13. When $\frac{1}{3}k + \frac{1}{4}k = 1$, what is the value of k ?

A. $\frac{1}{7}$

B. $\frac{12}{7}$

C. $\frac{7}{2}$

D. 6

E. 12

11. For all x, $(3x + 7)^2 = ?$

A. $6x + 14$

B. $6x^2 + 14$

C. $9x^2 + 49$

D. $9x^2 + 21x + 49$

E. $9x^2 + 42x + 49$

15. If $3^x = 54$, then which of the following must be true?

A. $1 < x < 2$
B. $2 < x < 3$
C. $3 < x < 4$
D. $4 < x < 5$
E. $5 < x$

9. The expression $(3x - 4y^2)(3x + 4y^2)$ is equivalent to:

A. $9x^2 - 16y^4$

B. $9x^2 - 8y^4$

C. $9x^2 + 16y^4$

D. $6x^2 - 16y^4$

E. $6x^2 - 8y^4$

22. If a, b, and c are positive integers such that $a^b = x$ and $c^b = y$, then $xy = ?$

F. ac^b

G. ac^{2b}

H. $(ac)^b$

J. $(ac)^{2b}$

K. $(ac)^{b^2}$

47. If r and s can be any integers such that $s > 10$ and $2r + s = 15$, which of the following is the solution set for r ?

A. $r \geq 3$
B. $r \geq 0$
C. $r \geq 2$
D. $r \leq 0$
E. $r \leq 2$

23. Which of the following expressions is equivalent to $\frac{1}{2}y^2(6x + 2y + 12x - 2y)$?

A. $9xy^2$

B. $18xy$

C. $3xy^2 + 12x$

D. $9xy^2 - 2y^3$

E. $3xy^2 + 12x - y^3 - 2y$

24. For nonzero numbers x and y, which of the following expressions is NOT equivalent to $\frac{-x}{y}$?

"Which of the following" Questions require you to test each one

F. $\frac{-x}{-y}$ $= \frac{-1(x)}{-1(y)}$

G. $\frac{x}{-y}$

H. $-\frac{x}{y}$

J. $\frac{-\pi x}{\pi y}$

K. $-\frac{1}{\frac{y}{x}}$ reciprocal

$$\frac{-x}{y} = -\frac{x}{y} = -1\left(\frac{x}{y}\right) = \frac{x}{-y} = \frac{-1(x)}{y} = \frac{x}{-1(y)}$$

37. Which of the following is NOT a factor of $z^5 - 16z$?

DO YOUR FIGURING HERE.

FACTORS

A. $z^2 - 1$
B. $z^2 - 4$
C. $z + 2$
D. z
E. $z - 2$

A

Factoring $z^5 - 16z$ becomes $z(z^4 - 16)$

Difference of Two squares → $z(z^2 - 4)(z^2 + 4) = z(z-2)(z+2)(z^2+4)$

38. What is the sine of α in the right triangle shown in the

19. $(2x - 3y)^2$ is equivalent to:

→ **A.** $4x^2 - 12xy + 9y^2$

B. $4x^2 - 10xy + 9y^2$

C. $4x^2 - 9y^2$

D. $4x^2 + 9y^2$

E. $4x - 6y$

$(a-b)^2 =$

$a^2 - 2ab + b^2$

Binomial Squared

Take 1st Term & Square it $(2x)^2 = 4x^2$

Take 2nd Term and Square it $(-3y)^2 = 9y^2$

Take both terms and multiply them and the double the product

$2x * -3y = -6xy * 2 = -12xy$

18. When $y = x^2$, which of the following expressions is equivalent to $-y$?

F. $(-x)^2$

G. $-x^2$

H. $-x$

J. x^{-2}

K. x

8. What is the simplified form of $-(3x + 5)^2$?

f. $9x^2 + 30x + 25$

g. $-9x^2 - 25$

h. $9x^2 + 25$

i. $-9x^2 - 30x - 25$

j. $-39x^2 - 25$

13. For what value of a is $x = 3$ a solution to the equation $x + 3 = ax + 9$?

A. 1.5
B. 1
→ C. −1
D. −1.5
E. −3

MAKE $x \to 3$

$$3 + 3 = a \cdot 3 + 9$$
$$6 - 9 = 3a$$
$$-3 = 3a$$
$$-1 = a$$

GO ON TO THE NEXT PAGE.

33. If $\sqrt{2x} - 5 = 1$, then $x = ?$

A. −8
B. 8
C. 9
D. 12
E. 18

E

You can do in your head

DO YOUR FIGURING HERE.

Solving for x

$(\sqrt{2x})^2 = (6)^2$

$2x = 36$

$x = 18$

Polynomials

15. $(4x^2 - 3x + 7) - (-1 + 5x + 2x^2)$ is equivalent to:

→ **A.** $2x^2 - 8x + 8$
B. $2x^2 + 2x + 8$
C. $2x^4 + 2x^2 + 6$
D. $6x^2 - 8x + 6$
E. $6x^4 - 8x^2 + 6$

$4x^2 - 3x + 7 + 1 - 5x - 2x^2$

$2x^2 - 8x + 8$

DO YOUR FIGURING HERE.

Make sure you distribute the negative properly.

19. $(2x - 3y)^2$ is equivalent to:

→ **A.** $4x^2 - 12xy + 9y^2$

B. $4x^2 - 10xy + 9y^2$

C. $4x^2 - 9y^2$

D. $4x^2 + 9y^2$

E. $4x - 6y$

$(a-b)^2 =$

$a^2 - 2ab + b^2$

Binomial Squared

Take 1st Term & Square it $(2x)^2 = 4x^2$

Take 2nd Term and Square it $(-3y)^2 = 9y^2$

Take both terms and multiply them and the double the product

$2x * -3y = -6xy * 2 = -12x$

9.0 can have 0.1 of a plant

31. What are the (x,y) coordinates of the unique point on the graph of $x + 4y = 18$ such that the y-coordinate of that point is twice the x-coordinate?

A. (1,2)
→ B. (2,4)
C. (3,6)
D. (4,8)
E. (9,18)

You can quickly try each one and see what works. Start with the small ones first (B) works

48. What is the value of $(x + 2)(x - 3) + 5$ when $x^2 - x - 6 = -4$?

F. -2
G. -1
H. 1
J. 2
K. 3

$(x+2)(x-3) = x^2 - x - 6 = -4$

Substitute $(x+2)(x-3)$ with -4

$(-4) + 5 = \underline{1}$

15. What polynomial must be added to $x^2 - 2x + 6$ so that the sum is $3x^2 + 7x$?

A. $4x^2 + 5x + 6$

B. $3x^2 + 9x + 6$

C. $3x^2 + 9x - 6$

D. $2x^2 + 9x - 6$

E. $2x^2 - 5x + 6$

21. $(a + 2b + 3c) - (4a + 6b - 5c)$ is equivalent to:

A. $-4a - 8b - 2c$
B. $-4a - 4b + 8c$
C. $-3a + 8b - 2c$
D. $-3a - 4b - 2c$
E. $-3a - 4b + 8c$

This month, Heather sold 75 figurines in 2 sizes. The large figurines sold for $15 each, and the small figurines sold for $10 each. The total amount of money received for the large figurines was the same as the total received for the small figurines. How many large figurines did Heather sell this month?

F. 25
G. 30
H. 37
J. 45
K. 50

What are the 2 positive integers such that the square root of their sum is 5 and the square root of their product is 12 ?

A. 2 and 3
B. 3 and 4
C. 5 and 144
D. 9 and 16
E. 12 and 25