

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 $\frac{-x}{y}$?

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

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

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

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

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

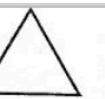
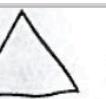
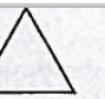
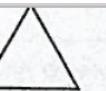
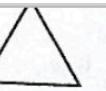
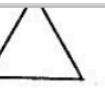
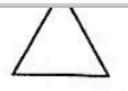
$$\frac{-1(x)}{-1(y)}$$

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

reciprocal

ACT-61B-SAMPLE

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



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

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

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

DO YOUR FIGURING HERE.

FACTORS

Factoring $z^5 - 16z$ becomes $z(z^4 - 16)$
Difference of Two squares $\rightarrow z(z^2 - 4)(z^2 + 4) = z(z-2)(z+2)(z^2+4)$

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. $4x - 6y$

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

then add 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 $x \rightarrow 3$

$$3 + 3 = a \cdot 3 + 9$$

$$6 - 9 = 3a$$

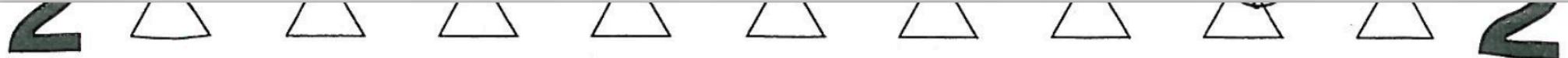
$$-3 = 3a$$

$$-1 = a$$

ACT-57B

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GO ON TO THE NEXT PAGE.



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

- E
→
A. -8
B. 8
C. 9
D. 12
E. 18

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. $4x - 6y$

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

then add the double the Product

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

→ 9.0 N-1 *you have 0.1 of a plant out now*

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

$$(-4) + 5 = 1$$



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?

- L. 2 and 3
- M. 3 and 4
- N. 5 and 144
- O. 9 and 16
- P. 12 and 25