

# The Weekly Rigor

No. 149

“A mathematician is a machine for turning coffee into theorems.”

April 29, 2017

## SAT Math Test Problem Children: Randomized Problem Set 2

(Part 2)

8. What are the solutions to  $3x^2 + 12x + 6 = 0$  ?

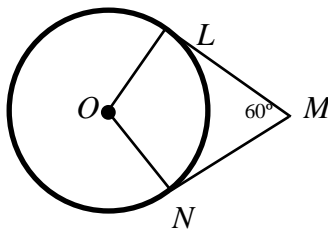
9.

$$ax + by = 11$$

$$2x + 6y = 77$$

In the system of equations above,  $a$  and  $b$  are constants. If the system has infinitely many solutions, what is the value of  $\frac{a}{b}$  ?

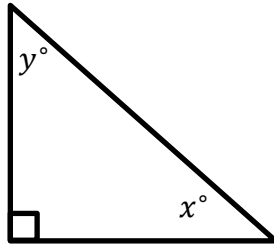
10.



In the figure above, point  $O$  is the center of the circle, line segments  $LM$  and  $MN$  are tangent to the circle at points  $L$  and  $N$ , respectively, and the segments intersect at point  $M$  as shown. If the circumference of the circle is 45, what is the length of minor arc  $\widehat{LN}$  ?

11. If  $x > 0$  and  $3x^2 + 5x - 2 = 0$ , what is the value of  $x$ ?

12.



In the triangle above, the sine of  $x^\circ$  is 0.4. What is the cosine of  $90^\circ - x^\circ$  ?

13.

$$(x + 2)^2 - 9 = 0$$

What is a value of  $x$  that satisfies the equation above?

14.

$$\begin{aligned} kx - 5y &= 3 \\ 6x - 7y &= 6 \end{aligned}$$

In the system of equations above,  $k$  is a constant and  $x$  and  $y$  are variables. For what value of  $k$  will the system of equations have no solution?

15. Which of the following complex numbers is equivalent to  $\frac{5-7i}{10+4i}$  ? (Note:  $i = \sqrt{-1}$ )

- A)  $\frac{5}{10} + \frac{7i}{4}$
- B)  $\frac{5}{10} - \frac{7i}{4}$
- C)  $\frac{11}{58} - \frac{45i}{58}$
- D)  $\frac{11}{58} + \frac{45i}{58}$

“Only he who never plays, never loses.”