E is None of These.

1. Simplify: $x\sqrt{24x^3} + \sqrt{48x} - \sqrt{54x^5}$; $x > 0$

   a) $5x^2\sqrt{3x}$ 　　　　 b) $4\sqrt{3x} + 5x^2\sqrt{6x}$ 　　　 c) $4x^2\sqrt{9x}$ 　　　 d) $4\sqrt{3x} - x^2\sqrt{6x}$

2. Simplify: $\sqrt{5} \bullet \sqrt[6]{8} \bullet \sqrt[8]{81}$.

   a) $\sqrt[24]{3240}$ 　　　　　　 b) $\sqrt{30}$ 　　　　 c) $6\sqrt[6]{5}$ 　　　　 d) $\sqrt[3]{30}$

3. Simplify: $\dfrac{\sqrt{2} - 3}{\sqrt{2} + 1}$

   a) $5 - 4\sqrt{2}$ 　　　　　　 b) $1 - \dfrac{3}{2}\sqrt{2}$ 　　 c) $2 + 3\sqrt{2}$ 　　　 d) $5 + 5\sqrt{2}$

4. Which of the following is a factor of $(x^3 - 16)$?

   a) $x + 2\sqrt[3]{2}$ 　　　　　　　　　 b) $x^2 + 2x\sqrt[3]{2} + 4\sqrt[3]{4}$

   c) $x^2 - 2x\sqrt[3]{2} + 4\sqrt[3]{4}$ 　　　　 d) $x^2 + 2x\sqrt[3]{2} + 2\sqrt[3]{4}$

5. For what value(s) of (a, b) will make this statement true: $\dfrac{\sqrt{a} - \sqrt{b}}{\sqrt{b} - \sqrt{a}} = -1$

   a) all values of (a, b) 　　　　　　　　 b) no value of (a, b)
   c) all values of (a, b), if $a > b$ 　　　　 d) all values of (a, b), if $a \neq b$

6. Which of the following term is in the simplified form of: $\sqrt{9x^4 + 9x^6 y^{-2}}$?

   a) $\sqrt{3x^2 + 3y^2}$ 　　　 b) $3x^2 y$ 　　　 c) $\sqrt{1 + x^2}$ 　　　 d) $\dfrac{3x^2\sqrt{x^2 + y^2}}{y}$

7. Simplify: $3\sqrt[4]{5x^4 + \dfrac{x^4}{16}} + \dfrac{2\sqrt[5]{x^5}}{\sqrt[3]{27}}$; $x > 0$

   a) $\dfrac{9x\sqrt[4]{6} + 2x}{8}$ 　　　 b) $\dfrac{13}{6}x$ 　　　 c) $\dfrac{31}{6}x$ 　　　 d) $\dfrac{27x\sqrt[4]{6} + 8}{12}$

8. Which of the following is equivalent to: $\left(2^{-2}-3^{-2}\right)^{-\frac{1}{2}}$?

    a. -1   b) 1   c) $\dfrac{3}{5}\sqrt{5}$ d) $\dfrac{6}{5}\sqrt{5}$

9. Solve: $\dfrac{1}{2+\sqrt{x}}+3\sqrt{x}=\dfrac{19}{8}$

    a) $\dfrac{4}{9}$ b) .44   c) $\dfrac{5}{9}$ d) $\dfrac{2}{3}$

10. Simplify: $\sqrt{\dfrac{x}{y^3}}\div\sqrt{\dfrac{y}{x^3}}$; $x>0,\ y>0$

    a) $\dfrac{x}{y}$ b) $\dfrac{x^2}{y^2}$ c) $\dfrac{y^2}{x^2}$ d) $\dfrac{y}{x}$

11. Find the smallest zero of $y=\left|\sqrt[3]{.02x-.1}\right|-.5$.

    a) -1.43   b) -1.35   c) -1.25   d) -1.13

12. If $g(x)=\sqrt{x}$ and $f(x)=\sqrt{x+1}$, find $g(g(f(x-1)))$.

    a) $\sqrt[8]{x}$ b) $\sqrt[6]{x}$ c) $\sqrt[4]{x}$ d) $\sqrt{x}$

13. Solve: $\sqrt{x+1}+\sqrt{x}=2$.

    a) $\frac{1}{8}$ b) $\frac{1}{4}$ c) $\frac{1}{2}$ d) $\frac{9}{16}$

14. $f(x)=\sqrt{x}$. Find $f(f(f(20736)))$.

    a) $\sqrt{6}$ b) $\sqrt[4]{6}$ c) $2\sqrt{3}$ d) $\sqrt[6]{6}$

15. Simplify: $\displaystyle\sum_{3}^{11}\dfrac{1}{\sqrt{n+1}+\sqrt{n}}$

    a) $2\sqrt{3}-\sqrt{11}$ b) $2-2\sqrt{3}$ c) $2\sqrt{3}$ d) $\sqrt{3}$

16. Simplify: $x\sqrt[4]{16x^6}+\sqrt{x^4}+x\sqrt{9x^2}$; $x>0$

    a) $2x(\sqrt{x}+x)$ b) $2x^2(\sqrt{x}+2)$ c) $x^2(2\sqrt{x}+3)$ d) $x(2x\sqrt{x}+3\sqrt{x}+x)$

