

Show all relevant work. If the provided space is insufficient, then attach additional worksheets to the exam.
Construction tools means: straight edge and compass.

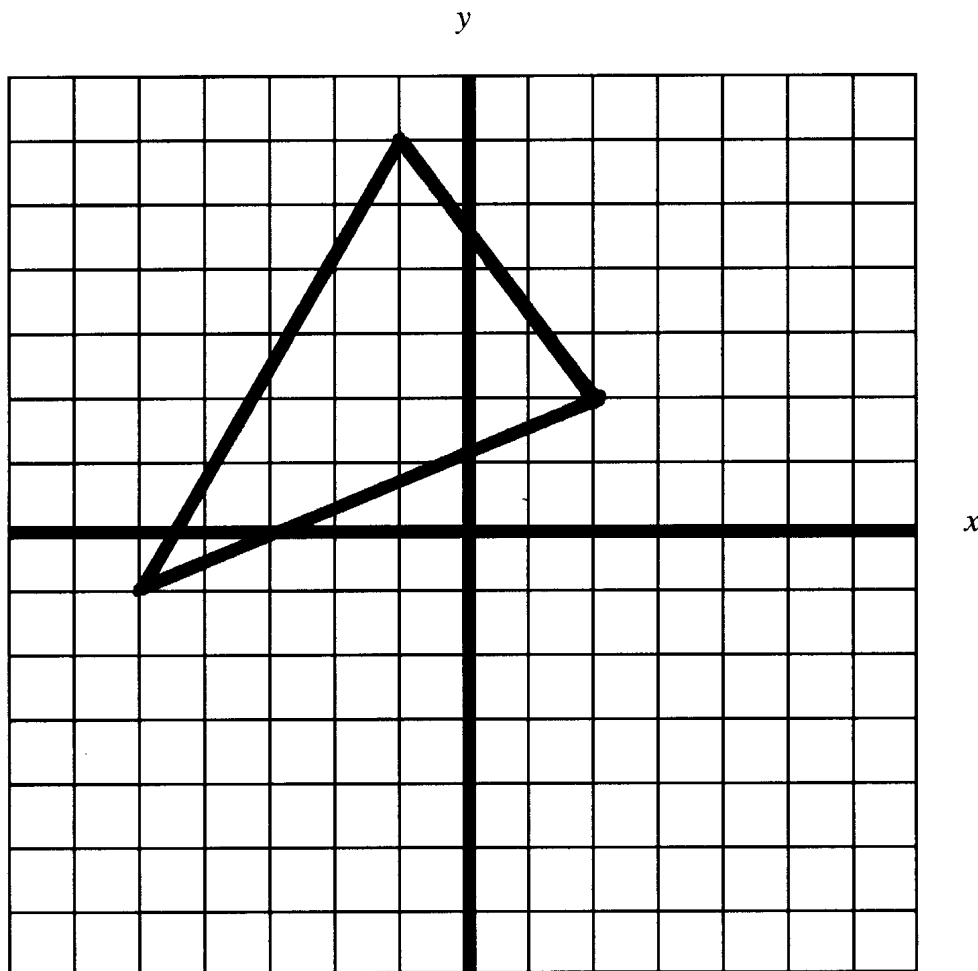
Terms & Definitions (3 Points Each):

On separate paper give a written definition for each of the following terms.

