

## Math 142

## Quiz 1

Complete without a calculator & show your work for full credit.

1. Simplify each of the following: (3 pts/problem)

a.  $(2x^3 - 5x)^3 = (2x^3 - 5x)(2x^3 - 5x)(2x^3 - 5x)$   
 $(4x^6 - 10x^4 - 10x^4 + 25x^2)(2x^3 - 5x)$   
 $(2x^3 - 5x)(4x^6 - 20x^4 + 25x^2) = 8x^9 - 40x^7 + 50x^5 - 20x^7 + 100x^5 - 125x^3$   
 $\frac{8x^9 - 60x^7 + 150x^5 - 125x^3}{1}$

b.  $\frac{12 \div 3 \cdot |2^2 - 3^2|}{7 + 3 \cdot 6} = \frac{4 \cdot |4 - 9|}{7 + 18} = \frac{4 \cdot |-5|}{25} = \frac{20}{25} = \left(\frac{4}{5}\right)$

2. Use scientific notation to express your solution. (2 pts/problem)

a.  $(4 \times 10^{16})(7.1 \times 10^{-5})$

$$28.4 \times 10^{16-5} = 28.4 \times 10^{11}$$

Balance the  
Place values  
 $\div 10$  the mult by  $10^1$

2.a.  $\underline{2.84 \times 10^{12}}$

- b. In a state with a population of 9,000,000 people, the average citizen spends \$6,000 on housing each year. What is the total spent on housing for the state?

$$9 \times 10^6 \times 6 \times 10^3 = 54 \times 10^9$$

b.  $\underline{\$5.4 \times 10^{10}}$

3. Simplify the  $\frac{14}{\sqrt{50}}$  using the properties of radicals. Your answer should be rationalized and in simplest terms.

$$\frac{14}{\sqrt{25 \cdot 2}} = \frac{14}{5\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{14\sqrt{2}}{5 \cdot 2}$$

(2 pts)

$$\frac{7\sqrt{2}}{5}$$

4. Factor completely. (2 pts/problem)

a.  $4x^4 + 23x^2 - 6$

$$4(-6) = -24$$

$$4x^4 + 24x^2 - x^2 - 6$$

$$4x^2(x^2 + 6) - 1(x^2 + 6)$$

$$24 - 1$$

$$= (x^2 + 6)(2x - 1)(2x + 1)$$

b.  $54w^3 + 2$

$$2(27w^3 + 1)$$

$$2(3w + 1)(9w^2 - 3w + 1)$$

5. Determine whether each statement is true or false. If the statement is false, make necessary changes to produce a true statement. (2 pts/problem)

a.  $\left(\frac{5}{10} - \frac{14}{25}\right)^2 = \frac{49}{225}$  False

$$\left(\frac{25}{50} - \frac{28}{50}\right)^2 = \left(\frac{-3}{50}\right)^2 = \frac{9}{2500}$$

b.  $(x+2)^{\frac{1}{2}} - (x+2)^{\frac{5}{2}} = (x+2)^{\frac{5}{2}}((x+2)^{\frac{3}{2}} - 1)$

$$(x+2)^{-5/2} \cdot ((x+2)^{3/2} - 1)$$

$$(x+2)^{-5/2} \cdot ((x+2)^2 - 1)$$

$$(x+2)^{-5/2} (x^2 + 4x + 4 - 1)$$

$$(x+2)^{-5/2} (x^2 + 4x + 3)$$

$$\frac{x^2 + 4x + 3}{(x+2)^{5/2}}$$