**Lesson 5: Functions, Geometry, Passport to Advanced Math**

**Exercise 1-Functions (Algebra 2)**

Use the following chart to answer questions 1 through 5.

|  |  |  |
| --- | --- | --- |
| a | H(a) | G(a) |
| -1 | 5 | -1 |
| 0 | 4 | 4 |
| 1 | 3 | 2 |
| 2 | 2 | 1 |
| 3 | -1 | 0 |
| 4 | 0 | 5 |
| 5 | 1 | 4 |

1. Is H(a) a function? Is G(a) a function? Is H(a) one to one? What about G(a)

2. If H(2b-5)=-1, then Find G(b).

3. H(m)\*G(m)=0. Find all values for m.

4. H-1(5)=s. Find G(-2s)

5. For some value c, G(c)-H(c)= 1. Find H(2c-1).

**Exercise 2-Solid Geometry and Coordinate Geometry**

A sphere is inscribed in a cube. If the Surface Area of the cube is 100, find the volume of the sphere? Find the surface area of the sphere.

A cylinder is inscribed in a rectangular solid. The rectangular solid has a height that is three times the width and a volume of 80. Find the surface area and volume of the cylinder.

The triangle ABC has one side, AB, with length of 10. Another side, BC has length of 12. Find the range of possible values for the area of triangle ABC.

Line Q intersects the origin. Line P follows 6x-12y=30 and is perpendicular to line Q. If line Q also passes through (t,t+1), find the value of t2+4t-5.



Write an equation for the line of best fit that measures the effect of eruption duration in minutes with waiting time between eruptions. Both variables are measured in minutes. Consider Eruption Durations between 0 and 3.5 minutes[[1]](#footnote-2)

**Exercise 3-Data Analysis and Probability**

The chart below shows data from 120 students in Bergen County. The bottom row includes those who chose not to answer the survey question.

|  |  |  |
| --- | --- | --- |
| Number of students | #Hours of HW | #Hours of TV |
| 14 | 2 | .5 |
| 20 | 0 | 2 |
| 14 | 1 | 1 |
| 15 | 3 | 2.5 |
| 21 | 3.5 | 1.5 |
| 18 | 2.5 | 1.8 |
| 4 | 1.5 | 3 |
| 14 | - | - |

Find the median values, mode values, and mean values among those who responded to both survey questions.

One student who initially chose to not respond now decides to respond. The median values for both variables stay the same. Find all possible values for the # hours of TV and # hours of HW that this student engaged in.

Find the median value of HW hours for those who watch less than 2 hours of TV.

In a separate study in New York, researchers find that the HW hours and TV hours are related in the following equation where H measures homework time in hours and T measures TV time in hours:

 H(T)=-T2+4T+6. A mother in New York wants her child to complete 3 hours of HW per night. How many hours of TV watched would correspond with this, on the average?

**Exercise 4-Counting Methods and Probability**

Jack has one crayon for each color of the rainbow (red, orange, yellow, green, blue, and violet).The crayons are to be arranged in a random order. What is the probability that red will be in the first spot and green will be in one of the remaining 2 spots?

In the same set of crayons mentioned above, find the probability that yellow is not in any of the 3 spots.

How many positive 3 digit integers contain exactly two prime digits?

How many positive integers below 1000 contain one digit that is an 8?

A certain coin contains heads and tails, but it is not a fair coin. The probability of heads is .62. Find the probability that when the coin is flipped 5 times, there will be at least 4 heads.

A bag of 20 marbles includes 6 red, 7 blue, 4 white, and 3 purple. Use this information to answer the following two questions.

What is the probability that when 3 marbles are removed without replacement, 2 will be blue and 1 will be purple?

When 4 marbles are removed with replacement, find the probability of obtaining 3 reds and then 1 blue.

1. Image from <http://en.wikipedia.org/wiki/Scatter_plot>. [↑](#footnote-ref-2)