

Math 10C

Factoring Worksheet

1. Factor each of the following.

a. $\frac{6x+3}{3}$ GCF: 3

$3(2x+1)$

b. $\frac{15x-20}{5}$ GCF: 5

$5(3x-4)$

2. Factor each trinomial.

a. $36x^2y - 12xy^2 + 24xy$ GCF: $12xy$

$12xy(3x - y + 2)$

b. $20r^2s^2 + 10rs^2 - 15r^2s$ GCF: $5rs$

$5rs(4rs + 2s - 5r)$

3. Factor each of the following.

a. $x^2 + 4x + 3$

$(x+3)(x+1)$

b. $x^2 + 5x + 6$

$(x+5)(x+1)$

c. $x^2 - 2x - 8$ $\begin{matrix} \times 8 \\ - 2 \\ \hline 4 \ 2 \end{matrix}$

$x^2 - 4x \mid -2x - 8$
 $x(x-4) \mid -2(x-4)$

$(x-2)(x-4)$

d. $x^2 + 12x - 28$ $\begin{matrix} \times 28 \\ - 12 \\ \hline 14 \ 2 \end{matrix}$

$x^2 + 14x \mid -2x - 28$
 $x(x+7) \mid -2(x+7)$

$(x+7)(x-2)$

4. Factor each of the following.

a. $\frac{2x^2 - 10x - 48}{2}$ GCF: 2

$2(x^2 - 5x - 24)$ $\begin{matrix} \times 24 \\ - 5 \\ \hline 8 \ 3 \end{matrix}$

$x^2 - 8x \mid +3x - 24$
 $x(x-8) \mid +3(x-8)$

$2(x+3)(x-8)$

c. $\frac{5x^2 + 15x + 10}{5}$ GCF: 5

$5(x^2 + 3x + 2)$ $\begin{matrix} \times 2 \\ + 3 \\ \hline 2 \ 1 \end{matrix}$

$x^2 + 2x \mid +x + 2$
 $x(x+2) \mid +1(x+2)$

$5(x+1)(x+2)$

b. $\frac{3x^2 - 21x + 18}{3}$ GCF: 3

$3(x^2 - 7x + 6)$ $\begin{matrix} \times 6 \\ + 7 \\ \hline 6 \ 1 \end{matrix}$

$x^2 - 6x \mid +x + 6$
 $x(x-6) \mid -1(x-6)$

$3(x-6)(x-1)$

d. $x^3 + 8x^2 + 15x$ GCF: x

$x(x^2 + 8x + 15)$ $\begin{matrix} \times 15 \\ + 8 \\ \hline 5 \ 3 \end{matrix}$

$x^2 + 5x \mid +3x + 15$
 $x(x+5) \mid +3(x+5)$

$x(x+5)(x+3)$

5. Factor each trinomial.

a. $\frac{2x^3 + 10x^2 + 12x}{2x}$ GCF: $2x$

$$\begin{array}{r} 2x(x^2 + 5x + 6) \\ \begin{array}{l} x^2 + 3x + 2x + 6 \\ x(x+3) + 2(x+3) \end{array} \\ \rightarrow 2x(x+2)(x+3) \end{array}$$

$\begin{array}{r} \times 6 \\ + 5 \\ \hline 32 \end{array}$

b. $\frac{4x^3 - 20x^2 - 56x}{4x}$ GCF: $4x$

$$\begin{array}{r} 4x(x^2 - 5x - 14) \\ \begin{array}{l} x^2 - 7x + 2x - 14 \\ x(x-7) + 2(x-7) \end{array} \\ \rightarrow 4x(x+2)(x-7) \end{array}$$

