

A.5 - A.7

Review Boost

$$1. (x^2+1)^4 [x^2 - 4(x^2+1)]$$

$$(x^2+1)^4 [x^2 - 4x^2 - 4]$$

$$(x^2+1)^4 (-3x^2 - 4)$$

$$2. (1-2x)^{-3/2} [x + (1-2x)]$$

$$(1-2x)^{-3/2} (-x+1), x \neq \frac{1}{2}$$

$$3. (4-x^2)^{1/2} [(4-x^2+x^2)]$$

$$(4-x^2)^{1/2} (4)$$

$$\frac{4}{(4-x^2)^{3/2}}, x \neq \pm 2$$

$$4. \frac{6(x+3) - 5}{x+3}$$

$$x+3$$

$$\frac{6x+13}{x+3}, x \neq -3$$

$$5. \frac{2(x-1) - 1(x+2)}{(x+2)(x-2)(x-1)}$$

$$2x-2-x-2$$

$$(x+2)(x-2)(x-1)$$

$$\frac{x-4}{(x+2)(x-2)(x-1)}, x \neq \pm 2, 1$$

$$6. \frac{2x-5(-1)}{x-5}$$

$$x-5$$

$$\frac{2x+5}{x-5}, x \neq 5$$

$$7. \frac{(x-3)(x+2)}{(x+3)(x+3)} \cdot \frac{x+3}{(x+2)(x-2)}$$

$$\frac{x-3}{(x+3)(x-2)}, x \neq -3, \pm 2$$

$$8. \frac{x+2}{5(x-3)} \cdot \frac{5(x-3)}{x-2}$$

$$\frac{x+2}{x-2}, x \neq 3, 2$$

$$9. \frac{(x+1)(x-1)}{x} \cdot \frac{x}{(x-1)(x-1)}$$

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

$$\frac{x+1}{x-1}, x \neq 0, 1$$

10.

$$\begin{aligned}
 & \frac{1}{1 + \frac{1}{x - \frac{1}{\frac{x^2+1}{x}}}} = \frac{1}{1 + \frac{1}{x - \frac{x}{x^2+1}}} \\
 &= \frac{1}{1 + \frac{1}{\frac{x(x^2+1) - x}{x^2+1}}} = \frac{1}{1 + \frac{1}{\frac{x^3+x-x}{x^2+1}}} = \frac{1}{1 + \frac{x^2+1}{x^3}} \\
 &= \frac{1}{\frac{1 \cdot x^3 + x^2 + 1}{x^3}} = \boxed{\frac{x^3}{x^3 + x^2 + 1}}, \quad x \neq 0
 \end{aligned}$$

$x^2+1 \neq 0$
 $x^2 \neq -1 \checkmark$
 $x^3 \neq 0$
 $x \neq 0 \checkmark$

11.

$$\begin{array}{r}
 2 \overline{) 1024} \\
 \underline{2 512} \\
 2 \overline{) 256} \\
 \underline{2 128} \\
 2 \overline{) 64} \\
 \underline{2 32} \\
 2 \overline{) 16} \\
 \underline{2 8} \\
 2 \overline{) 4} \\
 \underline{2 0} \\
 2
 \end{array}$$

$$\left((2^{10} x^{11} y^{12})^{1/2} \right)^{1/5} = (2^{10} x^{11} y^{12})^{1/10}$$

$$= 2^1 \cdot x^{11/10} \cdot y^{12/10} = 2 \sqrt[10]{x^{11} y^{12}}$$

$$= \boxed{2|x||y| \sqrt[10]{x y^2}}$$

$$13. \frac{4x^{3/2} y^{1/2}}{3x^{2/3} y} = \boxed{\frac{4x^{5/6}}{3y^{1/2}}}, \quad x \neq 0, y \neq 0$$

$$14. \left(\sqrt[3]{-64} \right)^4 = (-4)^4 = \boxed{256}$$

12.

$$\begin{array}{r}
 2 \overline{) 48} \\
 \underline{2 24} \\
 2 \overline{) 12} \\
 \underline{2 6} \\
 2 \overline{) 6} \\
 \underline{2 0} \\
 3
 \end{array}$$

