

Instructions: Complete the following problems. You may work alone or in a group. Do not just copy answers from a group member, but be sure that you understand the problem. Similar questions will appear on exams. You may be asked to explain or present the answers to the class. This assignment is due at the end of the class period.

1. Simplify each expression as much as possible. Write the final answer with all positive exponents.

a. $\frac{-27xy^3z^4}{18x^4y^3z} = \frac{-3z^3}{2x^4}$

b. $\frac{24m^2}{4m^{-3}} - m^3(2m^2 - 5m^{-1}) = 6m^5 - 2m^5 + 5m^2 = 4m^5 + 5m^2$

c. $\frac{8x^2 \cdot x^5}{12x^3 \cdot x^4} + \frac{(-3x)^{-1}(2x^3)}{(x^{-2})^2} = \frac{2}{3} - \frac{2x^3x^4}{3x} = \frac{2}{3} - \frac{2}{3}x^6$

d. $\frac{4x^2 - 2x}{2} = 2x - 1$

e. $\frac{5n^5 - 10n^3 - 25n}{25n} = \frac{1}{5}n^4 - \frac{2}{5}n^2 - 1$

f. $\frac{35xy + 20y}{-5y} = -7x - 4$

g. $\frac{25a^3b^2c + 10a^2bc^3}{-5a^4b^2c} = -\frac{5}{a} - \frac{2c^2}{a^2b}$

2. Perform the indicated long division.

a. $\frac{x^2 - 4x - 21}{x + 3} = x - 7$

b. $\frac{x^2 + 4x - 32}{x - 4} = x + 8$

c. $\frac{x^3 + 4x^2 - 15x + 6}{x - 2} = x^2 + 6x - 3$

d. $\frac{x^4 - x^3 + 10x - 4}{x + 2} = x^3 - 3x^2 + 6x - 2$

e. $\frac{2x^2 + 5x - 42}{2x - 7} = x + 6$

f. $\frac{x^3 + 4x^2 - 5x + 2}{x - 2} = x^2 + 6x + 7$

g. $\frac{3x^4 + 7x^3 - 5x^2 + 8x + 12}{x + 3} = 3x^3 - 2x^2 + x + 2$

h. $\frac{4x^2 + 5}{2x + 1} = 2x - 1 + \frac{6}{2x + 1}$

i. $\frac{64x^6 - 27}{4x^2 - 3} = 16x^4 + 12x^2 + 9$

j. $\frac{4x^2 - 3}{4x^2 - 3} = 1$

k. $\frac{16x^4 + 12x^2 + 27}{4x^2 - 3} = 4x^2 + 2x + 9$

3. Perform the indicated operations.

a. $(a - 5)(a + 6)$

$a^2 + a - 30$

b. $(7n + 3m^2 + 4m) - (-6m^2 - 7n + 4m)$ $9m^2 + 14n$

c. $(2ab + b^2 - a^2) + (b^2 - 4ab + a^2)$ $2b^2 - 2ab$

d. $\frac{4 + 7x^2 - 3x^4 + 6x^3}{18x^3y^{-4}z^6}$

$\frac{2}{x^2} + \frac{7}{2} - \frac{3x^2}{2} + 3x$

e. $\frac{27x^{-4}y^{-12}z^{-6}}{6x^2 - 28x + 30}$

$= \frac{2x^7y^8z^{12}}{3}$

f. $\frac{3x-5}{6x^2-28x+30}$

$2x-6$

g. $(x^3 + x - 1)(x + 5)$ $x^4 + 5x^3 + x^2 + 4x - 5$

h. $(x + 6)^2$ $x^2 + 12x + 36$

i. $\frac{7x-5+6x^2}{3x+5} - (2x+1) = 2x-1 - (2x+1) = -2$

$$\begin{array}{r} 2x-6 \\ 3x-5 \overline{) 6x^2 - 28x + 30} \\ - 6x^2 + 10x \\ \hline -18x + 30 \\ -18x + 30 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 2x-1 \\ 3x+5 \overline{) 6x^2 + 7x - 5} \\ - 6x^2 + 10x \\ \hline -3x - 5 \end{array}$$