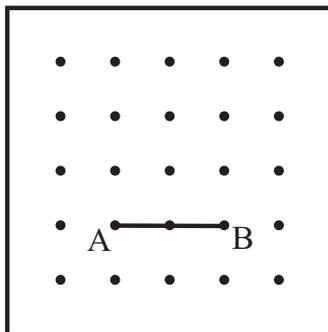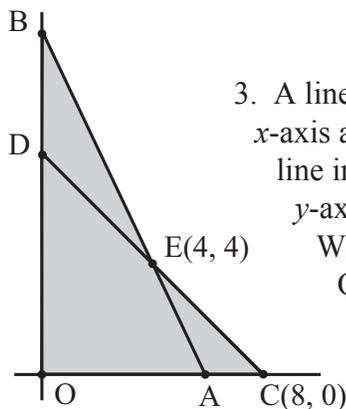1. In the geoboard shown, the points are evenly spaced vertically and horizontally. Segment AB is drawn using two points, as shown. Point C is to be chosen from the remaining 23 points. How many of these 23 points will result in triangle ABC being isosceles?

1. _____ points

2. A sequence of letters consists entirely of Xs and Ys where Xs always appear consecutively in groups of an even number of Xs while Ys always appear consecutively in groups of a multiple of three Ys. How many different sequences of 13 letters are possible? (Note: Four Xs immediately followed by six Xs is considered indistinguishable from ten Xs.)

2. _____ sequences

3. A line with a slope of −2 intersects the positive x-axis at A and the positive y-axis at B. A second line intersects the x-axis at C(8, 0) and the y-axis at D. The lines intersect at E(4, 4). What is the area of the shaded quadrilateral OBEC?

3. _____ sq units

4. What is the sum of the cubes of the first 10 positive odd integers?

4. _____

5. A set of five positive integers has a mean, median and range of 7. How many distinct sets whose members are listed from least to greatest could have these properties? Note: {4, 6, 7, 7, 11} is one such set to include.

5. _____ sets

6.   If $r \# s = r^2 - s^2$, what is the value of 6 # 4?

6. _____

7.   What is the greatest common factor of 20! and 200,000?

7. _____

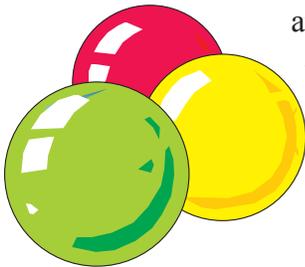8.   Harry has 49 coins totaling $1.00. Harry has only pennies, nickels, dimes and/or quarters. What is the smallest number of dimes he could have?

8. _____ dimes

9. A bag contains 3 red balls, 4 green balls, and 5 yellow balls. If balls are drawn one at a time without replacement, what is the probability that the first yellow ball is drawn on the eighth draw? Express your answer as a common fraction.

9. _____

10. The sum of the perimeters of two equilateral triangles is 45 inches, and the area of the larger one is 16 times the area of the smaller one. What is the area, in square inches, of the larger triangle? Express your answer in simplest radical form.

10. _____ sq inches