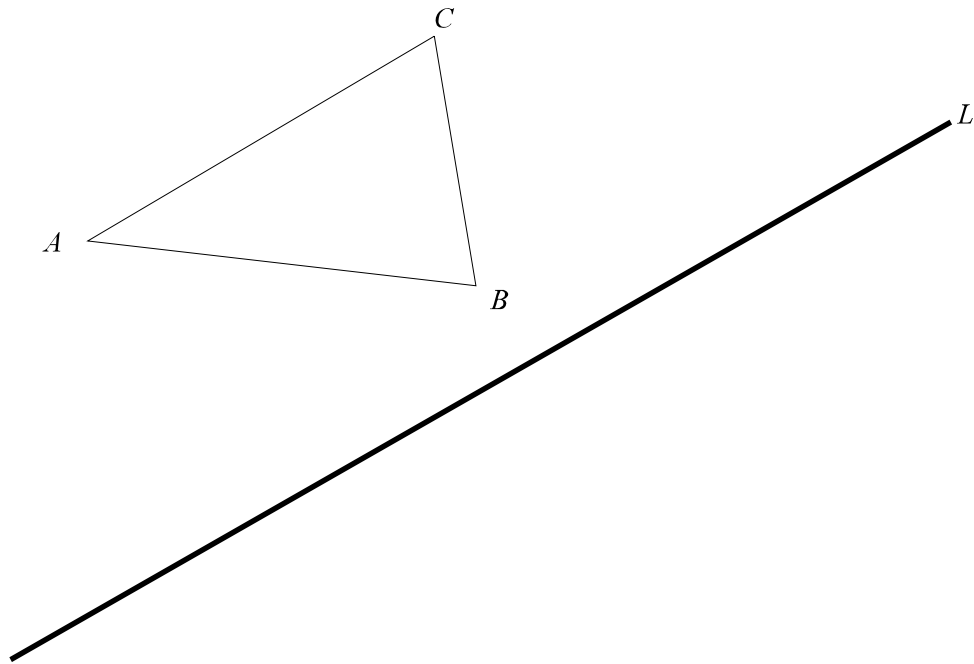
- | | | | |
|-----|--|-----|-------------|
| 10. | Line Symmetry | 13. | Permutation |
| 11. | Event | 14. | Histogram |
| 12. | Probability of Event A in a Sample Space S | 15. | Mean |
| | | 16. | Median |

Problems (6 Points Each):

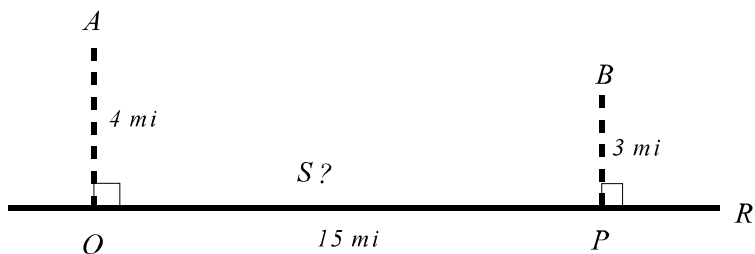
1. Consider the translation $(x,y) \rightarrow (x+2,y-4)$. Find the image of the figure below under this translation.



