Name ________________________       Math 1302 – Exam I – Feb. 16, 2004

1. Give me an example of

   a) the commutative law of multiplication → _______________________

   b) a real number that is not rational → _______________________

   c) a whole number that is not a natural number → _______________________

   d) a trinomial of degree 2. → _______________________

   e) a binomial of degree 2 with only one variable that can not be factored. → _______________________

2. Complete the following by using the

   a) Associative law of addition: ( 3 + x ) + y = ______________

   b) the distributive law: ( - 3 ) ( x + b ) = ____________________

3. Simplify to a single number in simplest form.

   a) -3² = _______  b) 0² = _______  c) - 25 ⅓ = _______  d) ( 9/ 25 )⁻³² = _______

   e) - 6⁻² = _______  e) ( - 2 )⁰ = _______  f) ( 8 )²/³ = _______

4. Evaluate if x = -1 and y = -2, z = - 3, and r = 0

   a) x⁵ = _______  b) ( y⁻⁵ )⁵ = _______  c) \( \frac{x - y}{x + y} \) = _______

5. Find each of the following absolute values. Write without absolute values and without parenthesis or grouping symbols of any kind. Exact answers – no calculator.

   a) 4 - | 4 - 7 | = __________

   b) | 8 - \( \sqrt{50} \) | = __________

   c) - | 4 | - | - 2 | = __________

   d) | 7 - 2\pi | = __________
7. True or False.

__________  a. An irrational number can not be written as a fraction.

__________  b. all whole numbers are positive

__________  c. 1 is the smallest natural number

__________  d. \(( x - 2y )^2 = x^2 - 4y^2\)

__________  f. two is the smallest prime number

8. Perform the given operations and simplify.

a) \(2 - 3 \cdot (2 - (4 - 5)) = \) ________________ 

b) \(4 - 2^2 \cdot (-4 + 8) ÷ 2 = \) ________

9. Use the rules of exponents to simplify

a) \((2x^2)^3 = \) ________________  

b) \((4x^2)(-2x^3y) = \) ________________

c) \((-2x^{-3})^2 \cdot (4x^3)^2 = \) _______  

d) \((9x^{-2})^{1/2} = \) ________________  

e) \((4/3)^2 = \) ____________

f) \(\frac{4x^2y^4}{8xy^7} = \) ____________

g) \(\frac{-4x^{-1}y^{-3}}{2x^{-3}y^2} = \) ________________

h) \(\frac{(-6x^{-2}y^{-3})^2}{2x^2y^{-4}} = \) ______________
10. Use the rules of radicals and fractional exponents to simplify.
   a) \( \sqrt[3]{16x^4y^2} = \) _____________
   b) \( \sqrt[3]{8x^6} = \) _____________
   c) \( 4 - 2\sqrt{9} = \) _____________
   d) \( (16x^2y^8)^{1/4} = \) _____________

11. Perform the given operation -- Do not factor.
   a) \((3x^2 - 4x + 6) - 2(x^2 - 2x + 3) = \) _________________
   b) \(3x^2y(x + 2y) = \) _________________
   c) \(2x + 3(x + 2) = \) _________________
   d) \((x - 4y)^2 = \) _________________

12. Find the GCF of the following
   a) GCF(80, 120) = _________________
   b) GCF(12x^2y^4, 16xy^5) = _________________

13. Find the LCM of
   a) LCM(24, 30) = _________________
   b) LCM(12xy^2, 8x^3y^4) = _______
14. Factor each of the following polynomials - All of these should factor. Factor completely!

   a) \( x^2 + 4x - 21 = \)__________________
   b) \( 3(x - 2y) + 5(x - 2y) = \)__________________
   c) \( 5x^4 - 20x^2y^2 = \)__________________
   d) \( x^4 - 16y^4 = \)__________________
   e) \( x^4 - 8x = \)__________________
   f) \( x^2 - 24x + 144 = \)__________________

15. Find the degree of each of the following polynomials.

   a) \( 4 \) ➔ __________
   b) \( 8^2x^3y^5 \) ➔ __________
   c) \( 1 + 5x^8 - 2x^4y^{5} \) ➔ __________


   a) \( (9)^{-3/2} = \)__________
   c) \( -8^{2/3} = \)__________

17. A polynomial that has three factors but only one term is called a ________________

   A monomial will always have only one ____________

18. Reduce each of the following algebraic fractions to lowest terms – by factoring and then cancelling.

   a) \( \frac{x^3 + y^3}{x^2 - y^2} = \)__________
   b) \( \frac{3 - xy}{xy - 3} = \)__________
19. More radicals - exact answers required.

a) \( \sqrt[4]{64x^6y^3} \cdot \sqrt[4]{4x^2y} = \) ________

b) \( \sqrt[5]{4x^2y^4} = \) __________

c) \( \sqrt{48} = \) ____

d) \( \sqrt[3]{40} = \) __________

d) \( \sqrt{8} + 2\sqrt{18} = \) ________

20. Even More radicals.

a) \( \frac{6}{\sqrt[3]{9x}} = \) ______________

b) \( \frac{\sqrt[3]{8}}{\sqrt[3]{4}} = \) ________

c) \( \sqrt[3]{4} \cdot \sqrt{2} = \) __________

D) \( \frac{4}{1-\sqrt{5}} = \) __________

e) \( \sqrt[3]{\frac{2}{36x}} = \) __________
21. A dress sells for $65 and there is an 8% sales tax. How much change will you get back if you paid with three twenties and a ten dollar bill?

22. Simplify by using the rules of exponents. No radicals in your final solution. No negative exponents in your final solution.

a) \(x^{1/2} \cdot x^{1/4} = \) __________

b) \(x^{1/4} \div x^{1/2} = \) __________

c) \((-2x^{1/2}y^{-1/2})^{-6} = \) __________

23. If \(x\) is assumed to be any real number then

what is

a) \(\sqrt{x^2} = \) __________

b) \(\sqrt[3]{-x^3} = \) __________

c) \(\sqrt{-4} = \) __________

24. True or False.

a) the absolute value of any real number is never negative. __________

b) There are always two square roots to any positive real number. __________

c) All real numbers are rational. __________