

MATHEMATICS 101 FINAL EXAM version 2 May 16, 2007

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	20	
2	30	
3	35	
4	30	
5	20	
6	30	
7	25	
8	20	
TOTAL	210	

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

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

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

(c) $|4 - 12| = |4| - |12|$

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

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

(f) $\frac{3x-y}{3} = x-y$

(g) If $x < 5$ then $-5x < -25$

(h) $(x+y) = x^2 + y^2$

(i) $(pz)^0 = 0$

(j) $2^{-2} < 0$

2. (5 points each)

(a) Draw the line $5x - 2y - 20 = 0$.

(b) Find the equation of the line through $(6, 4)$ and $(-4, -1)$.

(c) Find the equation of the line through $(3, 4)$ and has undefined slope.

(d) Find the equation of the line through $(-2, 3)$ that is perpendicular to the line $y = 2x$.

3. Find the solution sets of the followings:

(a) (10 points) $|-2x + 1| - 7 > 0$

(b) (15 points)

$$4 \leq 3 - 2x < 8 \quad \text{AND} \quad -2 + 3x \geq x - 5$$

(c) (10 points)

$$\frac{5}{2}x - 2y = 4$$

$$2x + \frac{3}{2}y = 13$$

4. Find the real number solutions of the following if there's any:

(a) (10 points) $\frac{1}{t+3} + \frac{4}{t+5} = \frac{2}{t^2 + 8t + 15}$

(b) (10 points) $x\sqrt{2} = \sqrt{5x - 2}$

(c) (10 points) $3p^2 = 6p - 4$

5. (a) (10 points) Add and write in lowest terms $\frac{5}{x^2 + 6x + 9} + \frac{2}{x^2 + 4x + 3}$

(b) (10 points) Simplify $\frac{m^{-1} + p^{-2}}{2m^{-2} - p^{-1}}$

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

(a) (10 points) $9\sqrt[3]{5q^7} - 2q\sqrt[3]{40q^4}$

(b) (10 points) $\sqrt[5]{128x^{100}t^{36}}$

(c) (10 points) $\left(\frac{a^6b^{-2}}{2a^{-2}}\right)^{-1} \left(\frac{2b^{-1}a^2}{3b^{-2}}\right)^{-2}$

7. Solve the following equations:

(a) (5 points) $3x - 5 - 2(3x - 4) = 4 - 5x + 7 - 8(x - 2)$

(b) (10 points) $(2x - 3)^2 - 121 = 0$

(c) (10 points) $x^{10} - 5x^5 + 4$

8. (a) (10 points) Rationalize $\frac{3 - \sqrt[3]{2}}{(\sqrt[3]{5})^2}$

(b) (10 points) Rationalize $\frac{2 - \sqrt{3}}{\sqrt{2} - \sqrt{5}}$