

Practice Problems

1. Completely factor each of the following.

a) $x^3 + y^3$

c) $x^{12} + 125$

e) $1 + 1000k^6$

b) $a^3 + 8b^3$

d) $27 + 8m^6$

f) $8p^3 + 125q^9$

2. Completely factor each of the following.

a) $5x^4 + 5x$

d) $a^3y^2 - a^3x^2 - b^3x^2 + b^3y^2$

b) $5b - 3a - 3ax^3 + 5bx^3$

e) $2abp^3y^4 - 16abq^3x^2 - 2abp^3x^2 + 16abq^3y^4$

c) $2a^2b^3 + 54a^2c^6$

3. Simplify each of the following.

a) $\frac{6x^3 + 6}{x^2 - x + 1}$

b) $\frac{a^2 - b^2}{a^3 + b^3}$

c) $\frac{4b^2x - a^2y - a^2x + 4b^2y}{2bx^3 - ay^3 - ax^3 + 2by^3}$

Answers

1. a) $(x + y)(x^2 - xy + y^2)$ b) $(a + 2b)(a^2 - 2ab + 4b^2)$ c) $(x^4 + 5)(x^8 - 5x^4 + 25)$
d) $(3 + 2m^2)(4m^4 - 6m^2 + 9)$ e) $(10k^2 + 1)(100k^4 - 10k^2 + 1)$ f) $(2p + 5q^3)(4p^2 - 10pq^3 + 25q^6)$
2. a) $5x(x + 1)(x^2 - x + 1)$ b) $(5b - 3a)(x + 1)(x^2 - x + 1)$ c) $2a^2(b + 3c^2)(b^2 - 3bc^2 + 9c^4)$
d) $(x + y)(x - y)(a + b)(a^2 - ab + b^2)$ e) $2ab(p + 2q)(p^2 - 2pq + 4q^2)(x - y^2)(x + y^2)$
3. a) $6x + 6$ b) $\frac{a - b}{a^2 - ab + b^2}$ c) $\frac{a + 2b}{x^2 - xy + y^2}$