1. Find the real-number root.

$\sqrt[3]{-\dfrac{1}{64}}$

[A] $-\dfrac{1}{4}$ [B] $-\dfrac{1}{64}$ [C] $\dfrac{1}{16}$ [D] $-\dfrac{1}{192}$

2. Simplify the radical expression. Use absolute value symbols when needed.

$\sqrt{9a^{10}}$

[A] $3\overset{8}{a}$ [B] $9a^8$ [C] $9\left| a \right|^5$ [D] $3\left| a \right|^5$

3. Multiply. Simplify if possible.

$4\sqrt{6} \cdot 2\sqrt{20}$

[A] $\sqrt{120}$ [B] $32\sqrt{30}$ [C] $16\sqrt{30}$ [D] $3\sqrt{20}$

4. Rationalize the denominator of the expression. Assume that all variables are positive.

$\dfrac{\sqrt{108x^9 y}}{\sqrt{3x^7 y^2}}$

[A] $\dfrac{6x\sqrt{y}}{y}$ [B] $\dfrac{\sqrt{324x^{16}y^3}}{\sqrt{3x^7 y^2}}$ [C] $\dfrac{\sqrt{36x^2}}{\sqrt{y}}$ [D] $\dfrac{36x^4\sqrt{y}}{y}$

5. $3\sqrt{7} - 3\sqrt{64} + 7\sqrt{112}$

[A] $31\sqrt{7} - 24 + 7\sqrt{112}$ [B] $7\sqrt{7}$ [C] $7\sqrt{183}$ [D] $31\sqrt{7} - 24$

6. $\sqrt{54} + \sqrt{24}$

7. Multiply.
$$\left(4 - \sqrt{3}\right)\left(8 + \sqrt{11}\right)$$

Rationalize the denominator. Simplify the answer.

8. $\dfrac{2 + \sqrt{6}}{2 - \sqrt{6}}$ [A] -5 [B] -1 [C] $-5 - 2\sqrt{6}$ [D] $-\dfrac{5}{2} - \sqrt{6}$

9. $\dfrac{2+3\sqrt[3]{3}}{\sqrt[3]{6}}$

10. Write the expression in radical form.

$2x^{\frac{7}{13}}$

[A] $2\sqrt[13]{x^7}$ [B] $\sqrt[7]{(2x)^{13}}$ [C] $\sqrt[13]{(2x)^7}$ [D] $2\sqrt[7]{x^{13}}$

11. Solve.

$\sqrt{x+8}-9=9$

12. Solve. Check for extraneous solutions.

$\sqrt{x+2}=x-10$

13. Let $f(x)=\dfrac{1}{x}$ and $g(x)=x^3$. Find $\dfrac{f(x)}{g(x)}$.

[A] x^4 [B] $\dfrac{x-1}{x^3}$ [C] $\dfrac{1}{x^4}$ [D] $\dfrac{x^3+1}{x}$

14. Let $f(x)=3x+4$ and $g(x)=x-1$. Find $f(x)-g(x)$.

15. Let $f(x)=8x-4$ and $g(x)=8x-7$. Find $(g\circ f)(2)$.

[A] 88   [B] 68   [C] 67   [D] 89

46. Divide. State any restrictions on the variables.

$$\frac{x^2+11x+30}{x^2-25} \div \frac{x+6}{x-6}$$

[A] $\dfrac{x-6}{x-5}$; $x \neq \pm 5, \pm 6$　　　　　　[B] $\dfrac{x+5}{x-6}$; $x \neq \pm 5, \pm 6$

[C] $\dfrac{x+5}{x-5}$; $x \neq 5$　　　　　　　　　　[D] $\dfrac{11x+6}{5}$; $x \neq 5$

47. Add or subtract. Simplify where possible.

$$\frac{x^2-7x-8}{x^2+6x+5} - \frac{1}{x+5}$$

Simplify the complex fraction.

48. $\dfrac{2-\dfrac{4}{3}}{3-\dfrac{2}{7}}$　　[A] $\dfrac{70}{69}$　　　　[B] $\dfrac{57}{14}$　　　　[C] 798　　　[D] $\dfrac{14}{57}$

49. $\dfrac{\dfrac{2}{x}+\dfrac{1}{3x}}{\dfrac{4}{3x}-\dfrac{3}{2x}}$　　[A] $\dfrac{1}{12x^2}$　　[B] $-\dfrac{1}{14}$　　[C] -14　　[D] $\dfrac{3}{12x^2}$

Solve the equation. Check each solution.

50. $\dfrac{x-9}{x-5} = \dfrac{x-3}{x+2}$

51. $\dfrac{4}{x^2-4}\ \ \dfrac{1}{x-2} = 1$　　[A] $-3, 0$　　[B] -3　　[C] $2, -3$　　[D] 0