

Ch. 6 Sample Quiz Key

$$1. a^6 b^{-4} c^3 \cdot a^3 b^7 c^{-9}$$

$$\left(\frac{a^{-3} b^{-1} c^{10}}{a^3 b} \right)$$

- multiplying: add Exponents

- move negative Exponents

$$2. \frac{4a^5 b^{-3} c^{-2}}{12a^3 b^2 c}$$

- dividing: subtract Exponents

$$b^{-3-2} = b^{-5} \quad c^{-2-1} = c^{-3} = \frac{1}{c^3}$$

$$\frac{4a^2 b^{-5} c^{-3}}{12} = \frac{1a^2}{3b^5 c^3}$$

- move negatives

- reduce fractions $\frac{4}{12} = \frac{1}{3}$

$$3. \frac{2x^2 y}{4z^{-1}} \cdot \frac{4z^3 x^{-4}}{12y^5}$$

- combine into 1 fraction

- simplify top & bottom

- subtract Exponents

$$\frac{2x^2 y \cdot 4z^3 x^{-4}}{4z^{-1} \cdot 12y^5} = \frac{8x^{-2} z^3 y}{12y^8 z^{-1}} = \frac{8x^{-2} y z^4}{12}$$

$$= \frac{2z^4}{3x^2 y^7}$$

$$4. \left(\frac{x^3 y^{-1}}{2x^{-1} y} \right)^{-2} = \left(\frac{2x^{-1} y}{x^3 y^{-1}} \right)^2$$

- Flip whole fraction

to make exponent positive

- distribute $(\quad)^2$ into

Everything.

$$= \frac{2x^{-2} y^2}{x^6 y^{-2}} = \frac{4x^{-8} y^4}{1}$$

- power to a power: multiply

$$= \frac{4}{x^8 y^4}$$

- in adding, combine like terms.

$$5. \quad 3x^4 - 6x^2 + 5x - 9 + (-x^3 + 2x^4 - 5x + 4)$$
$$= \boxed{5x^4 - x^3 - 6x^2 - 5}$$

$$6. \quad -9x^2 + 2x^3 + 3 - (-2x^2 + 3x + 6)$$
$$-9x^2 + 2x^3 + 3 + 2x^2 - 3x - 6$$
$$\boxed{2x^3 - 7x^2 - 3x - 3}$$

- distribute negative.

$$7. \quad (2x+3)(-x^2+4x+1)$$
$$-2x^3 + 8x^2 + 2x - 3x^2 + 12x + 3$$
$$\boxed{-2x^3 + 5x^2 + 14x + 3}$$

- distribute all terms in first to all terms in 2nd.

$$8. \quad x^3 + 64 = x^3 + 4^3$$

- sum of cubes

$$= \boxed{(x+4)(x^2 - 4x + 16)}$$

$$9. \quad 27x^3 - 125 = (3x)^3 - 5^3 = \boxed{(3x-5)(9x^2 + 15x + 25)}$$

$$10. \quad 16x^4 + 2x = 2x(8x^3 + 1) = 2x((2x)^3 + 1^3)$$

$$= \boxed{2x(2x+1)(4x^2 - 2x + 1)}$$

$$11. \quad 6x^3 - 16x^2 + 21x - 56$$
$$2x^2(3x-8) + 7(3x-8)$$

- factor by grouping

$$\boxed{(2x^2+7)(3x-8)}$$

$$12. \quad 12x^3 + 2x^2 - 30x - 5$$

$$2x^2(6x+1) - 5(6x+1)$$

$$\boxed{(2x^2-5)(6x+1)}$$

$$13. \quad 4x^3 - 12x^2 - 5x = -15$$

+15 +15

- get = 0

$$4x^3 - 12x^2 - 5x + 15 = 0$$

- factor by grouping

$$4x^2(x-3) - 5(x-3) = 0$$

$$(4x^2-5)(x-3) = 0$$

- set each factor = 0
& solve

$$4x^2-5=0 \quad x-3=0$$

$$4x^2=5 \quad \boxed{x=3}$$

$$x^2 = \frac{5}{4}$$

$$\boxed{x = \pm \sqrt{\frac{5}{4}}}$$

$$14. \quad 8x^3 = 64x^2 - x + 8$$

- get = 0

$$8x^3 - 64x^2 + x - 8 = 0$$

- factor (by grouping)

$$8x^2(x-8) + 1(x-8) = 0$$

$$(8x^2+1)(x-8) = 0$$

- set each = 0 & solve

$$8x^2+1=0 \quad x-8=0$$

$$x^2 = -\frac{1}{8} \quad \boxed{x=8}$$

$$x = \pm \sqrt{-\frac{1}{8}}$$

i's in answer: ignore

Bonus Problem:

$$x^3 - 27 = 0$$

$$x^3 - 3^3 = 0$$

$$(x-3)(x^2+3x+9) = 0$$

$$x-3=0 \quad x^2+3x+9=0$$

$$\boxed{x=3}$$

$$b^2-4ac$$

$$9-4(1)(9)$$

$$189+36$$

(something like)
(on test) (not as
bonus)