$\begin{array}{r} \times 14 \\ - 5 \\ \hline 72 \end{array}$

6. Factor each of the following.

a. $3x^2 + 4x + 1$ $\begin{array}{r} \times 3 \\ + 4 \\ \hline 31 \end{array}$

$$\begin{array}{r} 3x^2 + 3x + 1x + 1 \\ 3x(x+1) + 1(x+1) \\ (3x+1)(x+1) \end{array}$$

b. $2x^2 + 13x + 6$ $\begin{array}{r} \times 12 \\ + 13 \\ \hline 121 \end{array}$

$$\begin{array}{r} 2x^2 + 12x + 1x + 6 \\ 2x(x+6) + 1(x+6) \\ (2x+1)(x+6) \end{array}$$

d. $6x^2 + 5x + 1$ $\begin{array}{r} \times 6 \\ + 5 \\ \hline 61 \end{array}$

$$\begin{array}{r} 6x^2 + 6x + 1x + 1 \\ 6x(x+1) + 1(x+1) \\ (6x+1)(x+1) \end{array}$$

d. $2x^2 + 11x + 12$ $\begin{array}{r} \times 24 \\ + 11 \\ \hline 83 \end{array}$

$$\begin{array}{r} 2x^2 + 8x + 3x + 12 \\ 2x(x+4) + 3(x+4) \\ (2x+3)(x+4) \end{array}$$

7. Factor each of the following.

a. $2x^2 - 13x + 6$ $\begin{array}{r} \times 12 \\ 13 \\ \hline -12-1 \end{array}$

$$\begin{array}{r} 2x^2 - 12x - 1x + 6 \\ 2x(x-6) - 1(x-6) \\ (2x-1)(x-6) \end{array}$$

b. $2x^2 + 11x - 6$ $\begin{array}{r} \times 12 \\ - 11 \\ \hline +12-1 \end{array}$

$$\begin{array}{r} 2x^2 + 12x - 1x - 6 \\ 2x(x+6) - 1(x+6) \\ (2x-1)(x+6) \end{array}$$

d. $4x^2 - 15x + 9$ $\begin{array}{r} \times 36 \\ -12-3 \end{array}$

$$\begin{array}{r} 4x^2 - 12x + 3x + 9 \\ 4x(x-3) - 3(x-3) \\ (4x-3)(x-3) \end{array}$$

d. $10x^2 + 13x - 3$ $\begin{array}{r} \times 30 \\ -13 \\ \hline +15-2 \end{array}$

$$\begin{array}{r} 10x^2 + 15x - 2x - 3 \\ 5x(2x+3) - 1(2x+3) \\ (5x-1)(2x+3) \end{array}$$

8. Factor each trinomial.

a. $6x^3 - 24x^2 + 24x$ GCF: $6x$

$$6x(x^2 - 4x + 4)$$
$$\begin{array}{r} x^2 - 2x \quad | \quad -2x + 4 \\ x(x-2) \quad | \quad -2(x-2) \end{array}$$

$x^4 + 4$
 $-2 - 2$

$$\rightarrow 6x(x-2)(x-2)$$

b. $8x^2 - 20x + 12$ GCF: 4

$$4(2x^2 - 5x + 3)$$
$$\begin{array}{r} 2x^2 - 3x \quad | \quad -2x + 3 \\ x(2x-3) \quad | \quad -2(2x-3) \end{array}$$

$x^6 + 5$
 $-3 - 2$

$$4(x-2)(2x-3)$$

9. Factor each of the following.

a. $4x^2 - 12x + 9$

$$\begin{array}{r} 4x^2 - 6x \quad | \quad -6x + 9 \\ 2x(2x-3) \quad | \quad -3(2x-3) \end{array}$$

$x^3 6$
 $+12$
 $-6 - 6$

$$(2x-3)(2x-3)$$

b. $9x^2 + 30x + 25$

$$\begin{array}{r} 9x^2 + 15x \quad | \quad +15x + 25 \\ 3x(3x+5) \quad | \quad +5(3x+5) \end{array}$$

$x^2 25$
 $+30$
 $+15 + 15$

$$(3x+5)(3x+5)$$

10. Factor each of the following.

a. $49x^2 - 81$

$$(7x-9)(7x+9)$$

b. $9x^2 - 100$

$$(3x-25)(3x+25)$$

c. $x^2 - 64$

$$(x-8)(x+8)$$

d. $5x^4 - 80$ GCF: 5

$$(x^2 - 16)(x^2 + 16)$$
$$(x-4)(x+4)(x^2 + 16)$$

11. Factor each of the following.

a. $x^2 + 14xy + 33y^2$

b. $5x^2 - 13xy - 6y^2$

c. $u^2 - 6uv - 7v^2$

d. $3x^2 + 15xy + 12y^2$