

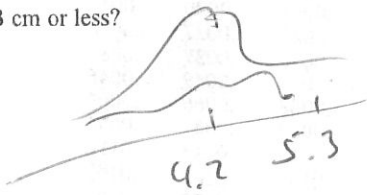
Use the following to answer questions 1 through 4

The petal lengths of *Iris versicolor* are normally distributed, with a mean petal length of 4.2 cm and standard deviation of 0.9 cm.

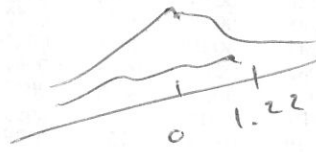
For a randomly selected *Iris versicolor*, what is the probability it has a petal length: $X \sim N(4.2, 0.9)$

1. of 5.3 cm or less?

- a) 0.89
- b) 0.20
- c) 0.65
- d) 0.11
- e) 0.72



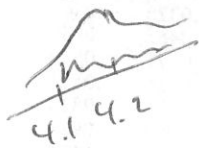
$$z = \frac{5.3 - 4.2}{0.9} = 1.22$$



$$0.89$$

2. of 4.1 cm or higher?

- a) 0.65
- b) 0.89
- c) 0.11
- d) 0.46
- e) 0.54



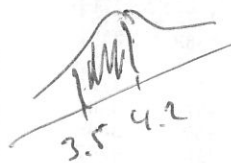
$$z = \frac{4.1 - 4.2}{0.9} = -0.11$$



$$1 - 0.4562 = 0.5438 \approx 0.54$$

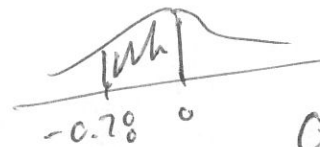
3. between 3.5 and 4.2?

- a) 0.43
- b) 0.28
- c) 0.22
- d) 0.78
- e) 0.72



$$z_1 = \frac{3.5 - 4.2}{0.9} = -0.78$$

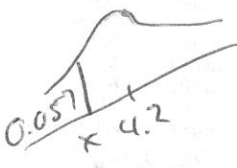
$$z_2 = \frac{4.2 - 4.2}{0.9} = 0$$



$$0.5 - 0.2177 = 0.2823 \approx 0.28$$

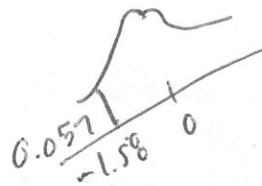
4. One particular *Iris versicolor* had a petal length such that 5.7% of *Iris versicolors* have a petal length less than it. What is its petal length?

- a) 4.14
- b) 3.14
- c) 5.62
- d) 2.78
- e) 4.25



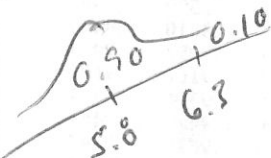
$$-1.58 = \frac{x - 4.2}{0.9}$$

$$x = 2.78$$



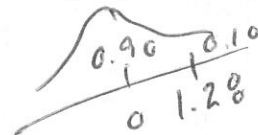
5. Wing lengths of *Drosophila melanogaster*, the common fruit fly, are normally distributed with a mean of 5.8 mm. If 10% of *Drosophila melanogaster* have a wing length of 6.3 mm or greater, what is the standard deviation of wing length?

- a) 0.39
- b) 0.56
- c) 5.00
- d) 0.78
- e) 1.24



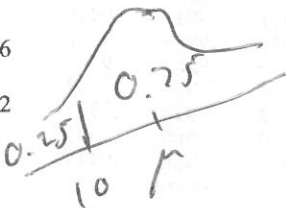
$$1.28 = \frac{6.3 - 5.8}{\sigma}$$

$$\sigma = 0.39$$



6. Triterpene is introduced into a lake in order to control an invasive species of fish. The rate at which triterpene is introduced is normally distributed, with a standard deviation of 6 L/hour. If we want to ensure that the probability of introducing triterpene into the lake at a rate of 10 L/hour or greater is 0.75, what should we set the mean rate to?

- a) 5.98
- b) 12.76
- c) 8.50
- d) 14.02
- e) 5.50



$$-0.67 = \frac{10 - \mu}{6}$$

$$\mu = 14.02$$

