A.5 - A.7
Review Boost

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

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

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

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

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

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

$\boxed{\dfrac{4}{(4-x^2)^{3/2}},\ x\neq\pm2}$

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

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

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

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

$\boxed{\dfrac{x-4}{(x+2)(x-2)(x-1)},\ x\neq\pm2,1}$

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

$\boxed{\dfrac{2x+5}{x-5},\ x\neq5}$

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

$\boxed{\dfrac{x-3}{(x+3)(x-2)},\ x\neq-3,\pm2}$

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

$\boxed{\dfrac{x+2}{x-2},\ x\neq3,2}$

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

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

$\boxed{\dfrac{x+1}{x-1},\ x\neq0,1}$

10.
$$\frac{1}{1+\dfrac{1}{x-\dfrac{1}{\dfrac{x^2+1}{x}}}} = \frac{1}{1+\dfrac{1}{x-\dfrac{x}{x^2+1}}}$$

$$= \frac{1}{1+\dfrac{1}{\dfrac{x(x^2+1)-x}{x^2+1}}} = \frac{1}{1+\dfrac{1}{\dfrac{x^3+x-x}{x^2+1}}} = \frac{1}{1+\dfrac{x^2+1}{x^3}}$$

$$= \frac{1}{\dfrac{1\cdot x^3+x^2+1}{x^3}} = \boxed{\frac{x^3}{x^3+x^2+1},\ x\neq 0}$$

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

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

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

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

2 | 1024
2 | 512
2 | 256
2 | 128
2 | 64
2 | 32
2 | 16
2 | 8
2 | 4
2

12.
2 | 48
2 | 24
2 | 12
2 | 6
3

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

18. $\dfrac{x^{4/3} y^{3/2}}{x^{4/3} y^1}$

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

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

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

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

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. $4\overline{)201}$ R 1

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

$1 \cdot i$

$\boxed{i}$

33. $4\overline{)17}$ R 1

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

$\boxed{i}$

34. $4\overline{)68}$

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

35. $4\overline{)35}$ R 3

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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