Math 172–Quiz # 4

November 15, 2013 **Name:** Solution Set

Instructors: Pat Wrean & Leah Howard **Total: 40 Points**

1. [3 points] Calculate the following and write your answer in scientific notation.

$\frac{0.00000036}{400{,}000 \times 0.03}$

$= \frac{3.6 \times 10^{-7}}{4 \times 10^{5} \times 3 \times 10^{-2}}$

$= \frac{0.9 \times 10^{-7}}{3 \times 10^{3}}$

$= 0.3 \times 10^{-10}$

$= 3 \times 10^{-1} \times 10^{-10} = 3 \times 10^{-11}$

3×10^{-11}

2. [4 points] Evaluate the following.

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

$= \frac{-1 \cdot (-4)^{2}}{2^{3}}$

$= \frac{-1 \cdot 16}{8}$

$= -2$

-2

b) $\left(\frac{1}{2}\right)^{-3}\left(\frac{4}{3}\right)^{-2}$

$2^{3}\left(\frac{3}{4}\right)^{2}$

$8 \cdot \frac{9}{16_2}$

$9/2$

$9/2$

3. [3 points] Simplify the following expression. Use only positive exponents in your answer.

$\frac{a^{-1}b^{-7}}{a^{2}(-5a^{3}b^{3})^{-2}}$

$\frac{(-5a^{3}b^{3})^{2}}{a^{2}\, a\, b^{7}}$

$\frac{25\, a^{6} b^{6}}{a^{3}\, b^{7}}$

$\frac{25a^{3}}{b}$

$\frac{25a^{3}}{b}$

$(-\frac{1}{2})$ negative exponents in final answer

4. [11 points] Factor the following polynomials **completely**:

a) $3x^3+12x^2+12x$

$3x(x+2)^2$

$3x(x^2+4x+4)$

$3x(x+2)^2$ (3)

b) $6x^3z-42x^2z+30xz$

$6xz(x^2-7x+5)$

$6xz(x^2-7x+5)$ (2)

c) $7x^3-56y^3$

$7(x-2y)(x^2+2xy+4y^2)$

$7(x^3-8y^3)$

$7(x-2y)(x^2+2xy+4y^2)$ (3)

d) $4y^{2r}+5y^r-6$

$(4y^r-3)(y^r+2)$

$4y^{2r}+8y^r-3y^r-6$

$4y^r(y^r+2)-3(y^r+2)$

$(4y^r-3)(y^r+2)$

$ac=-24$

1 24
2 12
-3 +8
4 6

(3)

5. [10 points] Find the solution set for the following equations.

a) $m^3+7m^2-4m-28=0$ $\{-7,-2,2\}$

$m^2(m+7)-4(m+7)=0$

$(m^2-4)(m+7)=0$

$(m-2)(m+2)(m+7)=0$

$m=2,-2,-7$

(3)

b) $(y-5)(y-6)=2$ $\{4,7\}$

$y^2-11y+30=2$

$y^2-11y+28=0$

$(y-4)(y-7)=0$

$y=4,7$

$ac=28$

$1 \quad 28$

$2 \quad 14$

$-4 \quad -7$

(3)

c) $6a^3=-7a^2+3a$ $\{-3/2, 0, 1/3\}$

$6a^3+7a^2-3a=0$

$a(6a^2+7a-3)=0$

$a[6a^2-2a+9a-3]=0$

$a[2a(3a-1)+3(3a-1)]=0$

$a(2a+3)(3a-1)=0$

$a=0,-3/2,1/3$

$ac=-18$

$1 \quad 18$

$-2 \quad +9$

$3 \quad 6$

(4)

6. [3 points] Find the product of the two polynomials.

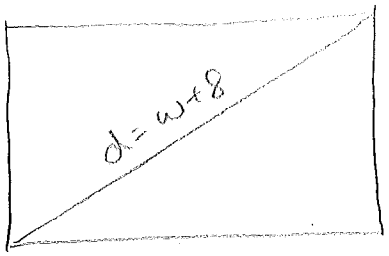
$(3x^{n+2}-x^n)(5x^{2n+3}-x^{2n+1})$

$15x^{3n+5} - 3x^{3n+3} - 5x^{3n+3} + x^{3n+1}$

$15x^{3n+5} - 8x^{3n+3} + x^{3n+1}$

$15x^{3n+5} - 8x^{3n+3} + x^{3n+1}$

7. [6 points] The length of a rectangular yard is four feet longer than its width. The diagonal distance across the yard is eight feet longer than the yard's width. Find the dimensions of the yard.



$a^2 + b^2 = c^2$

$w^2 + (w+4)^2 = (w+8)^2$

$w^2 + w^2 + 8w + 16 = w^2 + 16w + 64$

$w^2 - 8w - 48 = 0$

$(w+4)(w-12) = 0$

$w = -4, 12$

width cannot be negative

ac: -48

1 48
2 24
3 16
+4 -12
6 8

The yard is 12 feet by 16 feet.