

Name _____ Date _____ Period _____

Radicals and Rational Exponents: Review

Simplify the expression. Write all answers in simplest radical form where necessary.

1. $x^{2/3} \cdot x^{2/4}$

2. $(3x^{1/6})^3$

3. $\sqrt[4]{16x^5}$

4. $\sqrt[4]{81xy^6z^{12}}$

5. $6x^{1/4} \cdot 3x^{3/4}$

6. $\frac{(4x^4)^3}{(2x^3y)^{-1}}$

7. $2\sqrt[3]{125xy^{11}}$

8. $6(x^{1/3}y^4)^{-3} \cdot (x^{1/4}y^3)^4$

9. $(3^{2/3})^{1/2}$

10. $\sqrt{-40}$

11. $\sqrt[5]{-32}$

12. $\sqrt{-\frac{18}{25}}$

Write the following in standard form

13. $(4 - 5i) + 2(3 + 2i)$

14. $(3 + 2i) - (5 - 6i)$

15. $(-3 + 4i)(3 - 3i)$

16. $3(2 - 6i)(2 + 6i)$

17. $\frac{2 + 5i}{2 - 2i}$

18. $\frac{3 - 2i}{5 + 4i}$

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Radicals and Rational Exponents: Review

Simplify the expression. Write all answers in simplest radical form where necessary.

1. $x^{2/3} \cdot x^{2/4}$

$$x^{\frac{2}{3} + \frac{1}{2}} = x^{\frac{4}{6} + \frac{3}{6}} = x^{\frac{7}{6}} = x^{\frac{6}{6} \cdot \frac{7}{6}}$$

$$\underline{(\sqrt[6]{x})^7 \text{ or } x\sqrt[6]{x}}$$

2. $(3x^{1/6})^3$

$$3^3 x^{\frac{3}{6}} = x^{\frac{1}{2}}$$

$$\underline{27\sqrt{x}}$$

3. $\sqrt[4]{16x^5}$

$$2x^{\frac{5}{4} + \frac{1}{4}}$$

$$\underline{2x\sqrt[4]{x}}$$

4. $\sqrt[4]{81xy^6z^{12}}$

$$\underline{3yz^3\sqrt[4]{xy^2}}$$

5. $6x^{1/4} \cdot 3x^{3/4}$

$$x^{\frac{1}{4} + \frac{3}{4}} = x^1 = x$$

$$\underline{18x}$$

6. $\frac{(4x^4)^3}{(2x^3y)^{-1}}$

$$\frac{4^3 x^{12}}{2^{-1} x^{-3} y^{-1}} = 2 \cdot 64 x^{12-(-3)} y$$

$$\underline{128x^{15}y}$$

7. $2\sqrt[3]{125xy^{11}}$

$$2 \cdot 5y^3 \sqrt[3]{xy^2}$$

$$\underline{10y^3\sqrt[3]{xy^2}}$$

8. $6(x^{1/3}y^4)^{-3} \cdot (x^{1/4}y^3)^4$

$$6x^{-\frac{3}{3} \cdot 12} y^{-12} \cdot x^{\frac{4}{4} \cdot 12} y^{12}$$

$$6x^{-1+1} y^{-12+12}$$

$$6x^0 y^0$$

$$\underline{6}$$

9. $(3^{2/3})^{1/2}$

$$3^{\frac{2}{6}} = 3^{\frac{1}{3}}$$

$$\underline{\sqrt[3]{3}}$$

10. $\sqrt{-40}$

$$i\sqrt{4 \cdot 10}$$

$$\underline{2i\sqrt{10}}$$

11. $\sqrt[5]{-32}$

$$\underline{-2}$$

12. $\sqrt{\frac{18}{25}}$

$$i\frac{\sqrt{18}}{\sqrt{25}}$$

$$\underline{\frac{3i\sqrt{2}}{5}}$$

Write the following in standard form

13. $(4 - 5i) + 2(3 + 2i)$

$$4 - 5i + 6 + 4i$$

$$\underline{10 - i}$$

14. $(3 + 2i) - (5 - 6i)$

$$3 + 2i - 5 + 6i$$

$$\underline{-2 + 8i}$$

15. $(-3 + 4i)(3 - 3i)$

$$-3(3 - 3i) + 4i(3 - 3i)$$

$$-9 + 9i + 12i - 12i^2$$

$$-9 + 21i + 12$$

$$\underline{3 + 21i}$$

16. $3(2 - 6i)(2 + 6i)$

$$3(2^2 + 6^2)$$

$$3(4 + 36)$$

$$3(40)$$

$$\underline{120}$$

17. $\frac{2+5i}{2-2i} \cdot \frac{2+2i}{2+2i} = \frac{2(2+2i) + 5i(2+2i)}{2^2 + 2^2}$

$$\frac{4 + 4i + 10i + 10i^2}{8}$$

$$\frac{-6 + 14i}{8} = -\frac{6}{8} + \frac{14}{8}i$$

-3	+ 7i
4	4

18. $\frac{3-2i}{5+4i} \cdot \frac{(5-4i)}{(5-4i)} = \frac{3(5-4i) - 2i(5-4i)}{5^2 + 4^2}$

$$\frac{15 - 12i - 10i + 8i^2}{25 + 16} = \frac{15 - 22i - 8}{41}$$

$$\frac{7 - 22i}{41}$$

7	- 22i
41	41