The Weekly Rigor

No. 137 "A mathematician is a machine for turning coffee into theorems." February 4, 2017

SAT Math Test Problem Children: Systems of Linear Equations

(Part 5)

15.

$$ax + by = 9$$
$$3x + 4y = 54$$

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

16.

$$ax + by = 11$$
$$2x + 6y = 77$$

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

17.

$$kx - 2y = 5$$
$$3x - 4y = 8$$

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?

18.

$$kx - 5y = 3$$
$$6x - 7y = 6$$

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?

19. Which of the following equations represents a line that is parallel to the line with equation $y = -4x + 4$?

A) $6x + 4y = 15$
B) $4x - y = 7$
C) $8x + 2y = 6$
D) $x + 2y = 1$

20. Which of the following equations represents a line that is parallel to the line with equation $y = 2x + 3$?

A) $6x + 4y = 3$
B) $8x - 4y = 7$
C) $8x + 2y = 7$
D) $x + 6y = 10$

21.

$y = x - 3$
$2y - 2x = 6$

The system of equations above consists of two equations, and the graph of each equation in the *xy*-plane is a line. Which of the following statements is true about these two lines?

A) The lines are parallel.

B) The lines are the same.

C) The lines are perpendicular.

D) The lines intersect at $(-3, 6)$.