Practice Exercises

Factor the following polynomials completely.

1. $36x^2 - 64$
2. $16x^4 - 49y^2z^2$
3. $4a^2 - b^6$
4. $81m^4n^2 - 9z^6$
5. $a^4 - 16b^2$
6. $16m^8 - 81b^4$
7. $c^4 - 1$

Problem Set

Factor the following polynomials completely.

1. $4x^2 - 49y^2$
2. $a^2 - 100$
3. $y^8 - 16z^4$
4. $y^4 - 1$
5. $25m^2 - 9$
6. $144x^6 - 100y^4$
7. $a^2b^4 - 121$
8. $x^6y^2 - 49z^8$
9. $x^2y^4 - 64$
10. $36m^6 - 81$

Problem Set

1. $4x^2 - 49y^2$
$= (2x)^2 - (7y)^2$
$= (2x - 7y)(2x + 7y)$

2. $a^2 - 100$
$= (a)^2 - (10)^2$
$= (a - 10)(a + 10)$

3. $y^8 - 16z^4$
$= (y^4)^2 - (4z^2)^2$
$= (y^4 - 4z^2)(y^4 + 4z^2)$
$= (y^2 - 2z)(y^2 + 2z)(y^4 + 4z^2)$

4. $y^4 - 1$
$= (y^2)^2 - (1)^2$
$= (y^2 - 1)(y^2 + 1)$
$= (y - 1)(y + 1)(y^2 + 1)$

5. $25m^2 - 9$
$= (5m)^2 - (3)^2$
$= (5m - 3)(5m + 3)$

6. $144x^6 - 100y^4$
$= 4(36x^6 - 25y^4)$
$= 4[(6x^3)^2 - (5y^2)^2]$
$= 4(6x^3 - 5y^2)(6x^3 + 5y^2)$

7. $a^2b^4 - 121$
$= (ab^2)^2 - (11)^2$
$= (ab^2 - 11)(ab^2 + 11)$

8. $x^6y^2 - 49z^8$
$= (x^3y)^2 - (7z^4)^2$

$= \left(x^3y - 7z^4\right)\left(x^3y + 7z^4\right)$

9. $x^2y^4 - 64$

$= (xy^2)^2 - (8)^2$

$= \left(xy^2 - 8\right)\left(xy^2 + 8\right)$

10. $36m^6 - 81$

$= 9(4m^6 - 9)$

$= 9[(2m^3)^2 - (3)^2]$

$= 9\left(2m^3 - 3\right)\left(2m^3 + 3\right)$