

SM2 Unit 3 Extra Practice

3.1-3.3-Simplify each expression containing fractional exponents. Describe the process you used.

1) $49^{3/2}$
 $\sqrt{49}^3$
 $7^3 = \boxed{343}$

2) $(8a^3)^{1/3}$
 $\sqrt[3]{8a^3} = \boxed{2a}$

3) $(81k^{16})^{1/4}$
 $\sqrt[4]{81k^{16}}$
 $\boxed{3k^4}$

4) $3^{1/7} 3^{1/4}$
 $3^{1/7 + 1/4} = \boxed{3^{11/28}}$

5) $\frac{6y^{1/2}}{15y^{2/3}}$
 $\frac{2}{5} y^{1/2 - 2/3} = \frac{2}{5} y^{-1/6} = \boxed{\frac{2}{5y^{1/6}}}$

6) $(x^{5/3})^{-2}$
 $x^{-10/3} = \boxed{\frac{1}{x^{10/3}}}$

7) $x^0 \cdot 4x^3 \cdot 3x^{-2/3}$
 $12x^{3 - 2/3}$
 $\boxed{12x^{7/3}}$

8) $(a^{2/3} b^{5/4})^{1/6}$
 $a^{2/3 \cdot 1/6} b^{5/4 \cdot 1/6} = \boxed{a^{1/9} b^{5/24}}$

9) $(x^{1/2} y)(x^{-3/4} y^{1/2})$
 $x^{1/2 - 3/4} y^{1 + 1/2}$
 $x^{-1/4} y^{3/2} = \boxed{\frac{y^{3/2}}{x^{1/4}}}$

10) $\left(\frac{a^3}{b^{1/2}}\right)^{3/4}$
 $\frac{a^{3 \cdot 3/4}}{b^{1/2 \cdot 3/4}} = \boxed{\frac{a^{9/4}}{b^{3/8}}}$

3.4- Simplify the following radical expressions. Describe the similarities and differences between the left and right problems.

11) $\sqrt{4} = \boxed{2}$
 $\sqrt[2]{2^2}$

12) $\sqrt{-4} = \boxed{2i}$
 $\sqrt{-1} \cdot \sqrt{4}$

13) $\sqrt{81} = \boxed{9}$
 $\sqrt[9]{9^9}$

14) $\sqrt{-81} = \boxed{9i}$
 $\sqrt{-1} \cdot \sqrt{81}$

15) $\sqrt[3]{27} = \boxed{3}$
 $\sqrt[9]{3^9}$
 $\sqrt[3]{3^3}$

16) $\sqrt[3]{-27} = \boxed{-3}$
 $\sqrt[9]{-9^9}$
 $\sqrt[3]{-1 \cdot 27}$
 $\sqrt[3]{-1} \cdot \sqrt[3]{27}$
 $\sqrt[3]{-1} \cdot 3 = -3$

Evaluate i raised to the indicated power. Describe your process.

$$17) i^{18} = i^{16} \cdot i^2 = 1 \cdot (-1) = \boxed{-1}$$

$$18) i^{39} = i^{36} \cdot i^3 = 1 \cdot (-i) = \boxed{-i}$$

$$19) i^{1000001} = i^{1000000} \cdot i = 1 \cdot i = \boxed{i}$$

$$20) i^{600} = \boxed{1}$$

Simplify each expression. Describe the process you used for each one.

$$21) (-3 - 2i) + (4 - 6i) = \boxed{1 - 8i}$$

$$22) 6 - (10 + 3i) = 6 - 10 - 3i = \boxed{-4 - 3i}$$

$$23) (2 - 3i)(1 + 2i)$$

$$2 + 4i - 3i - 6i^2 = 2 + i - 6(-1) = \boxed{8 + i}$$

$$24) (19 + 5i) - (2 - 6i) = 19 + 5i - 2 + 6i = \boxed{17 + 11i}$$

$$25) (8 + 3i)(2 - i)$$

$$16 - 8i + 6i - 3i^2 = 16 - 2i - 3(-1) = \boxed{19 - 2i}$$

$$26) (7 - 3i) + (-5i) = \boxed{7 - 8i}$$

Solve each equation by taking square roots.

$$27) \sqrt{x^2} = \sqrt{-36} \Rightarrow \boxed{x = \pm 6i}$$

$$28) \sqrt{a^2} = \sqrt{-136} \Rightarrow \boxed{a = \pm 2i\sqrt{34}}$$

$$\sqrt{136} = \sqrt{2 \cdot 68} = \sqrt{2 \cdot 2 \cdot 34} = 2\sqrt{34}$$

$$29) 3x^2 - 1 = 26 \Rightarrow 3x^2 = 27 \Rightarrow x^2 = 9 \Rightarrow \boxed{x = \pm 3}$$

$$30) \sqrt{(m+1)^2} = \sqrt{-16} \Rightarrow m+1 = \pm 4i \Rightarrow \boxed{m = -1 \pm 4i}$$

$$31) \sqrt{(y-4)^2} = \sqrt{-3} \Rightarrow y-4 = \pm i\sqrt{3} \Rightarrow \boxed{y = 4 \pm i\sqrt{3}}$$

$$32) -2n^2 = 80 \Rightarrow n^2 = -40 \Rightarrow n = \pm i\sqrt{40} = \pm 2i\sqrt{10} \Rightarrow \boxed{n = \pm 2i\sqrt{10}}$$

$$\sqrt{40} = \sqrt{4 \cdot 10} = 2\sqrt{10}$$