UNIVERSITY OF DELAWARE

M114 – 01S

Final Exam

The following multiple choice questions are worth 5 points each.

1. Calculate the mean, $\overline{x}$, and the standard deviation, s, in the following frequency table:

Scores	Frequency
20 – 34	5
35 – 49	10
50 – 64	25
65 – 79	10

a. $\overline{x} = 49.50 \quad s = 19.36$

b. $\overline{x} = 54.00 \quad s = 13.21$

c. $\overline{x} = 12.50 \quad s = 8.66$

d. cannot be determined

2. Heights of women are normally distributed with a mean, $\mu = 63.6$ in. and a standard deviation of $\sigma = 2.5$ in. If a woman is randomly selected, find the probability that her height is more than 68.6 in.

a. 0.4772

b. 0.5000

c. 0.0228

d. 0.9772

e. 2.0000

3. The population of weights of men is normally distributed with a mean of $u = 173$ lbs. and a standard deviation of $\sigma = 30$ lbs. If 32 men are randomly selected, find the probability that their mean weight will be between 173 lbs. and 186 lbs.

a. 0.9493

b. 0.0071

c. 0.4929

d. 0.1664

4. The National Assessment of Educational Progress test was given to a sample of 1077 young women. The sample mean score was 275 points and the standard deviation was 60 points. Find a 99 % Confidence Interval for the population mean. Note: $z_c = 2.58$.

a. $270.28 \leq \mu \leq 279.72$

b. $271.42 \leq \mu \leq 278.58$

c. $220.91 \leq \mu \leq 358.43$

d. $261.52 \leq \mu \leq 288.48$

5. Consider the following data, which gives the weight (in thousands of pounds) x and gasoline mileage (miles per gallon) y for ten different automobiles.

x	2.5	3.0	4.0	3.5	2.7	4.5	3.8	2.9	5.0	2.2
y	40	43	30	35	42	19	32	39	15	44

Find the linear regression equation which models this data. Correct the values of "a" and "b" to 3 decimal places.

Approximate the gasoline mileage if the weight of the automobile is 4.9 thousand lbs.

a. 24

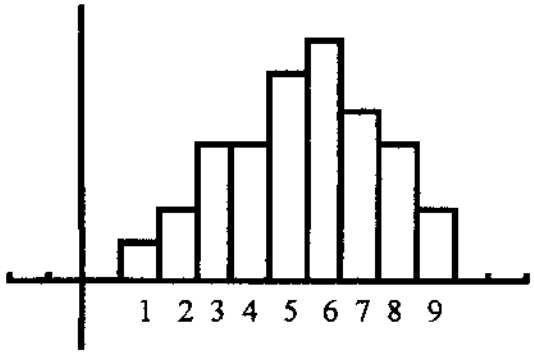
b. 18

c. 41

d. 33

e. 15

To answer questions 6 and 7 use the histogram below



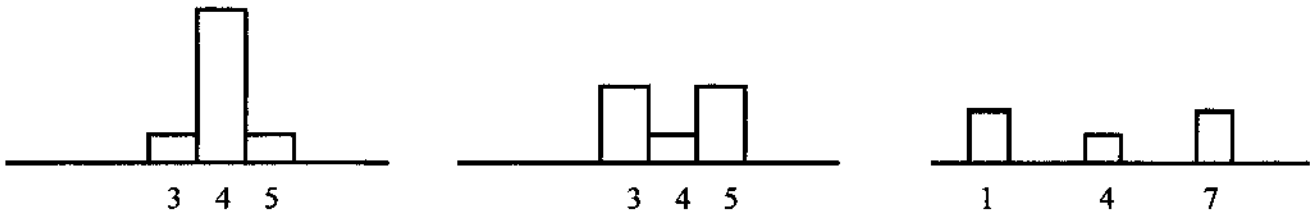
6. What is the mode of the scores shown in the histogram?

a. there is no mode
b. 4
c. 5
d. 6
e. 7

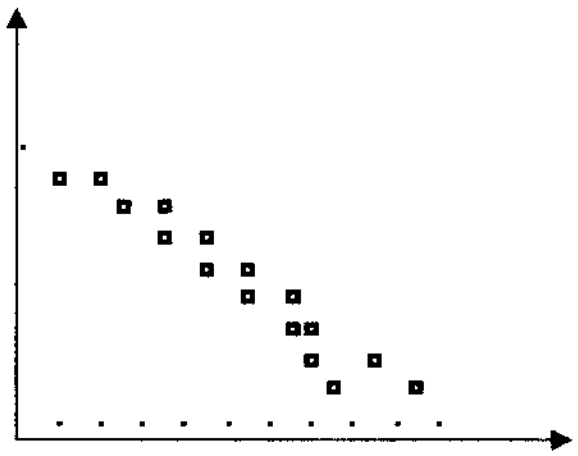
7. Which of the following statements best describes the histogram?

a. It shows data that is skewed to the right.
b. It shows there are two outliers.
c. It shows data that is approximately normally distributed.
d. It is incorrect because the data is not grouped.
e. It is incorrect because too many bars are the same height.

8. The following histograms show 3 different data sets that have a mean of 4. Which data set has the largest standard deviation?



9. What kind of relationship is depicted in the following graph?



a. a strong positive correlation

b. a strong negative correlation

c. a weak positive correlation

d. a weak negative correlation

e. no correlation.

