MATH LEAGUE COMPETETION
DECEMBER 12th, 2013
SENIOR DIVISION

INDIVIDUAL ROUND

NAME : _____ SCHOOL:_____ TEAM #:_____

_____ 1. Today is Thurday, what day of the week will it be 100 days from now?

_____ 2. Three CD's are bought at an average cost of $15 each. If a fourth CD is purchased, the average cost becomes $16. What is the cost of the fourth CD?

_____ 3. The units digit in the product $\left(5^2+1\right)\left(5^3+1\right)\left(5^{23}+1\right)$ is

_____ 4. Given $w\Omega e = w^2 - e$, then the value of $5\ \Omega\ (5\ \Omega\ 5) =$

_____ 5. The product of 2, 3, 5, and y is equal to its sum. What is the value of y?

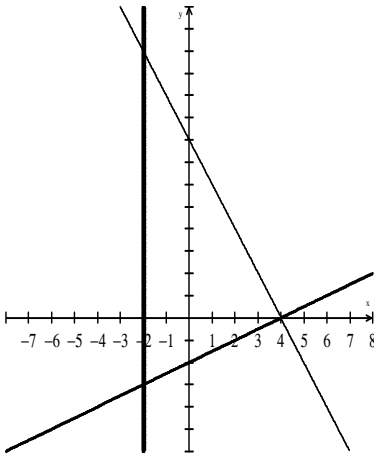
_____ 6. In a sequence, every term after the second term is **twice the sum of the two preceding terms.** The seventh term of the sequence is 8, and the ninth term is 24. What is the eleventh term of the sequence?

_____ 7. The number of solutions (x, y) of the equation $3x + y = 100$, where x and y are **positive integers**, is

_____ 8. The parabola defined by the equation $y = (x-1)^2 - 4$ intersects the x-axis at the points P and Q. If (a, b) is the mid-point of the line segment PQ, what is the value of a?

_____ 9. When a positive integer N is divided by 60, the remainder is 49. When N is divided by 15, the remainder is

_____ 10. The lines $y = -2x + 8$ and $y = \frac{1}{2}x - 2$ meet at $(4, 0)$, as shown. The area of the triangle formed by these two lines and the line $x = -2$ is …



_____ 11. If $\frac{1}{x} = 2$ and $3 = \frac{1}{x} + \frac{3}{y}$, then $x + y$ =

_____ 12. The digits 2, 2, 3, and 5 are randomly arranged to form a four digit number. What is the probability that the sum of the first and last digits is even?

_____ 13. If $2^x = 15$ and $15^y = 32$, the value of xy is

_____14. Lines are *concurrent* if they each pass through the same point. The lines $y = 2x + 3$, $y = 8x + 15$, and $y = 5x + b$ are concurrent. What is the value of b?

_____ 15. In the multiplication shown, P and Q each represent a single digit, and the product is 32 951. What is the value of P + Q?

$$\begin{array}{r} 39P \\ \times\ \ Q3 \\ \hline \\ \hline 32951 \end{array}$$

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ANSWERS !

INDIVIDUAL ROUND

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SAT 1. Today is Thurday, what day of the week will it be 100 days from now?

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$\frac{10}{29}$ 5. The product of 2, 3, 5, and *y* is equal to its sum. What is the value of *y*?

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1 8. The parabola defined by the equation $y = (x-1)^2 - 4$ intersects the *x*-axis at the points *P* and *Q*. If (*a*, *b*) is the mid-point of the line segment *PQ*, what is the value of *a*?

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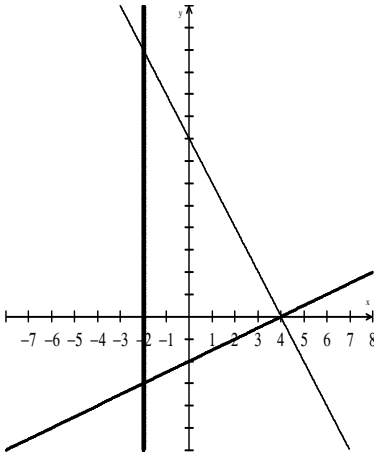

$\frac{7}{2}$ 11. If $\frac{1}{x} = 2$ and $3 = \frac{1}{x} + \frac{3}{y}$, then $x + y$ =

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