Math 1030, Homework Activity #7, Summer 2014 Name KEY
Sections 5.3, 5.4

Instructions: Complete the following problems. You may work alone or in a group. Do not just copy answers from a group member, but be sure that you understand the problem. Similar questions will appear on exams. You may be asked to explain or present the answers to the class. This assignment is due at the end of the class period.

1. Perform the indicated operation and combine like terms to simplify. Use any appropriate formulas.
   a. $2x(3x-5)$ $6x^2-10x$
   b. $(x^2y)(4x^2y-3xy^2)$ $4x^4y^2-3x^3y^3$
   c. $(x+5)(x+7)$ $x^2+12x+35$
   d. $(3m-2y)(2m+5y)$ $6m^2+11my-10y^2$
   e. $(2-y)(4-y)$ $8-6y+y^2$
   f. $(2a-b)(5a+2b)$ $10a^2-ab-2b^2$
   g. $\left(x-\frac{1}{3}\right)\left(x+\frac{1}{3}\right)$ $x^2-1/9$
   h. $(4x^2+1)(4x^2-1)$ $16x^4-1$
   i. $(8a-5b)(8a+5b)$ $64a^2-25b^2$
   j. $(x-2)^2$ x^2-4x+4
   k. $(5k+2y)^2$ $25k^2+20ky+4y^2$
   l. $\left(x+\frac{1}{2}\right)^2$ $x^2+x+1/4$
   m. $-\frac{1}{2}x(2x+6)(x-3)$ $-1/2x(2x^2-18) = -x^3+9x$
   n. $(2x-3)(x^2-2x-1)$ $2x^3-4x^2-2x-3x^2+6x+3 = 2x^3-7x^2+4x+3$
   o. $(2m^2-m+2)(2m+1)$ $4m^3+2m^2-2m^2-m+4m+2 = 4m^3+3m+2$
   p. $(2m^2-m+4)(-m^3-2m-1)$ $-2m^5-4m^3-2m^2+m^4+2m^2+m-4m^3-8m-4 = -2m^5-8m^3+m^4-7m-4$
   q. $(2a-1)(a+4)(a+1)$ $(2a-1)(a^2+5a+4)$ $2a^3+10a^2+8a-a^2-5a-4 = 2a^3+9a^2+3a-4$
   r. $-\frac{1}{2}x^2(10x^5-6x^4+12x^3)+(x^3)^2$ $-5x^7+3x^6-6x^5+x^6 = -5x^7+4x^6-6x^5$
   s. $(2a+5b)^2-(2a-5b)^2$ $(4a^2+40ab+25b^2)-(4a^2-40ab+25b^2) = 80ab$
   t. $(a+3)^2-(a+4)(3a-1)$ $a^2+6a+9-(3a^2+11a-4) = -2a^2-5a+13$
   u. $(2x+1)^3$ $8x^3+12x^2+6x+1$
   v. $[(x-y)+3][(x-y)-3]$ $(x-y)^2-3^2 = x^2-2xy+y^2-9$
   w. $(m-2)^4$ $m^4-8m^3+24m^2-48m+16$

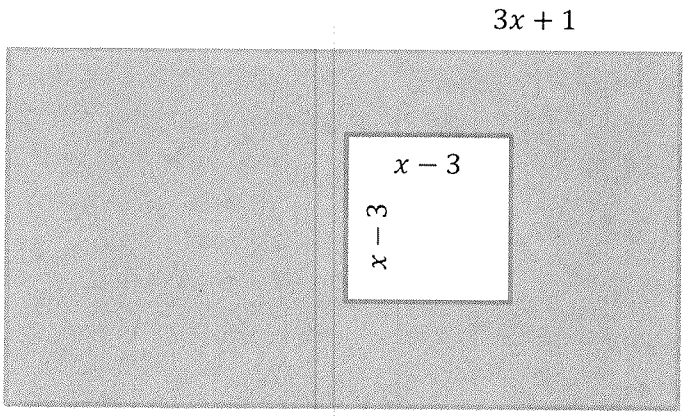
2. Find an expression for the area of the region shown. Simplify.

$x(3x+1)-(x-3)^2 =$

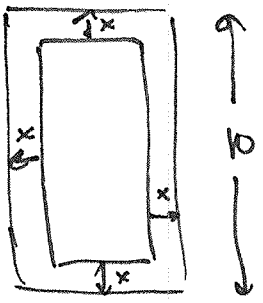
$3x^2+x-(x^2-6x+9) =$

$3x^2+x-x^2+6x-9 =$

$2x^2+7x-9$



3. You have an 8x10 frame, and want to include a border of width x. Draw the shape below and write an expression for the exposed region inside the border.



$(10-2x)(8-2x) = A$

4. Simplify each expression. Write the answer with only positive exponents.
   a. $(3y^{-2}z^3)^2$ $9y^{-4}z^6 = 9z^6/y^4$
   b. $\frac{-16m^{10}}{24m^3}$ $-2m^7/3$
   c. $(24ab)^0 = 1$
   d. $(-25k^5r^{-12})\left(\frac{2}{5}k^{-3}r\right)^2 = -25k^5r^{-12}\cdot\frac{4}{25}k^{-6}r^2 = -4k^{-1}r^{-10} = \frac{-4}{kr^{10}}$
   e. k^{-1} $1/k$
   f. $\frac{6}{x^{-4}} = 6x^4$
   g. $\left(\frac{4}{3}y^{-2}z\right)\left(\frac{5}{8}y^{-2}z^4\right) = \frac{2\cdot5}{3}y^{-4}z^5 = \frac{10z^5}{3y^4}$
   h. $(3a^2b^{-1})\left(\frac{4a^{-1}b^2}{b^3}\right)^2 = 3a^2b^{-1}\cdot 4a^{-2}b^4/b^6 = \frac{12}{b^3}$
   i. $(3x^2y^{-3})(12^{-1}x^{-5}y^{-6}) = \frac{1}{4}x^{-3}y^{-9} = \frac{1}{4x^3y^9}$
   j. $(-x^{-4})(2x^{-3})^{-2}\left(\frac{1}{36}x^{10}\right) = -x^{-4}\cdot 2^{-2}x^6\cdot\frac{1}{36}x^{10} = \frac{x^{12}}{144}$
   k. $\left(\frac{2x^{-4}y^{-3}}{4xy^3}\right)^{-2}(4x^2y^{-1})^{-3} = \frac{16x^2y^6}{2x^{-8}y^{-6}}\cdot\frac{1}{64x^6y^{-1}} = \frac{x^4y^{13}}{8}$
   l. $\left(x^{2a}y^bz^{-c}\right)^{3a}$ $\frac{x^{6a}y^{3ab}}{z^{3ac}}$
   m. $\left(\frac{a^nb^{2m}}{ab^2}\right)^{-3} = \frac{a^3b^6}{a^{3n}b^{6m}} = a^{3-3n}b^{6m-6}$

5. Use the division rule to explain why any number to the zero power is equal to one.

$\frac{a^n}{a^n} = 1$, but by division rule this is $a^{n-n} = a^0$ so it must also be $= 1$

6. Use the negative exponent rule to explain why $\frac{a^n}{a^m} = a^{n-m}$ without using the division rule.

$$\frac{a^n}{a^m} = a^n\cdot\frac{1}{a^m} = a^n\cdot a^{-m} = a^{n-m}$$

neg. exp. rule