



# Algebra 2 Workbook

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Exponents and radicals

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MATH

## POWERS OF NEGATIVE BASES

- 1. Simplify the expression.

$$-2^2$$

- 2. Simplify the expression.

$$(-3)^4$$

- 3. Simplify the expression.

$$(-5)^3$$

- 4. Simplify the expression.

$$-3^3 + (-1)^5 \cdot 9^2$$

- 5. Simplify the expression.

$$-4^2 \cdot (-2)^3 + 0^4$$

- 6. Simplify the expression.



$$-9^2 + (-1)^6 - 3^2 \cdot (-5)^3$$



## POWERS OF FRACTIONS

- 1. Simplify the expression.

$$\left(\frac{5}{6}\right)^2$$

- 2. Simplify the expression.

$$\left(\frac{1}{2}\right)^3 \cdot \left(\frac{2}{3}\right)^2$$

- 3. Simplify the expression.

$$\left(\frac{x^3}{y^5}\right)^2 \cdot \left(\frac{xy}{z^2}\right)^4$$

- 4. Simplify the expression.

$$\left(\frac{2}{3}\right)^4$$

- 5. Simplify the expression.



$$\left(\frac{x^3}{y^2}\right)^5$$

■ 6. Simplify the expression.

$$\left(\frac{a^2}{b}\right)^4$$



## ZERO AS AN EXPONENT

- 1. Simplify the expression.

$$\frac{4^0 \cdot 9^2}{(-2)^0 + 2^1}$$

- 2. Simplify the expression.

$$1,042^0$$

- 3. Simplify the expression.

$$(10^2 + 3^3)^0$$

- 4. Simplify the expression.

$$(-1)^0$$

- 5. Simplify the expression.

$$(2ac - 4x)^0$$



■ 6. Simplify the expression.

$$(-100b)^0$$



## NEGATIVE EXPONENTS

- 1. Simplify the expression.

$$3 \cdot 5^{-2} \cdot 6^{-2}$$

- 2. Simplify the expression.

$$4^{-3}$$

- 3. Simplify the expression.

$$-3^{-1}$$

- 4. Simplify the expression.

$$-2^{-2} \cdot (-2)^{-2}$$

- 5. Write the expression with only positive exponents.

$$a^{-5}$$

- 6. Write the expression with only positive exponents.





$$\frac{x^{-3}y^2}{x^4y^7}$$



## NEGATIVE EXPONENTS AND PRODUCT RULE

- 1. Write the expression without any negative exponents.

$$\frac{(2ab)^{-2}a^2}{b^{-4} \cdot (ab)^0}$$

- 2. Write the expression without any negative exponents.

$$\frac{2x^0y^{-5}}{z^{-1}(xy^2)^{-3}}$$

- 3. Write the expression without any negative exponents.

$$\frac{1}{a^{-8}}$$

- 4. Write the expression without any negative exponents.

$$\frac{8}{z^{-3}}$$

- 5. Write the expression without any negative exponents.



$$\frac{2y^{-4}}{x^{-9}}$$

- 6. Write the expression without any negative exponents.

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



## FRACTIONAL EXPONENTS

- 1. Simplify the expression.

$$b^2 \cdot b^{\frac{2}{3}}$$

- 2. Simplify the expression.

$$x^5 \cdot x^{\frac{1}{6}}$$

- 3. Simplify the expression.

$$\left(\frac{1}{16}\right)^{\frac{3}{2}}$$

- 4. Simplify the expression.

$$8^{\frac{2}{3}}$$

- 5. Simplify the expression.

$$3^{-\frac{3}{7}}$$



■ 6. Simplify the expression.

$$(81a^4b^{\frac{1}{2}})^{-\frac{5}{4}}$$



## RATIONALIZING THE DENOMINATOR

- 1. Rationalize the denominator.

$$\frac{2}{\sqrt{5}}$$

- 2. Rationalize the denominator.

$$\frac{1}{4\sqrt{3}}$$

- 3. Simplify the expression, making sure to rationalize the denominator.

$$\sqrt{\frac{4}{12}} + \sqrt{\frac{9}{12}}$$

- 4. Simplify the expression, making sure to rationalize the denominator.

$$\sqrt{\frac{6}{25}} + \sqrt{\frac{20}{24}}$$

- 5. Simplify the expression, making sure to rationalize the denominator.



$$4\sqrt{\frac{2}{3}} - 7\sqrt{\frac{3}{2}} + \sqrt{96}$$

- 6. Simplify the expression, making sure to rationalize the denominator.

$$5\sqrt{\frac{5}{7}} + \sqrt{\frac{7}{5}} - \sqrt{140}$$



## RATIONALIZING WITH CONJUGATE METHOD

- 1. Simplify the expression.

$$\frac{2 - \sqrt{5}}{\sqrt{5} - 7}$$

- 2. Simplify the expression.

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

- 3. Simplify the expression.

$$\frac{8}{4 + \sqrt{2}}$$

- 4. Simplify the expression.

$$\frac{x + \sqrt{5}}{-5\sqrt{x} + \sqrt{5}}$$





- 5. Simplify the expression.

$$\frac{1 + \sqrt{y}}{\sqrt{y} + \sqrt{3}}$$

- 6. Simplify the expression.

$$\frac{\sqrt{x}}{\sqrt{x} + \sqrt{y}}$$



