

MATH 6 HOMEWORK 11

December 21, 2025

Algebraic expressions and exponents:

$$a^0 = 1$$

$$a^m \cdot a^n = a^{m+n}$$

$$a^m \div a^n = \frac{a^m}{a^n} = a^{m-n}$$

$$(ab)^n = a^n \cdot b^n$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$a^n = \frac{1}{a^{-n}}$$

$$(a^m)^n = a^{m \cdot n}$$

$$\sqrt{ab} = \sqrt{a}\sqrt{b} \quad \sqrt{a+b} \neq \sqrt{a} + \sqrt{b}$$

$$(a \pm b)^2 = a^2 \pm 2ab + b^2$$

$$(a+b)(a-b) = a^2 - b^2$$

And *factorizing*:

$$a(b+c) = ab + ac$$

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1. Simplify:

$$(a) \left(\frac{5a^3b^5}{4a^5b^3} \right)^4 = \quad (b) \frac{(-ab)^9}{(-ab)^3} = \quad (c) \left(\frac{7a^4b^3}{21ab} \right)^2 \cdot \frac{3^4}{a^64} =$$

2. Simplify the following and show the answer in the exponent form.

$$a) \frac{42^2}{6^2} = \quad b) \frac{6^5 \cdot 2^4}{3^5 \cdot 2^2} = \quad c) \frac{3^{-5} \cdot 2^7}{3^{-3} \cdot 2^4} = \quad d) \left(\frac{15a^2b^5}{5a^4b^3} \right)^{-3} =$$

3. Add fractions, simplify:

$$(a) \frac{1}{a} + \frac{1}{b} =$$
$$(b) \frac{1}{x-1} - \frac{2}{x+1} =$$
$$(c) b - \frac{ab}{a-b} =$$

4. Open parenthesis, simplify:

$$(a) \left(3a + \frac{1}{3a} \right)^2 =$$
$$(b) (3x - 7y)^2 =$$
$$(c) (3x + 1)(3x - 1) =$$

5. Simplify radicals

$$(a) \sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} = 7^{\frac{?}{?}} = 7^? \cdot \sqrt{7}$$
$$(b) \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} = 3^? \cdot \sqrt[3]{3}^?$$
$$(c) \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} =$$
$$(d) (\sqrt{17} - \sqrt{11}) \cdot (\sqrt{17} + \sqrt{11}) =$$
$$(e) (\sqrt{7} - \sqrt{2}) \cdot (\sqrt{7} + \sqrt{2}) =$$
$$(f) (\sqrt{11} - \sqrt{3}) \cdot (\sqrt{11} + \sqrt{3}) =$$

6. Factorize (i.e., write as a product, opposite to 4.) the following expressions:

$$a. ac + ab =$$

$$b. x^2 + 3x^3 =$$