2

17. Simplify: $\dfrac{1}{\sqrt{2}-\sqrt{3}+1}+\dfrac{1}{\sqrt{2}-\sqrt{3}-1}$

    a) $-5\sqrt{2}+4\sqrt{3}$ b) $-\sqrt{2}-\sqrt{3}$ c) $\dfrac{\sqrt{2}+\sqrt{6}}{2}$ d) $\dfrac{\sqrt{2}}{2}$

18. One of the solutions to $x^2-\sqrt{3}\,x-18=0$ is:

    a) $-\sqrt{3}$ b) $\sqrt{3}$ c) $2\sqrt{3}$ d) $3\sqrt{3}$

19. Find the sum of the solutions to: $\sqrt{y+5}+\sqrt{8-y}=5$

    a) -3 b) -1 c) 3 d) 4

20. Simplify: $\sqrt[3]{8c^2d^4}\cdot\sqrt{9c^3d^3}$

    a) $6c^2d^2\sqrt[12]{c^2d^3}$ b) $6c^2d^2\sqrt[6]{cd^5}$ c) $6cd\sqrt[6]{c^2d^3}$ d) $6c^2d^2\sqrt[3]{c^2d}$

21. Which of the following equations has the solution $2-3\sqrt{6}$?

    a) $x^2+4x-50=0$ b) $x^2-4x-50=0$
    c) $x^2+3\sqrt{6}\,x+2=0$ d) $x^2+3\sqrt{6}\,x-2=0$

22. Simplify: $\left(2\sqrt{3}+\sqrt{2}-3\right)\left(\sqrt{3}-2\sqrt{2}+1\right)$.

    a) $-1-5\sqrt{2}+5\sqrt{3}-3\sqrt{6}$ b) $7-5\sqrt{2}+5\sqrt{3}-3\sqrt{6}$
    c) $7-5\sqrt{2}-\sqrt{3}-3\sqrt{6}$ d) $-1+7\sqrt{2}-\sqrt{3}-3\sqrt{6}$

23. Find the y-coordinate of the intersection of the graphs: $y=\sqrt{x+1}$ and $y=\sqrt{x-3}+1$.

    a) 5.25 b) 2.5 c) 1.75 d) 1

24. Solve for y: $\sqrt{7+2\sqrt{y}}-\sqrt{7-2\sqrt{y}}=2$

    a) 6 b) 5 c) 3 d) 2

25. Which of the following ordered pairs satisfy the equation: $\sqrt{x+2\sqrt{y}}-\sqrt{x-2\sqrt{y}}=2$?

    a) $(3,1)$ b) $(-2,7)$ c) $(4,5)$ d) $(6,5)$

26. A baseball thrown horizontally from a height of h and an initial velocity v_o will travel

    m meters according to the relationship: $s = v_o \sqrt{\dfrac{h}{4 \cdot 9}}$ (ignoring wind resistance).

    What is the initial velocity if a baseball is thrown horizontally from a height of 3.6m and traveled 18.2 m? (nearest tenth)

    a) 15.6   b) 18.4   c) 23.1   d) 27.8

27. The speed of sound in air varies directly as the square root of the Kelvin temperature. If the speed of sound was 320m/s when the temperature was 256°K, what was the temperature when the speed of sound was 100m/s?

    a) 25   b) 80   c) 100   d) 120

28. Find the sum $a + b$ if $\left(2 + 3\sqrt{7}\right)\left(a + b\sqrt{7}\right) = -107 - 13\sqrt{7}$.

    a) -6   b) -3   c) 2   d) 7

29. Which of the following values of c will give the following equations radical solutions: $x^2 - 3x + c = 0$?

    a) $-\dfrac{7}{4}$ b) $\dfrac{5}{4}$ c) $\dfrac{7}{4}$ d) $\dfrac{9}{4}$

30. The expression $\sqrt{10 + \sqrt{10 + \sqrt{10 + \sqrt{10 + \ldots}}}}$,where … indicate an infinite repeating

    pattern, can be expressed in the form $\dfrac{a + \sqrt{b}}{c}$, find b.

    a) 2   b) 19   c) 37   d) 41

Tie-Breakers:

1. Simplify: $\sqrt{13 - 4\sqrt{3}} - \sqrt{31 + 12\sqrt{3}} + \sqrt{12 - 6\sqrt{3}}$.

2. For what value of c will $x^2 - 3\sqrt{2}\,x + c = 0$ have 2 as a solution?

3. What is the function shown in the graph? Point shown is (-3, -2)