**Equations and Inequalities**

1. Superman wants to figure out if he can buy enough $3 capes and $5 hair gel cannisters, and still stay within his budget of $24 dollars. Which of the following values of x and y satisfy the following inequality?

**A. (3, 5) B. (5, 7) C. (6, 1) D. (6, 2) E. NOTA**

1. The Flash likes to speedily convert one equation into another. However, he sometimes gets stumped. Which of the following equations are equivalent to ?

**A. B.**

**C. D. E. NOTA**

1. Superman, being a superior being, can increase his powers very quickly. Batman, a mere mortal, can only increase his powers linearly. Superman’s power increase can be modeled by the function and Batman’s power increase can be modeled by the function . At what point (x, y) will Batman and Superman be at equal powers?

**A. (-2, 16) B. (0, 0) C. (2, 16) D. (4, 24) E. NOTA**

1. At the Superhero Mall, there are two superhero plushie dispensers. The Batman plushie dispenser initially requires 5 Supercoins to power on, and each Batman plushie costs 3 Supercoins. The Superman plushie dispenser initially requires 2 Supercoins to power on, and each Superman plushie costs 5 Supercoins. Batman and Superman each buy the same amount of plushies at their respective dispensers. The ratio of the number of coins Batman spent and the number of coins Superman spent is . How many plushies, in total, did Batman and Superman buy?

**A. 22**  **B. 20**  **C. 18 D. 11** **E. NOTA**

1. Weather Wizard creates large warm and cold fronts using his weather wand. The area where these fronts intersect is met with tumultuous weather. Graphed on the Cartesian Plane, what is the area of the intersection by the following inequalities:

**A. 5 B. 6 C. 7 D. 8 E. NOTA**

1. Batman has an impressive collection of Bat Credit Cards, each card partially made of silver! There are two types of Bat Credit Cards in his collection: Normal Cards and Deluxe Cards. Normal Cards are composed of 3 ounces of silver, while Deluxe Cards are composed of 6 ounces of silver. If the total number of Bat Credit Cards in his collection is 61, and if it took 225 ounces of silver to create his collection, what is the value of , where a is the number of Normal Cards Batman owns, and b is the number of Deluxe Cards Batman owns.

**A. 624 B. 625 C. 657 D. 658 E. NOTA**

**Statistics**

1. Brandon asked each member of the Justice League to rate him on a scale from 1 to 10. The results came back as follows : 2, 3, 5, 5, 7, 9, 11. What is the sum of the mean, median, mode, and range of the data set?

**A. 24 B. 25 C. 26 D. 27 E. NOTA**

1. The interquartile range (IQR) of a data set is the difference between the lower quartile (Q1) and the upper quartile (Q3).

IQR = Q3 - Q1

For example, given {1, 3, 3, 7, 8, 9}, Q3 = 8 and Q1 = 3, so IQR = 8 - 3 = 5.

What is the IQR of this data set? {2, 3, 5, 8, 9, 11}

**A. 3 B. 4 C. 5 D. 6 E. NOTA**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6 | 3 | 6 | 9 | 9 | 9 | 9 |  |  |
| 7 | 0 | 0 | 2 | 4 | 5 | 5 | 8 | 9 |
| 8 | 1 | 4 | 5 | 6 | 7 | 8 | 8 | 8 |
| 9 | 0 | 2 | 3 | 3 | 4 | 5 | 9 |  |

Clark Kent surveyed the public by asking random individuals on the street, “How confident are you that I am Superman?” What is the sum of median, mode, and range of the data he collected, represented on the plot above?

**A. 185 B. 186 C. 187 D. 188 E. NOTA**

1. What is the name of the plot Clark Kent used in Question 9?

**A. Box-and-whiskers plot B. Scatter Plot**

**C. Spaghetti Plot D. Stem-and-leaf plot E. NOTA**

1. Which one of the following graphs would be the most appropriate for the data Clark collected?

**A. Line Graph B. Histogram C. Pie Chart**

**D. Spaghetti Plot E. NOTA**

1. When Correy asked DJ Rubber Ducky how many more songs he will play, DJ Rubber Ducky merely gave Correy this accurate probability distribution below. What is the probability DJ Rubber Ducky will play 6 more songs?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Value | 1 | 2 | 3 | 4 | 5 | 6 |
| Probability | 0.2 | 0.2 | 0.1 | 0.1 | 0.3 | ? |

**A. 0.1 B. 0.6 C. 0.9 D. 1 E. NOTA**

**Number Fun**

1. Pentagonal numbers are given by the formula , where is the nth pentagonal number. Aquaman loves identifying pentagonal numbers, because they can be used to create cool pentagonal patterns! Today, Aquaman realized his age is equal to the 5th pentagonal number. How old is Aquaman?

**A. 1 B. 5 C. 35 D. 94 E. NOTA**

1. Suppose that the numbers 11, 13, 41, 43 are assigned to variables a, b, c, d, in no particular order. If the value of is the largest it can be, what is ?