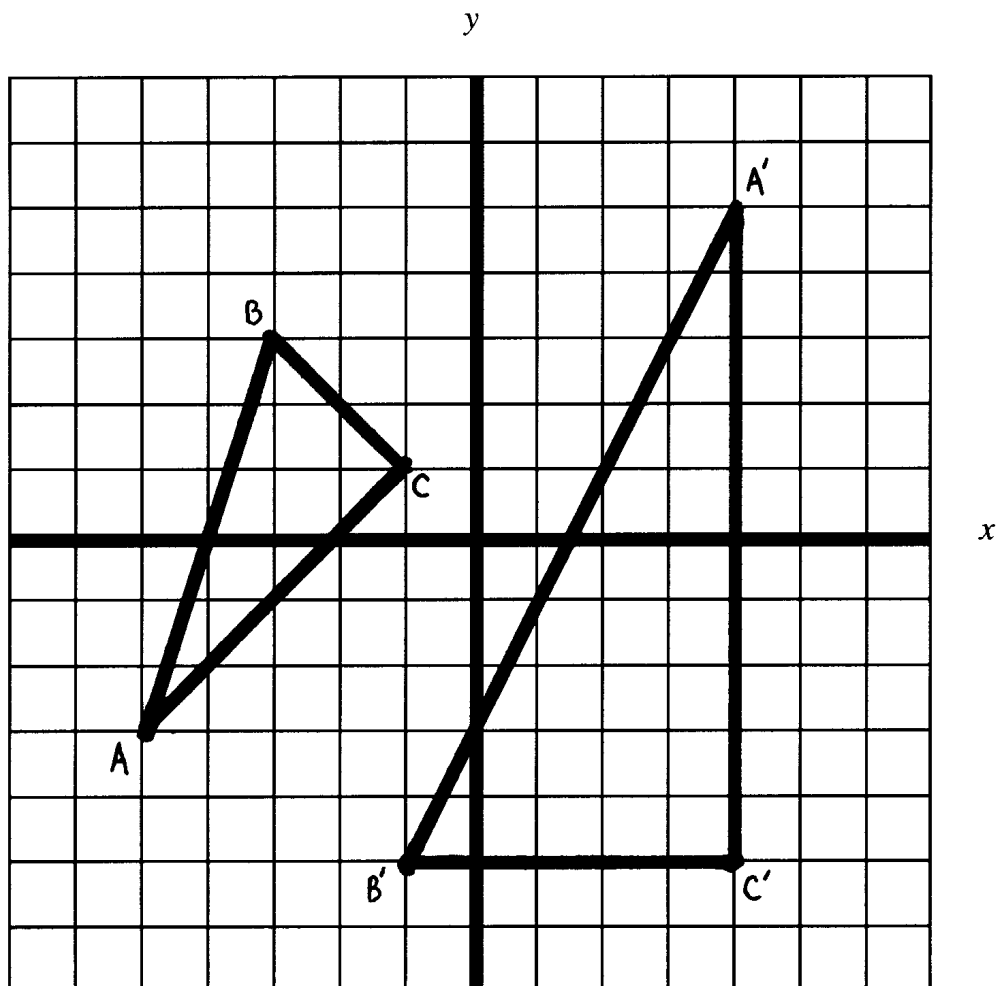
2. Using construction tools find the image of the triangle $\triangle ABC$ upon reflection across the line L .



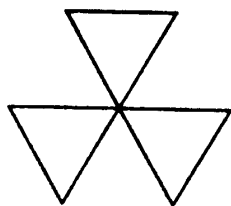
3. Two towns at A and B in the following figure plan to pipe water from a river represented by the line R as shown. The towns have decided to build a single pumping station S at the edge of the river between the towns and to build pipe lines from the station S to the towns. Where (how far from point O) should the station S be located so as to minimize the length of the required pipe lines to towns A and B from S ?



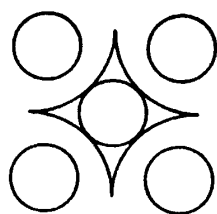
4. Describe a series of transformations which will take $\triangle ABC$ to $\triangle A'B'C'$ which is similar.



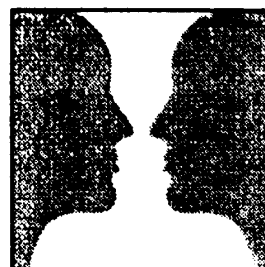
5. For each of the following figures, identify the types of symmetry (line, rotational or point) it possesses.



(a)



(b)



(c)

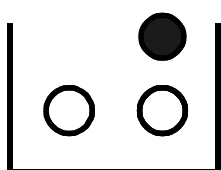
6. In the game of "Between" two cards are dealt from a standard deck of 52 bridge cards. You then pick a third card from the deck. To win, you must pick a card that has a value in between the other two cards. The order of values is 2, 3, 4, 5, 6, 7, 8, 9 10, J, Q, K, A, where the letters represent jack, queen, king and ace, respectively. Determine the probability of winning if the first two cards dealt are the following:

a. 5 and J

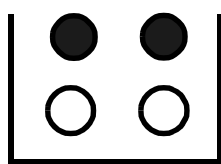
b. 2 and K

c. 5 and 6

7. Below are three boxes which contain white and colored balls. A ball is drawn randomly from box 1 and then placed in box 2. Then, a ball is drawn randomly from box 2 and placed in box 3. Finally, a ball is drawn randomly from box 3. What is the probability that the ball drawn from box 2 is colored? What is the probability that the last ball drawn from box 3 is white?



