ALGEBRA – journal questions (mostly MCR)

Summarize everything you need to know about these topics. Use examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary

1. ## Factoring SUM & DIFFERENCE of CUBES (AP)

   make a note on:
   - the reason for the name
   - record the formulas one can follow

a. Difference of cubes $$x^3 - 8y^6$$	b. Sum of cubes $$27x^3 + 125$$	include SOAP mnemonic to help you remember the signs: $$a^3 \pm b^3 = (a \text{ [same sign] } b)(a^2 \text{ [opposite sign] } ab \text{ [always positive] } b^2)$$

   c. Factoring "Smallest Exponent Out" example, explain your steps for factoring the following

   $$\tfrac{2}{3}(3x+2)^{1/2}(2x+3)^{-2/3} - \tfrac{3}{2}(2x+3)^{1/3}(3x+2)^{-1/2}$$

RATIONAL EXPRESSIONS – where x is in denominator (MCR)

2. SIMPLIFY EXPRESSIONS
   a. RESTRICTIONS. What are they? Show an example how they create a hole/VA discontinuities in the graph. Make a note that you need to factor since they are not visible in expanded form.

Simplify with monomial terms, state restrictions.	
b. $$\dfrac{-12ab^3}{6ab^2}$$	c. $$\dfrac{-5x^2yz}{10xyz^2}$$
Simplify with polynomial terms that YOU HAVE TO FACTOR FIRST, state restrictions	
d. $$\dfrac{-10m^2}{6m + 8m^2}$$	e. $$\dfrac{2x^2 + 6x}{x^2 + 2x - 3}$$

   f. CANCELLING MISTAKE notes ie. discuss why $\dfrac{2+3}{3} \neq 2$ but $\dfrac{2 \bullet 3}{3} = 2$ and then show a correct way of simplifying $\dfrac{2x - 4x^2}{2x}$

3. MULTPLYING/DIVIDING

Multiplying rational expressions, state restrictions	
a. $$\dfrac{6mn^2}{4m^2 - 9} \times \dfrac{2m - 3}{-18m^2n}$$	b. $$\dfrac{b^2 - b}{b^2 - 4b + 3} \times \dfrac{b^2 - 5b + 6}{b^2 + 4b}$$
Dividing rational expressions, state restrictions before and after the flip	
c. $$\dfrac{(5ab^3)^2}{(a + b)^3} \div \dfrac{(2a^2b)^3}{(a + b)^2}$$	d. $$\dfrac{9a^2 - 16b^2}{a + 2b} \div \dfrac{12ab - 9a^2}{6a + 12b}$$

4. ADDING/SUBTRACTING
   a. Explain the process of finding LCM/LCD in your own words, then show solutions to b. and c. using your steps.

b. Find LCM of $$16xy^2 \text{ and } 7y^3z \text{ and } 12x^4z$$	c. Find LCM of $$x^2 - x - 6 \text{ and } x^2 - 9$$
d. Make a note of a COMMON MISTAKE made with LCD or LCM ie. discuss why LCM of x and $2x^2$ is just $2x^2$ but LCM of x and $x + 2$ will not be just $x + 2$ What is the true LCM of the last one?	e. Add/subtract rational expression $$\dfrac{n + 3}{3n^2 + 7n + 2} - \dfrac{3 + n}{2n^2 - n - 10}$$ state restrictions.