

# SAT Math: Essential Algebra 1 Concepts

## I. Exponent Rules

$$1. \frac{y^4 z^{-4} x^9}{z^5 x^3 y^{-2}}$$

$$2. (3x - 4y^2)(3x + 4y^2)$$

$$3. -8x^3(7x^6 - 3x^5)$$

$$4. \frac{28x^4 y^3}{4xy}$$

$$5. \sqrt[6]{x^4} (\sqrt[3]{x^4})$$

$$6. \frac{(2a^{-1} \sqrt{b})^4}{ab^{-3}}$$

$$7. \frac{(8x^5 y^4)(6x^{13} y^3)}{16x^6 y^{14}}$$



## II. Systems of Equations

8. For the system of equations shown below, what is the value of  $x$ ?

$$2x + 3y = 3$$

$$x - y = 4$$

9. What is the solution  $(x, y)$  to the system of equations shown below?

$$10x - 8y = 4$$

$$-5x + 3y = -9$$

10.  $-3y + ax = 36$ ,  $2y - 10x = 14$  If  $a$  is a constant, for what value of  $a$  will the system of equations have no solution?

11.  $3y - 6x = 12$ ,  $ty + zx = 48$ .  $t$  and  $z$  are constants. If the system of equations has infinite solutions, what is the value of  $\frac{t}{z}$ ?

12. How many possible solutions exist for the system of equations?

$$y = x^2 + 2x - 5$$

$$4x + 3y = 10$$

A. 0

B. 1

C. 2

D. Infinite

13. How many possible solutions exist for the system of equations?

$$y = x^2 + 3x - 8$$

$$-4x - 2y = 4$$

A. 0

B. 1

C. 2

D. Infinite

### III. Imaginary Numbers

14.  $(4 + 9i) + (7 - 6i) =$

15. What is the sum of  $5 + 5i$  and  $8 + 11i$ ?

16.  $(13 + 12i) - (4i^2 - 10i) =$

17.  $(6 + 7i) - (-5i^2 - 4i) =$

18. Put into the form of  $a + bi$ :  $\frac{5+10i}{4+3i}$

19. Put into the form of  $a + bi$ :  $\frac{22+10i}{2+2i}$

