**Show all work.**
**Simplify your answer.**
**Circle your answer.**

No books, no calculators, no cell phones, no pagers, no electronic devices of any kind.

Name_____

Circle your Discussion Section:

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343  T   12:05--12:55        1412 STERLING
344  R   12:05--12:55        1327 STERLING
345  T   13:20--14:10        1327 STERLING
346  R   13:20--14:10        1327 STERLING
```

| Problem | Points | Score |
|---|---|---|
| 1 | 10 | |
| 2 | 10 | |
| 3 | 10 | |
| 4 | 10 | |
| 5 | 10 | |
| 6 | 10 | |
| 7 | 10 | |
| Total | 70 | |

Solutions will be posted shortly after the exam: www.math.wisc.edu/∼miller/m210

1. (10 pts) Three fair dice are thrown. What is the probability that at most one die comes up a six? Circle your answer.

2. (10 pts) A random variable $X$ has three possible outcomes, 10, 20, and 40. The probability that $X$ is 10 is .2 and the probability that $X$ is 20 is .5. Find the

(a) expected value of $X$, $\mu = E(X)$ and the

(b) variation of $X$, $\nu = Var(X)$.

Circle your answer.

3. (10 pts) Find the equation of the line thru the point $(-2, -1)$ and parallel to the line thru the points $(2, 3)$ and $(4, 1)$. Graph both lines.

4. (10 pts) Suppose that Willie's Waterbeds makes a rectangular children's bed for which the length is 25 percent larger than the width and the sum of the length plus the width is 99 inches. Find the length and width of the bed.

5. (10 pts) The following is the augmented matrix for a system of three linear equations in the four variables $x_1, x_2, x_3, x_4$.

$$\left[\begin{array}{cccc|c} 1 & 1 & 0 & 1 & 4 \\ 0 & 1 & 1 & 0 & 1 \\ 1 & 2 & 1 & 2 & 8 \end{array}\right]$$

If it has a unique solution find it and state that the solution is unique.

If it has no solution state that and say why it has no solutions.

If it has infinitely many solutions, state that it does and find any two distinct solutions.

Circle your answer.

6. (10 pts) Let

$$A = \begin{bmatrix} 1 & 2 \\ -1 & 1 \end{bmatrix} \qquad B = \begin{bmatrix} -1 & -1 \\ 2 & 3 \end{bmatrix}$$

Find $p$ and $q$ such that

$$pA + qB = \begin{bmatrix} -1 & 0 \\ 3 & 7 \end{bmatrix}$$

Circle your answer.

7. (10 pts) Find the inverse (if it exists) of the matrix $A$. Circle your answer.

$$A = \begin{bmatrix} 0 & 1 & 1 \\ 0 & 0 & 2 \\ 1 & 0 & 1 \end{bmatrix}$$

Answers

1. 200/216

2. $\mu = 24 \qquad \nu = 124$

3. $y = -x - 3$

4. 44 by 55

5. There are infinitely many solutions. Two are $[1, 0, 1, 3]$ and $[0, 1, 0, 3]$

6. $p = 1$, $q = 2$

7.
$$\begin{bmatrix} 0 & -1/2 & 1 \\ 1 & -1/2 & 0 \\ 0 & 1/2 & 0 \end{bmatrix}$$