$$\boxed{4|x|\sqrt{3x}}$$

$$15. \frac{7}{\sqrt[3]{x}} + 70x$$

$$\frac{7 \cdot \sqrt[3]{x^2}}{\sqrt[3]{x} \cdot \sqrt[3]{x^2}} + 70x$$

$$\frac{7\sqrt[3]{x^2}}{x} + 70x$$

$$\boxed{\frac{7x^{2/3} + 70x^2}{x}, x \neq 0}$$

$$16. \frac{7}{i\sqrt{5}+2} \cdot \frac{i\sqrt{5}-2}{i\sqrt{5}-2}$$

$$= \frac{7i\sqrt{5} - 14}{5i^2 - 4}$$

$$= \frac{7i\sqrt{5} - 14}{-9}$$

$$= \boxed{\frac{14 - 7i\sqrt{5}}{9}}$$

$$17. \frac{3-\sqrt{6}}{3+\sqrt{6}} \cdot \frac{3-\sqrt{6}}{3-\sqrt{6}}$$

$$\frac{9 - 6\sqrt{6} + 6}{9 - 6}$$

$$\frac{15 - 6\sqrt{6}}{3}$$

$$\boxed{5 - 3\sqrt{6}}$$

$$18. x^{4/3} y^{3/2}$$

$$\frac{x^{4/3} y^1}{x^{4/3} y^1}$$

$$\boxed{y^{1/2}, x \neq 0, y \neq 0}$$

$$19. 8i \cdot 5|x| = \boxed{40|x|i}$$

$$20. y^8 \cdot y^3 = \boxed{y^{11}}$$

$$21. \frac{8x^{-4/3}}{16x^{-8/3}} = \boxed{\frac{x^{4/3}}{2}, x \neq 0}$$

$$22. \boxed{10i}$$

$$23. \boxed{-10-12i}$$

$$24. 7 - (-5)$$

$$\boxed{12}$$

$$25. \boxed{15i|x|}$$

$$26. \boxed{-1+4i}$$

$$27. \boxed{6-6i}$$

$$28. -32 - 16i\sqrt{3} + 10i\sqrt{3} + 15i^2$$

$$\boxed{-47 - 6i\sqrt{3}}$$

$$29. \boxed{15 - 30i}$$

$$30. (4 + 12i - 9)(2 + 3i) = \boxed{-46 + 9i}$$

$$(-5 + 12i)(2 + 3i) = -10 - 15i + 24i + 36i^2$$

$$31. 1 - 4i + 4i^2$$

$$\boxed{-3 - 4i}$$

$$32. \begin{array}{r} 50 \\ 4 \overline{) 201} \\ \underline{-20} \\ 1 \end{array}$$

$$(i^4)^{50} \cdot i$$

$$1 \cdot i$$

$$\boxed{i}$$

$$33. \begin{array}{r} 4 \\ 4 \overline{) 17} \\ \underline{-16} \\ 1 \end{array}$$

$$(i^4)^4 \cdot i$$

$$\boxed{i}$$

$$34. \begin{array}{r} 17 \\ 4 \overline{) 68} \end{array}$$

$$(i^4)^{17} = \boxed{1}$$

$$35. \begin{array}{r} 8 \\ 4 \overline{) 35} \\ \underline{-32} \\ 3 \end{array}$$

$$(i^4)^8 \cdot i^3 = i^3 = \boxed{-i}$$

$$36. \frac{(2+i)(3+i\sqrt{2})}{3-i\sqrt{2} \cdot 3+i\sqrt{2}}$$

$$\frac{6 + 2i\sqrt{2} + 3i + \sqrt{2}i^2}{9 - 2i^2}$$

$$\boxed{\frac{6 - \sqrt{2} + (2\sqrt{2} + 3)i}{11}}$$

$$37. \frac{(5-6i)(2-3i)}{(2+3i)(2-3i)}$$

$$\frac{10 - 15i - 12i + 18i^2}{4 - 9i^2}$$

$$\boxed{\frac{-8 - 27i}{13}}$$

$$38. \frac{(8+3i)(5+4i)}{(5-4i)(5+4i)}$$

$$\frac{40 + 32i + 15i + 12i^2}{25 - 16i^2}$$

$$\boxed{\frac{28 + 47i}{41}}$$

$$39. \frac{8}{1+6i} \cdot \frac{1-6i}{1-6i}$$

$$\frac{8 - 48i}{1 - 36i^2}$$

$$\boxed{\frac{8 - 48i}{37}}$$

$$C1. (3x+2)(1-x)^2 [7(3x+2) + (1-x)]$$

$$(3x+2)(1-x)^2 (21x+14+1-x)$$

$$(3x+2)(1-x)^2 (20x+15)$$

$$\boxed{5(3x+2)(1-x)^2 (4x+3)}$$

$$C2. 2x(x-5)^3 [(x-5) - 2x]$$

$$2x(x-5)^3 (-x-5)$$

$$\boxed{-2x(x-5)^3 (x+5)}$$

$$C3. (3-4x)^{1/3} [5(3-4x)^{1/3} - 8(5x-1)]$$

$$\boxed{(3-4x)^{1/3} [5(3-4x)^{1/3} - 40x + 8]}$$