Box 1

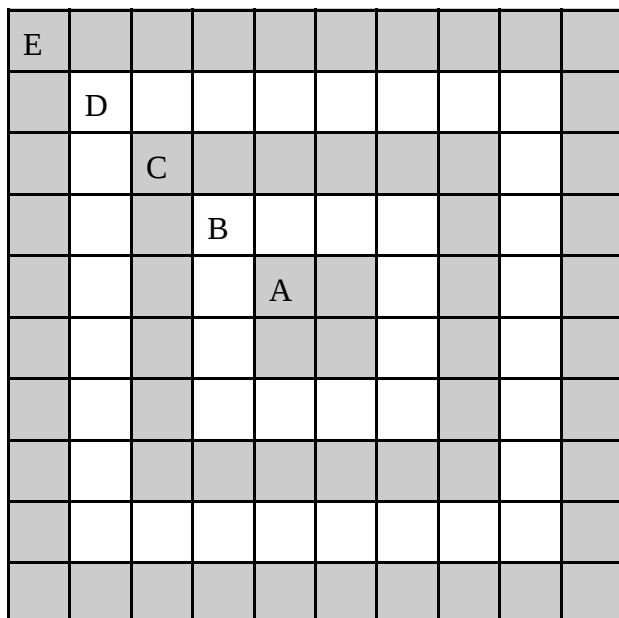


Box 2



Box 3

8. In the following square dart board, suppose a dart is equally likely to land in any region on the board. Points are given as follows:



Region	Points
A	10
B	8
C	6
D	4
E	2

- What is the probability for a dart landing in each region?
- What is the probability that a dart will land in one of the shaded regions?
- What is the expected point value for a dart landing on the board?

9. Find the number of ways to rearrange the letters in the following words:

a. OHIO

c. ILLINOIS

b. IOWA

d. OKLAHOMA

10. The probability that a basketball player will make a free throw successfully at any time in a game is 80%. If the player attempts 6 free throws, what is the probability that the player will make at least 5 of the free throws?

11. Five women live together in an apartment. Three of the women have blue eyes. If two of the women are selected at random, what is the probability that they both will have blue eyes?

12. Consider the following stem-and-leaf plot which gives the weight in kilograms of 15 junior high students.

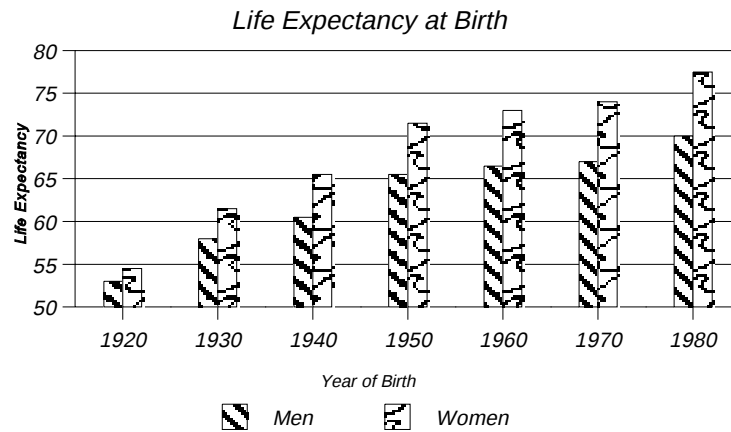
- a. Construct a histogram, based on the stem-and-leaf plot, for the weights of the junior high students.
- b. Find the mean, median and mode for the weights of the junior high students.

**Weights of Junior
High Students**

2		8
3		347779
4		002347
5		67

4 | 3 represents 43 kg

13. The following bar graph shows the life expectancies for men and women:



- a. Whose life expectancy has changed the most since 1920?
 - b. In 1920, about how much longer was a woman expected to live than a man?
 - c. In 1980, about how much longer was a woman expected to live than a man?
14. If the mean weight of the seven linemen on a football team is 270 lbs. and the mean weight of the four backfield members is 210 lbs., what is the mean weight of the 11 -person team?