College Algebra — Joysheet 1
MAT 140, Fall 2014 — D. Ivanšić

Name: Saul Ocean

Show all your work!

1. (12pts) Simplify and write the answer so all exponents are positive:

a) $(2x^2y^{-4})^5(4x^{-3}y^{-7})^3 =$ $2^5(x^4)^5(y^{-4})^5 \cdot 4^3 \cdot (x^{-3})^3(y^{-7})^3$

$= 32\,x^{10}y^{-20} \cdot 64 \cdot x^{-9}y^{-21}$

$= 2048\,x\,y^{-41} = \frac{2048x}{y^{41}}$

b) $\frac{(6u^3v^{-5})^2}{(9u^2v^{-4})^3} = \frac{6^2(u^3)^2(v^{-5})^2}{9^3(u^2)^3(v^{-4})^3} = \frac{2\cdot 2\cdot 3\cdot 3\,u^6v^{-10}}{3\cdot 3\cdot 3\cdot 9\,u^6v^{-12}} = \frac{4v^2}{81}$ ($-10-(-12)$)

2. (4pts) Convert to scientific notation or a decimal number:

$3.32906 \times 10^5 = 332{,}906$ $\qquad$ $0.00002387 = 2.387 \times 10^{-5}$

3. (8pts) Simplify and write in standard form:

a) $x^2(7x+1) - (x-4)(2x+5) = 7x^3 + x^2 - (2x^2 - 8x + 5x - 20)$

$= 7x^3 + x^2 - 2x^2 + 3x + 20$

$= 7x^3 - x^2 + 3x + 20$

b) $(3x+5)(x^2-7x-4) = 3x^3 - 21x^2 - 12x + 5x^2 - 35x - 20$

$= 3x^3 - 16x^2 - 47x - 20$

4. (15pts) Use formulas to expand:

a) $(2x-7)(2x+7) =$ $(2x)^2 - 7^2 = 4x^2 - 49$

b) $(3x+5y)^2 =$ $(3x)^2 + 2\cdot 3x \cdot 5y + (5y)^2 = 9x^2 + 30xy + 25y^2$

c) $(5x-2)^3 =$ $(5x)^3 - 3\cdot(5x)^2\cdot 2 + 3\cdot 5x\cdot 2^2 - 2^3$

$= 125x^3 - 150x^2 + 60x - 8$

5. (15pts) Factor the following. Use either a known formula or a factoring method.

a) $x^2 - 10x - 24 =$ $(x-12)(x+2)$

prod $= -24$ $-12, 2$

sum $= -10$

b) $6x^2 - 29x - 5 =$ $6x^2 + x - 30x - 5 = x(6x+1) - 5(6x+1)$

prod $= -30$ $-30, 1$ $= (x-5)(6x+1)$

sum $= -29$

c) $64v^3 + 8 =$ $8(8v^3+1) = 8((2v)^3 + 1^3) = 8(2v+1)((2v)^2 - 2v\cdot 1 + 1^2)$

$= 8(2v+1)(4v^2 - 2v + 1)$

6. (6pts) Write the following sets in interval notation. Then graph the interval.

$\{x \mid 4 \le x < 13\}$ $[4, 13)$

$\{x \mid x \ge -5\}$ $[-5, \infty)$

$\{x \mid x < 3\}$ $(-\infty, 3)$