

Simplify. Write without negative exponents.

1. $(2x^3y^2)^3$

$$\boxed{8x^9y^6}$$

3. $\left(\frac{3x^2y^4}{2z}\right)^3$

$$\boxed{\frac{27x^6y^{12}}{8z^3}}$$

Simplify.

5. $\sqrt[3]{54}$

$$\boxed{3\sqrt[3]{2}}$$

7. $\frac{\sqrt[3]{56}}{\sqrt[3]{7}} = \sqrt[3]{\frac{56}{7}} = \sqrt[3]{8} = \boxed{2}$

9. $(3 + 2\sqrt{3})(2 - 4\sqrt{3})$

$$6 - 12\sqrt{3} + 4\sqrt{3} - 8\sqrt{9}$$

$$6 - 8\sqrt{3} - 24 = \boxed{-18 - 8\sqrt{3}}$$

Write in radical form:

11. $3x^{\frac{3}{4}} \cdot x^{-\frac{1}{4}}$

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

$$3x^{\frac{2}{4}}$$

$$3x^{\frac{1}{2}} = \boxed{3\sqrt{x}}$$

2. $\frac{-3x^2y^4z}{2xy^5z^{-4}}$

$$-3x^{2-1}y^{4-5}z^{1-(-4)} = \boxed{\frac{-3xz^5}{y}}$$

4. $(3X^{-3})^{-2}$

$$3^{-2}X^6 = \frac{X^6}{3^2} = \boxed{\frac{X^6}{9}}$$

6. $\sqrt{6} \cdot \sqrt{2} = \sqrt{12} = \boxed{2\sqrt{3}}$

8. $2\sqrt{12} + 3\sqrt{48} - 2\sqrt{75}$

$$4\sqrt{3} + 12\sqrt{3} - 10\sqrt{3} = \boxed{6\sqrt{3}}$$

10. $\frac{2+\sqrt{3}}{4-\sqrt{3}} \cdot \frac{(4+\sqrt{3})}{(4+\sqrt{3})}$

$$\frac{8+2\sqrt{3}+4\sqrt{3}+\sqrt{9}}{16-\sqrt{9}} = \frac{8+6\sqrt{3}+3}{16-3}$$

$$= \boxed{\frac{11+6\sqrt{3}}{13}}$$

12. $y^{\frac{2}{3}}z^{\frac{1}{3}}$

$$\boxed{\sqrt[3]{y^2z}}$$

Write with positive rational (fractional) exponents.

13. $\sqrt[3]{x^5}$

$$\boxed{x^{\frac{5}{3}}}$$

14. $\frac{x^{\frac{1}{2}}y^2}{x^2y^{\frac{3}{2}}}$

$$x^{\frac{1}{2}-2} y^{2-\frac{3}{2}} = \boxed{\frac{y^{\frac{1}{2}}}{x^{\frac{3}{2}}}}$$

Simplify:

15. $4(-3i) - 6(4+2i)$
 $-12i - 24 - 12i$

$$-24i - 24$$

$$\boxed{-24 - 24i}$$

16. $(5-2i)^2$

$$(5-2i)(5-2i)$$

$$25 - 10i - 10i + 4i^2$$

$$25 - 20i + 4(-1)$$

$$25 - 20i - 4$$

$$\boxed{21 - 20i}$$

17. $\frac{2+5i}{1-3i} \cdot \frac{(1+3i)}{(1+3i)}$

$$\frac{2+6i+5i+15i^2}{1-9i^2} = \frac{2+11i-15}{1+9} = \boxed{\frac{-13+11i}{10}}$$

18. i^{45}

$$\frac{45}{4} = 11 \cdot 25$$

$$\boxed{i}$$

i^1	i	0.25
i^2	-1	0.5
i^3	$-i$	0.75
i^4	1	Whole #

19. $i^{34} + i^{17}$

$$\frac{34}{4} = 8 \cdot 5 \quad \frac{17}{4} = 4 \cdot 25$$

$$\boxed{-1 + i}$$

20. $i^{32} - i^{24}$

$$\frac{32}{4} = 8 \quad \frac{24}{4} = 6$$

$$i - i = \boxed{0}$$

21. $(5^{x+7})(5^{3x-4})$

$$5^{x+7+3x-4}$$

$$\boxed{5^{4x+3}}$$