10. Write the equation of the line that passes through the point $\left(\frac{1}{4},\frac{2}{3}\right)$ and is perpendicular to the line $3x-2y=5$.

a. $y=-\frac{2}{3}x+\frac{1}{2}$

b. $y=\frac{2}{3}x+\frac{1}{2}$

c. $y=-\frac{2}{3}x+\frac{5}{6}$

d. $y=\frac{2}{3}x+\frac{5}{6}$

e. $y=\frac{2}{3}x+\frac{1}{4}$

11. Solve: $(x+1)^2+5=(x+3)^2$

Which of the following is true about the solution?

a. It is between -2 and -1

b. It is between -1 and 0

c. It is between 0 and 1

d. It is between 1 and 2

e. There is no real solution.

12. Which of the following represent(s) y as a function of x?

I	II	III
Domain (x) Range (y)	$x^2+y^2=4$	$(1,7),(1,-2),(2,5),(3,1)$
1 → 1		
2 → 2		
3 → 2		

a. I only

b. II only

c. I and III only

d. All are functions

e. none are functions

13. Solve: $3(x+10) \le 12(x+1)$

a. $x \ge 2$

b. $x \le 2$

c. $x \ge -2$

d. $x \le -2$

14. Solve: $(x-5)(x+2)=8$

Add the two solutions.
Their sum is:

a. 19

b. 6

c. 3

d. -3

e. 17

15. The function $s = -16t^2 + 256t + 3$ gives the height s, in feet, of a toy rocket shot directly upward, where time t is in seconds. What is the maximum height of the rocket?

a. 259 feet

b. 728 feet

c. 1027 feet

d. 8 feet

e. It cannot be determined.

16. Determine the equation of the quadratic function with vertex at $(-2,5)$ and another point at $(2,-3)$.

a. $y = \frac{1}{2}(x+2)^2 + 5$

b. $y = -\frac{1}{2}(x+2)^2 + 5$

c. $y = \frac{1}{8}(x-2)^2 + 5$

d. $y = -\frac{1}{8}(x-2)^2 + 5$

e. none of the preceding.

17. A conservation organization believes that a particular game preserve has the resources to support 1000 animals of a certain endangered species and that the growth of the herd is modeled by the following equation:

$$N = \frac{1000}{1+9e^{-.166t}}$$

Determine the population after 5 years.

a. 203

b. 46

c. 126

d. 72

e. none of the preceding

22. Solve for x: $5e^x - 8 = 40$

x is between:

a. 0 and 2

b. 2 and 3

c. -2 and 0

d. -3 and -2

23. Solve the following logarithmic equation:

$\ln(5x+1) = 1$

a. $e-1$

b. $5(e^2+1)$

c. $\frac{e-1}{5}$

d. $e+1.6$

e. None of the preceding

Name:_____ **Section:**_____

Instructor:_____

The following questions are free response.

24. Match the following graphs with their equations. [15 points]

Equations

A. $y = -x^2 + 5$

B. $y = \ln x$

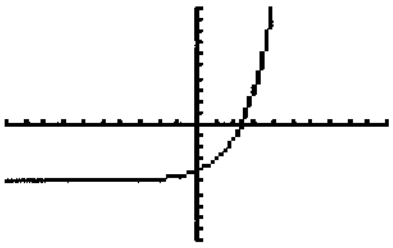
C. $y = 2^x - 5$

D. $y = x^2 - 10x + 25$

E. $y = (5)2^x$

F. $y = -2x + 5$

I.



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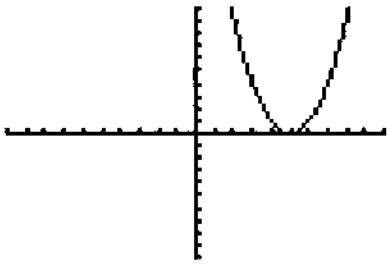
II.



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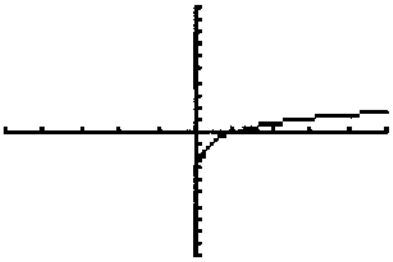

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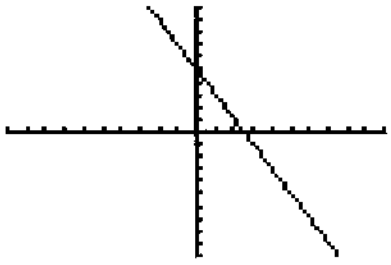

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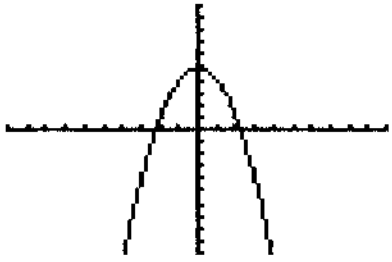
V.



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25. A factory manufactures two kinds of work shoes (for very large people), Climbers and Jumpers. Climbers require four pounds of leather and five pounds of rubber. Jumpers require six pounds of leather and two pounds of rubber. The company has 450 pounds of leather and 260 pounds or rubber available per day. Profit from Climbers is $16 a pair and profit from Jumpers is $20 per pair. How many pairs of Climbers and how many pairs of Jumpers should the factory produce per day so that it will have the maximum profit? What is the amount of the maximum profit? [20 pts] **Please show all work to receive credit.**