

MATHEMATICS 101 Practice Midterm 3 Spring 2008

Name: _____

Instructor and section:_____

1. No calculators are allowed.
2. No notes or books are allowed.
3. Show your work and make your methods clear. Unjustified answers will receive no credit, except for true/false questions.

problem	worth	your score
1	10	
2	18	
3	22	
4	15	
5	15	
6	18	
7	12	
TOTAL	110	

1. (2 points each) Are the followings true (T) or false (F) ?

(a) $\sqrt{2^2} = 2$

(b) $\sqrt{(-3)^2} = -3$

(c) $\sqrt[3]{(-3)^3} = -3$

(d) $5^{-4/3} = -\sqrt[3]{5^4}$

(e) Every real number is a solution of the equation $\frac{x+1}{x+1} = 1$.

2. Simplify the followings.

(a) (5 points) $\frac{a^2 - a - 6}{a^2 + 5a + 6}$

(b) (5 points) $\frac{y^2 - 4}{2y + 4}$

(c) (8 points) $\frac{p - \frac{2}{p+1}}{\frac{1}{p+1} + \frac{p}{p-3}}$

3. Add or multiply as indicated.

(a) (5 points) $\frac{mp}{m^2 - p^2} - \frac{p}{m - p}$

(b) (5 points) $\frac{4 - p}{p^2 - 2p - 3} + \frac{2p - 4}{p^2 - 5p + 6}$

(c) (5 points) $\frac{x^2 + 2x}{x + 1} \cdot \frac{x^2 - 1}{x^3 + x^2}$

(d) (7 points) $\frac{m^2q^3(8k - 16)}{3mpk} \div \frac{m^5pq(3k - 6)}{2mk^2}$

4. (a) (8 points) Solve $\frac{2}{4x+7} + \frac{x}{3} = \frac{6}{12x+21}$

(b) (7 points) Christina finishes the beer keg in 7 hours and Brandon can finish the same keg in 3 hour. If it takes Alex 6 hours to fill that keg, what would happen if they acted all at the same time?

5. Simplify the followings assuming that all variables represent positive numbers.

(a) (5 points) $\sqrt[3]{32x^9y^6}$

(b) (5 points) $\sqrt{50x^9y^{11}}$

(c) (5 points) $\sqrt[4]{3}\sqrt[3]{4}$

6. Add or multiply as indicated. All variables represent positive numbers.

(a) (6 points) $2\sqrt[3]{16x^2y^7} + \sqrt[3]{54x^5y^4}$

(b) (6 points) $9\sqrt[4]{16x^5y^8} - 14\sqrt[4]{81xy^{12}}$

(c) (6 points) $2\sqrt{\frac{75}{16}} + 4\frac{\sqrt{8}}{\sqrt{32}}$

7. (a) (5 points) Rationalize $\frac{\sqrt{2} - \sqrt{3}}{\sqrt{5} + \sqrt{3}}$

(b) (7 points) Compute $(\sqrt[3]{3} - 6)(\sqrt[3]{3} + 6)(\sqrt[3]{3})$

1 Answers

1. a) True b) False c) True d) False e) False

2. a) $\frac{a-3}{a+3}$ b) $\frac{y-2}{2}$ c) $\frac{(p+2)(p-3)}{(p+3)}$

3. a) $\frac{-p^2}{(m-p)(m+p)}$ b) $\frac{(p+6)}{(p-3)(p+1)}$ c) $\frac{(x+2)(x-1)}{(x+1)}$ d) $\frac{16kq^2}{9m^3p^2}$

4. a) $x = 0$ b) $\frac{42}{13}$ hours

5. a) $2x^3y^2\sqrt[3]{4}$ b) $5x^4y^5\sqrt{2xy}$ c) $3^{\frac{1}{4}}4^{\frac{1}{3}} = 3^{\frac{3}{12}}4^{\frac{4}{12}} = (3^34^4)^{\frac{1}{12}} = \sqrt[12]{3^34^4}$

6. a) $(4y^2 + 3xy)\sqrt[3]{2x^2y}$ b) $(18xy^2 - 42y^3)\sqrt[4]{x}$ c) $\frac{8 + 10\sqrt{3}}{4}$

7. a) $\frac{\sqrt{10} - \sqrt{6} - \sqrt{15} + 3}{2}$ b) $3 - 36\sqrt[3]{3}$