

King Fahd University of Petroleum and Minerals
 College of Sciences Math Prep-Year Program
 Math 001-Term 042
 Quiz # 2

20

Instructor: Bassam Al-Absi

Name: Sample Key Solution SEC 01 & 03 ID#: 00000

PLEASE WRITE NEAT, ORGANIZED AND COMPLETE SOLUTIONS

1.

(4 pts)

a. Simplify the expression $(x-1)^2(3x+1)^3$

$$\begin{aligned}
 &= (x^2 - 2x + 1)(27x^3 + 27x^2 + 9x + 1) \\
 &= 27x^5 + 27x^4 + 9x^3 + x^2 - 54x^4 - 54x^3 - 18x^2 - 2x + 27x^3 + 27x^2 + 9x + 1 \\
 &= 27x^5 - 27x^4 - 18x^3 + 10x^2 + 7x + 1
 \end{aligned}$$

(1 pt)

b. State the coefficient of x^3 is -18

2. Factor each of the following expression completely:

(3 pts)

a. $4x^2 - 12xy + 9y^2 + 4x - 6y$

$$\begin{aligned}
 &= (4x^2 - 12xy + 9y^2) + (4x - 6y) \\
 &= (2x - 3y)^2 + 2(2x - 3y) \quad \left. \begin{array}{l} \dots \dots \dots (2 \text{ pts}) \\ \dots \dots \dots (1 \text{ pt}) \end{array} \right\} \\
 &= (2x - 3y)(2x - 3y + 2)
 \end{aligned}$$

(3 pts)

b. $y^4 + 8y = y(y^3 + 8)$ (1 pt)

$$= y \cdot (y+2)(y^2 - 2y + 4) \quad (2 \text{ pts})$$

(5 pts) 3. Simplify $\frac{\frac{x+2}{x^2-1} + (x+1)^{-1}}{\frac{x}{2x^2-x-1} + \frac{1}{x-1}}$

$$= \frac{\frac{x+2}{(x-1)(x+1)} + \frac{1}{x+1}}{\frac{x}{(2x+1)(x-1)} + \frac{1}{x-1}}$$

$$= \frac{x+2+x-1}{(x-1)(x+1)} \cdot \frac{x+2x+1}{(2x+1)(x-1)} \quad (2+2) \text{ pts}$$

$$= \frac{2x+1}{(x-1)(x+1)} \cdot \frac{(2x+1)(x-1)}{(3x+1)}$$

$$= \frac{(2x+1)^2}{(x+1)(3x+1)} \quad (1 \text{ pt})$$

(4 pts) 4. $\frac{r^{-1}+q^{-1}}{r^{-1}-q^{-1}} \cdot \frac{r-q}{r+q}$

$$= \frac{\frac{1}{r} + \frac{1}{q}}{\frac{1}{r} - \frac{1}{q}} \cdot \frac{r-q}{r+q}$$

$$= \frac{q+r}{r \cdot q} \cdot \frac{r \cdot q}{q-r} \cdot \frac{r-q}{r+q}, \text{ Notice that } r-q = -(q-r) \quad (2 \text{ pts})$$

$$= -1$$

(1 pt)