College Algebra — Joysheet 1
MAT 140, Spring 2026 — D. Ivanšić

Name: Saul Ocean

Covers: JIT 6, 7, 11, 12, 14, 15, 17 *Show all your work!*

Write the sets in interval notation and sketch them on the number line.

1. (3pts) $\{x \mid x \leq 4\}$

$(-\infty, 4]$

2. (3pts) $\{x \mid -2 < x < 0\}$

$(-2, 0)$

Solve the equations.

3. (3pts) $2x - 4 = 7x - 2$ $|+4$

$2x = 7x + 2$ $|-7x$

$-5x = 2$ $|\div -5$

$x = -\frac{2}{5}$

4. (4pts) $5 + 2(a-3) = -3(a+3)$

$5 + 2a - 6 = -3a - 9$

$2a - 1 = -3a - 9$ $|+3a$

$5a - 1 = -9$ $|+1$

$5a = -8$ $|\div 5$

$a = -\frac{8}{5}$

Simplify and write in standard form:

5. (4pts) $(x^2 - 5x + 2)(x - 3) =$ $x^3 - 5x^2 + 2x - 3x^2 + 15x - 6$

$= x^3 - 8x^2 + 17x - 6$

6. (4pts) $x^2(x+4) - (x-7)^2 =$ $x^3 + 4x^2 - (x-7)(x-7)$

$= x^3 + 4x^2 - (x^2 - 7x - 7x + 49)$

$= x^3 + 4x^2 - x^2 + 14x - 49$

$= x^3 + 3x^2 + 14x - 49$

Simplify and write the answer so all exponents are positive:

7. (2pts) $y^6(3y)^4 = y^6 \cdot 3^4 y^4 = 81y^{10}$

8. (2pts) $\dfrac{(2x)^6}{x^4} = \dfrac{2^6 x^6}{x^4} = 64x^2$

9. (3pts) $(u^5v^{-2})^4 u^{-7}v^7 = (u^5)^4 (v^{-2})^4 u^{-7} v^7 = u^{20} v^{-8} u^{-7} v^7 = u^{13} v^{-1} = \dfrac{u^{13}}{v}$

10. (5pts) $(4a^{-2}b^4)^3 (a^5c^{-2})^{-4} = 4^3 (a^{-2})^3 (b^4)^3 (a^5)^{-4} (c^{-2})^{-4}$

$= 64 a^{-6} b^{12} a^{-20} c^8 = 64 a^{-26} b^{12} c^8$

$= \dfrac{64 b^{12} c^8}{a^{26}}$

11. (7pts) $\dfrac{(6x^5y^{-3})^3}{(2x^{-2}y^2)^4} = \dfrac{6^3 (x^5)^3 (y^{-3})^3}{2^4 (x^{-2})^4 (y^2)^4} = \dfrac{3\,3\,3}{1\,1\,1} \dfrac{6\cdot6\cdot6}{2\cdot2\cdot2\cdot2} x^{15-9} y^{-9-8} = \dfrac{27x^{23-17}}{2}$

$= \dfrac{27x^{23}}{2y^{17}}$

Factor the following.

12. (4pts) $x^2 + 3x - 10 = (x+5)(x-2)$

prod $= -10$ $5, -2$
sum $= 3$

13. (4pts) $x^2 - 10x + 24 = (x-6)(x-4)$

prod $= 24$ $-6, -4$
sum $= -10$

Use the *ac*-method or another method to factor. Show how you got your answer.

14. (6pts) $2x^2 + 7x - 15 = 2x^2 + 10x - 3x - 15$

prod $= -30$ $10, -3$
sum $= 7$

$= 2x(x+5) - 3(x+5)$

$= (2x-3)(x+5)$

15. (6pts) $4x^2 - 8x - 5 = 4x^2 - 10x + 2x - 5$

prod $= -20$ $-10, 2$
sum $= -8$

$= 2x(2x-5) + 2x - 5$

$= (2x-5)(2x+1)$