# Factoring Polynomials

Section 1 - Factor the greatest common factor from each polynomial

1. $3x + 9$
2. $6x - 15$
3. $8y + 18$
4. $2x^3 - 6x^2$
5. $y^4 - y^2$
6. $6n^2 + 12n + 15$
7. $8y^2 - 10y + 12$
8. $5x^3 - 6x^2 + 7x$
9. $4y^5 - 8y^4 - 2y^2$

Section 2 – Factor each polynomial into two binomials

1.) $a^2 + 12a + 27$
2.) $y^2 + 21y + 110$
3.) $n^2 - 4n + 4$
4.) $x^2 - 12x + 20$
5.) $x^2 + 11x - 12$
6.) $r^2 - 10r + 9$
7.) $n^2 - 10n + 24$
8.) $x^2 - 8x - 48$
9.) $w^2 - 15w + 14$
10.) $a^2 - 20a + 99$
11.) $m^2 - 8m - 33$
12.) $c^2 - 2c + 1$
13.) $x^2 - 12x + 32$
14.) $y^2 - 4y + 3$
15.) $a^2 + 4a - 5$
16.) $x^2 - 15x + 50$
17.) $x^2 + 17x + 66$
18.) $m^2 - 6m + 5$
19.) $x^2 + 7x - 8$
20.) $x^2 + 9x - 36$

Section 3 – Factor each polynomial into two binomials

1. $3x^2 + 11x + 10$
2. $2n^2 + 10n + 8$
3. $5a^2 + 19a + 12$
4. $2y^2 + 11y + 12$
5. $3m^2 + 18m + 24$
6. $5c^2 + 23c + 18$

1. The area of a rectangle is $(x^2 - 12x + 35)$. If the length is $(x - 5)$, find the width. (hint: "x - 5" times "something" will give you "$x^2 - 12x + 35$.")

2. The area of a rectangle is $3a^2 + 5a - 28$. If the length is $(a + 4)$, find the width.

3. A rectangle has an area of $3x^2 + 5x - 12$. What factors are the length and width of the rectangle?

   a. $(3x + 4)(x - 3)$
   b. $(3x - 4)(x + 3)$
   c. $(3x + 3)(x - 4)$
   d. $(3x - 3)(x + 4)$

4. The area of a certain rectangle is $5n^2 - 6n - 27$. Which factors are the width and length of the rectangle?

   a. $(5n + 3)(n - 9)$
   b. $(5n - 3)(n + 9)$
   c. $(5n + 9)(n - 3)$
   d. $(5n - 9)(n + 3)$

5. If the area of a certain rectangle is $6m^2 - 2a - 28$, and the length is $(2m + 4)$, what is the width?

   a. $(3m + 7)$
   b. $(4m - 7)$
   c. $(4m + 7)$
   d. $(3m - 7)$

6. If the area of a certain rectangle is $7x^2 - 31x + 12$, and the width is $(x - 4)$, what is the length?

   a. $(7x + 3)$
   b. $(7x - 3)$
   c. $(7x + 8)$
   d. $(7x - 8)$