**A. 24 B. 52 C. 56 D. 84 E. NOTA**

1. Hawkgirl is counting kettles of hawks in the sky. She first sees a kettle of two hawks, then a kettle of five hawks, then a kettle of eight hawks. This arithmetic sequence of hawks continues. How many hawks will be in the forty-fourth kettle Hawkgirl sees?

**A. 127 B. 128 C. 129 D. 130 E. NOTA**

1. Leon is tired of Superman constantly bragging about himself. He gives Superman an “impossible problem”: to compute the sum . To Leon’s dismay, Superman answered correctly within seconds. What is the correct answer?

**A. 115 B. 4545 C. 5000 D. 5050 E. NOTA**

1. The Green Lantern can exterminate 8 goons an hour. Brandon, on the other hand, can only exterminate 1 goon every hour. The Green Lantern decides to help Brandon out with his pitiful extermination rate. How long would it take for the Green Lantern and Brandon, working together, to exterminate 100 goons, in hours? Round up to the next whole number if your answer isn’t a whole number.

**A. 9 B. 10 C. 11 D. 12 E. NOTA**

1. Brandon and the Green Lantern are now ready to take on big kahunas. They can defeat 10 big kahunas in 10 hours using 10% of their power. What percent of their power do they have to use to defeat 12 big kahunas in 4 hours? (Assume that the percent of power they use is directly proportional to the rate of defeating big kahunas.)

**A. 5% B. 10% C. 30% D. 40% E. NOTA**

**Exponents and Radicals**

1. Batman loves the number seven, because there are seven members of the Justice League. He sometimes just multiplies seven by itself over and over and over to see what number he’ll get. What is the units digit of ?

**A. 1 B. 3 C. 7 D. 9 E. NOTA**

1. Superman isn’t fond of multiplying numbers over and over – he has things to do! Help him out and find the tens digit of ?

**A. 1 B. 2 C. 3 D. 4 E. NOTA**

1. Amy gives the following equation to Wonder Woman to see if it stumps her. Solve for x.

**A. 2 B. 3 C. 4 D. 5 E. NOTA**

1. The Green Lantern getting ready to blast Sinestro with his green laser beam. Sinestro is 6 feet directly in front of the Green Lantern, and the Green Lantern is levitating 8 feet above Sinestro. Ignoring the height of the two super humans, how long, in feet, will the Green Lantern’s laser beam need to be to hit Sinestro?

**A. 10 B. 10.5 C. 11 D. 14 E. NOTA**

1. What is the value of ?

**A. 2 B. 4 C. 8 D. 16 E. NOTA**

1. Batman keeps on getting caught in supervillians’ traps, such as this: evaluate .

**A. -16 B. -8 C. 8 D. 16 E. NOTA**

**Money**

For reference, a quarter = $0.25, a dime = $0.10, a nickel = $0.05, a penny = $0.01. Half dollars will not be used in any of these questions.

1. Martian Manhunter has just arrived on Earth. Unfortunately, he does not have any Earth money and only has 40 Martian dollars. If one Martian dollar is equal to $3.14 in Earth money and the standard cost of a bottle of water (in Earth money) is $2.50, how many bottles of water can he buy?

**A. 16 B. 50 C. 51 D. 125.6 E. NOTA**

1. The Justice League cannot continue to finance itself by just fighting crime. Thus, they turn to Gotham City’s wealthiest individual, Bruce Wayne, for financial assistance. Bruce Wayne says he can provide the Justice League with half a million dollars each year for five years and will raise it to 1 million dollars per year after that. At the end of the 13th year, how much money will Bruce Wayne have given to the Justice League?

**A. $2,500,000 B. $5,000,000 C. $5,250,000**

**D. $10,500,000 E. NOTA**

1. Superman decides to open a bank account and deposit the $1000 he found lying on the street. After 5 years, he withdraws all the money in that account. Which of the following expressions accurately represents $1000 compounded annually for 5 years with 5% interest?

**A. B. C.**

**D. E. NOTA**

1. On Superman’s home planet, Krypton, there are 4 different denominations of coins: Foo, Bar, Sawgon, and Ligma. A Foo is worth $0.06, a Bar is worth $0.09, a Sawgon is worth $0.66, and a Ligma is worth $0.69. What is the minimum number of coins to make perfect change for $4.20, using at least 3 different coins?

**A. 6 B. 7 C. 8 D. 9 E. NOTA**

1. The Green Lantern wants to give Wonder Woman 25 cents for her help. (He’s pretty cheap.) How many different combinations are there to make 25 cents using quarters, dimes, nickels, and pennies?

**A. 13 B. 14 C. 15 D. 16 E. NOTA**

1. Tommy bought a Batman action figure initially priced at $45. He used a 20%-off percent coupon that he received from Bruce Wayne himself. After the discount, it is taxed at 2%. How much did Tommy pay for the toy?

**A. $7.20 B. $9.00 C. $36.00 D. $36.72 E. NOTA**