Comprehensive Algebra Drill

The answers can be found in Part IV.

4. If $\dfrac{a^2 + 2x}{3} = 5$ and $a^2 + 2 = \dfrac{7x}{5}$, then what is the value of x?

    (A) 2.24
    (B) 3
    (C) 3.82
    (D) 5
    (E) 28.33

8. For which of the following values of k does $x^2 + 3.5x + k = 0$ have one distinct, real root?

    (A) −3.5
    (B) −1.75
    (C) 3.0625
    (D) 6.125
    (E) 7

10. If $x + \sqrt[3]{x} = 30$, then what is the value of x?

    (A) 3.107
    (B) 17.578
    (C) 25
    (D) 27
    (E) 27,000

14. If y subtracted from $4x$ is the cube root of 2, and $3x$ subtracted from $2y$ is the square of 3, then what is the sum of x and y?

    (A) −28.14
    (B) −10.26
    (C) 5.73
    (D) 10.26
    (E) 28.41

16. If the maximum value of a quadratic function is −2, then how many distinct real roots COULD the function have?

    I. 0
    II. 1
    III. 2

    (A) I only
    (B) II only
    (C) I and III only
    (D) II and III only
    (E) I, II, and III

24. If $2x^2 + bx + c = 0$, then for which of the following values of b and c are there no real values of x?

    (A) $b = 0,\ c = 0$
    (B) $b = -6,\ c = 4$
    (C) $b = -8,\ c = 8$
    (D) $b = 3,\ c = 1$
    (E) $b = -9,\ c = 11$

26. If $\left| \dfrac{x^3 + 5}{2} \right| < 6$, then

    (A) $-2.57 < x < 1.91$
    (B) $-1.91 < x < 2.57$
    (C) $-1.710 < x < 1.91$
    (D) $x < -1.91$ or $x > 2.57$
    (E) $x < -2.57$ or $x > 1.91$

36. For how many real values of x does $2x^4 - 5x^3 + x^2 - 6x + 9 = 0$?

    (A) 5
    (B) 4
    (C) 3
    (D) 2
    (E) 1

40. If $-3 < a < 4$, and $-2 < b < 2$, then what is the range of $(a+b)^2$

(A) $0 \leq (a+b)^2 < 36$

(B) $25 < (a+b)^2 < 36$

(C) $-25 < (a+b)^2 < 36$

(D) $-36 < (a+b)^2 < 25$

(E) $0 < (a+b)^2 < 36$

46. If $x \neq \pm 2$, then $\dfrac{x^3 - 2x^2 + 4x - 8}{x^4 - 16} =$

(A) $\dfrac{1}{x+2}$

(B) $\dfrac{1}{x-2}$

(C) $\dfrac{1}{x}$

(D) $\dfrac{1}{x^2 - 4}$

(E) $x - 2$

49. If $f(x) = x^4 + x^3 - 5x^2 + 2$ and $g(x) = 2x + 3$, which of the following is true?

(A) $f(x) = g(x)$ for exactly 4 values of x.
(B) $f(x) = g(x)$ for exactly 3 values of x.
(C) $g(x) = 0$ for exactly 4 values of x.
(D) $f(x) = 0$ for exactly 3 values of x.
(E) $f(x) \neq g(x)$ for any value of x when $-2 < x < 2$