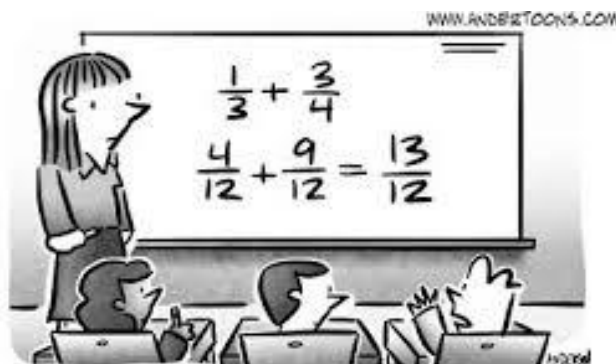


Fourteenth Annual PI Competition

Math II Team Test



"OK, we made it so they had something in common, added them together, and then the end result is *improper*? I mean, I kinda feel like we just made things worse!"

Math II Team Problem 1

There are 12 blue marbles, 8 red marbles, and 16 white marbles in a bag. You grab marbles out of the bag one marble at a time. If you grab multiple marbles in succession, you put them back into the bag before grabbing another one.

Let Y = the probability of grabbing a red marble

Let S = the probability of grabbing a white marble

Let A = the probability of grabbing a white marble and a red marble

Let L = the probability of grabbing 2 blue marbles

What is $S \times L \div A \times Y$? Express your answer as a fraction.

Math II Team Problem 2

Solve each question for x , then find the mean of the different values of x . Express your answer as a decimal.

- A) $3x + 3 = 12$
 - B) $2(x + 5) = 10$
 - C) $4(x - 2) = 28$
 - D) $4(x - 3) = 3(x + 2)$
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Math II Team Problem 3

Express your answer in terms of pi (π).

Let U = the circumference of a circle with radius 7

Let B = the area of a circle with diameter 8

Let L = the circumference of a circle inscribed in a square with side length 10

Let E = the diameter of a circle with area 25π

What is $(B + L + U) \times E$

Math II Team Problem 4

Find $AB + CD$ if:

- A) $f(2)$ where $f(x) = x^2 + 9x - 15$
 - B) $g(3)$ where $g(x) = 9(x - 1)^4 - 8x$
 - C) $h(14)$ where $h(x) = x^2 + 6x - 2$
 - D) $k(4)$ where $k(x) = (x - 3)(x + 3)$
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Math II Team Problem 5

Let T = the number of ounces in 2 tons(4000 pounds)

Let A = the number of liters in 153 milliliters

Let R = the number of feet in 15 yards

Let P = the number of centimeters in 31 decameters

What is $T + R + A - P$

Math II Team Problem 6

Let H = the 9th term in the sequence $\{1, 1, 2, 3, 5, 8, \dots\}$

Let D = the 6th term in the sequence $\{16, 8, 4, 2, \dots\}$

Let S = the next term in the sequence $\{\frac{2}{8}, \frac{3}{9}, \frac{2}{5}, \frac{5}{11}, \dots\}$

Let A = the 7th term in the sequence $\{6, 12, 18, \dots\}$

What is $D + A + S + H$

Math II Team Problem 7

Consider the following set of numbers: $\{-5, 12, 9, -3, -5, 22, 8, -2, -9\}$

Let A = the mode of the set of numbers

Let E = the range of the set of numbers

Let R = the median of the set of numbers

Let G = the mean of the set of numbers

What is $R + A \times G + E$

Math II Team Problem 8

Let $x = 2$, $y = -2$, and $z = 5$:

$$F = (z - y) + (y + 4x)$$

$$O = y(yz + 3x)$$

$$L = -3y - z^x$$

$$W = (xy + z)^2$$

What is $W \times O \times L \times F$

Math II Team Problem 9

Solve each equation and find the median of the set created by the solutions.

A) $11 - \frac{(14-9) \times 5}{75 \div 15}$

B) $\frac{65}{4} \div \frac{5}{8} - 13$

C) $\sqrt{32} \times \sqrt{2}$

D) $|5 - 17|$

Math II Problem 10

Consider the list of numbers $\{2, 5, 9, 13, 7, 12, 29, 33, 4, 6\}$

If a number is randomly picked from this list,

Let I = the probability of picking an odd integer

Let K = the probability of picking an even integer

Let N = the probability of picking a prime number

Let E = the probability of picking a double-digit integer

What is $(N + I) - (K + E)$
