagery (i.e. contact prints or positive transparencies).

_____ (4)

9. The 8 object attributes for interpretation are: (8)

4 S's: _____

2 T's: _____

7,8: _____

10 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 45/60 inches in length and this graduation is labeled as 2,250 feet on the ground, the computed RF is 1:_____ (5)

11. If an object located at 600 ft.(a.g.l.) elevation measures 0.26 inches in length on an aerial photograph taken with a 152.4mm focal length and the same object is 494 ft. in length on the ground:

a. The RF scale of the photo at m.s.l. is 1: _____ (5)

b. If the same object (0.26 in.), was located at m.s.l., it would

have a **ground length** of _____ ft. (6)

12. 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 79.2/60 inch and the same distance on a 1:24,000 quad sheet as 59.4/60 inches. (Keep the decimal on the measurements even though you couldn't read the scale to the nearest 0.1/60 inch)

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)

12. Your boss wants you to contract for new imagery that will allow him to see and measure wood duck boxes that are 12 x 12 inches in size. From your Spatial Technologies course you recall that the human eye can detect and measure objects that are 0.01 inches in size.

A. The smallest scale allowed for the project will be _____ . (5)

B If the focal length of the aircraft camera is 152.4 mm and the average terrain elevation is 800 ft (m.s.l.), the aircraft altitude required to achieve the desired scale will be _____ . (5)

Bonus: (5 points, all or none)

If the image distance on an unknown photo scale between the NW corner of the SE1/4, SE1/4, NE 1/4 and the SW corner of the SW1/4, SE1/4, SW 1/4 of section 18, T18N, R06E is measured as 3.169545 in., the R.F. of the photo is calculated to be: _____ .