

Sample Exam 1 - Solutions

MAT 1275 Fall 2016

1. Evaluate:

$$\left(\frac{2^{-1}}{5^{-2}}\right)^2 = \frac{625}{4}$$

2. Simplify. Express your solutions using positive exponents only.

$$(a) \frac{a^3b^{-2}}{a^{-2}b^{-4}} = a^5b^2$$

$$(b) (3ab^{-1})(4a^{-3}b^3) = \frac{12b^2}{a^2}$$

$$(c) \frac{-84ab^{-5}}{6a^3b^{-7}} = -\frac{14b^2}{a^2}$$

$$(d) \left(\frac{25x^{-1}y^{-5}}{x^{-4}x^{-6}}\right)^{-2} = \frac{y^{10}}{625x^{18}}$$

$$(e) \left(\frac{a^{1/3}b^{1/2}}{c^{5/8}}\right)^4 = \frac{a^{4/3}b^2}{c^{5/2}}$$

$$(f) \frac{4x^2y^2}{9x^3} \div \frac{8y^2}{27xy} = \frac{3y}{2}$$

3. Simplify.

$$(a) \frac{2a+1}{3} + \frac{5a-4}{3} = \frac{7a-3}{3}$$

$$(b) \frac{2a-1}{4} + \frac{3a+2}{6} = \frac{12a+1}{12}$$

$$(c) \frac{2n}{n^2-25} + \frac{3}{4n+20} = \frac{11n-15}{4(n+5)(n-5)}$$

$$(d) \frac{1}{2} - 18k = \frac{1-36k}{2}$$

$$(e) \frac{\frac{18a^3}{b^2}}{\frac{6a^2}{b}} = \frac{3a}{b}$$

$$(f) \frac{\frac{6}{a} - \frac{5}{b^2}}{\frac{12}{a^2} + \frac{1}{b}} = \frac{6ab^2 - 5a^2}{12b^2 + 2a^2b} = \frac{a(6b^2 - 5a)}{2b(6b + a^2)}$$

4. Solve these equations. Be sure to check your solution(s).

$$(a) \frac{2}{3x} = \frac{7}{2x} + \frac{3}{5}, \text{ solution set: } \{-85/18\}$$

$$(b) \frac{2}{3x} + \frac{1}{4} = \frac{11}{6x} - \frac{1}{3}, \text{ solution set: } \{2\}$$

$$(c) \frac{1}{n-1} + 1 = \frac{1}{n^2-n}, \text{ solution set: } \{-1\}$$

5. Express in simplest radical form. Assume all variables represent positive values.

$$(a) \sqrt{x^2y^4} = xy^2$$

$$(b) \sqrt{9x^2y^4z^2} = 3xy^2z$$

$$(c) \sqrt{\frac{h^2k^4}{16}} = \frac{hk^2}{4}$$

6. Write in radical form.

$$(a) 3x^{1/3} = 3\sqrt[3]{x}$$

$$(b) 4(ab)^{3/2} = 4\sqrt{(ab)^3}$$

$$(c) 6y^{3/4} = 6\sqrt[4]{y^3}$$

7. Write using rational exponents rather than radical notation.

$$(a) \sqrt[4]{a^2b^3} = a^{1/2}b^{3/4}$$

$$(b) -2\sqrt[3]{t} = -2t^{1/3}$$

8. Simplify.

$$(a) \left(\frac{100}{9}\right)^{-3/2} = \frac{27}{1000}$$

$$(b) 81^{-3/4} = \frac{1}{27}$$

$$(c) -25^{-3/2} = -\frac{1}{125}$$

$$(d) \frac{1}{36^{-1/2}} = 6$$