

Factoring Polynomials

Emphasis on Factoring Quadratics with $a = 1$

Completely factor each of the following:

<p>1. $n^2 - 2n - 3$</p> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 10px;"> $(n-3)(n+1)$ </div> <div style="margin-left: 20px;"> $\begin{array}{r} 3 \\ \hline +1 \quad -3 \\ \hline \end{array} = -2$ </div>	<p>2. $n^2 + 9n - 10$</p> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 10px;"> $(n+10)(n-1)$ </div> <div style="margin-left: 20px;"> $\begin{array}{r} 10 \\ \hline -1 \quad 10 \\ \hline \end{array} = 9$ </div>
<p>3. $n^2 + 2n - 80$</p> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 10px;"> $(n+10)(n-8)$ </div> <div style="margin-left: 20px;"> $\begin{array}{r} 80 \\ \hline 1 \quad 80 \\ 2 \quad 40 \\ 4 \quad 20 \\ 5 \quad 16 \\ \hline -8 \quad +10 \\ \hline \end{array} = 2$ </div>	<p>4. $x^2 + 20x + 100$</p> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 10px;"> $(x+10)(x+10)$ </div> <div style="margin-left: 20px;"> $\begin{array}{r} 100 \\ \hline 1 \quad 100 \\ 2 \quad 50 \\ 4 \quad 25 \\ 5 \quad 20 \\ \hline +10 \quad +10 \\ \hline \end{array} = 20$ <p style="text-align: center;">OR</p> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 10px;"> $(x+10)^2$ </div> </div>
<p>5. $x^2 + 10x + 21$</p> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 10px;"> $(x+7)(x+3)$ </div> <div style="margin-left: 20px;"> $\begin{array}{r} 21 \\ \hline 1 \quad 21 \\ \hline +3 \quad +7 \\ \hline \end{array} = 10$ </div>	<p>6. $k^2 - 8k - 20$</p> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 10px;"> $(k-10)(k+2)$ </div> <div style="margin-left: 20px;"> $\begin{array}{r} 20 \\ \hline 1 \quad 20 \\ \hline +2 \quad -10 \\ \hline 4 \quad 5 \\ \hline \end{array} = -8$ </div>
<p>7. $n^2 + 9n + 18$</p> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 10px;"> $(n+6)(n+3)$ </div> <div style="margin-left: 20px;"> $\begin{array}{r} 18 \\ \hline 1 \quad 18 \\ 2 \quad 9 \\ \hline +3 \quad +6 \\ \hline \end{array} = 9$ </div>	<p>8. $n^2 + 12n + 20$</p> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 10px;"> $(n+2)(n+10)$ </div> <div style="margin-left: 20px;"> $\begin{array}{r} 20 \\ \hline 1 \quad 20 \\ \hline +2 \quad +10 \\ \hline 4 \quad 5 \\ \hline \end{array} = 12$ </div>
<p>9. $x^2 - 6x - 27$</p> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 10px;"> $(x-9)(x+3)$ </div> <div style="margin-left: 20px;"> $\begin{array}{r} 27 \\ \hline 1 \quad 27 \\ \hline +3 \quad -9 \\ \hline \end{array} = -6$ </div>	<p>10. $m^2 - 3m - 28$</p> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 10px;"> $(m-7)(m+4)$ </div> <div style="margin-left: 20px;"> $\begin{array}{r} 28 \\ \hline 1 \quad 28 \\ 2 \quad 14 \\ \hline +4 \quad -7 \\ \hline \end{array} = -3$ </div>

$$11. 2x^2 - 34x + 144$$

$$2(x^2 - 17x + 72)$$

$$2(x-9)(x-8)$$

$$\begin{array}{r} 72 \\ 1 \ 72 \\ 2 \ 36 \\ 3 \ 24 \\ 4 \ 18 \\ 6 \ 12 \\ \hline -8 \ -9 = -17 \end{array}$$

$$12. 6b^2 + 24b - 216$$

$$6(b^2 + 4b - 36)$$

$$\begin{array}{r} 36 \\ 1 \ 36 \\ 2 \ 18 \\ 3 \ 12 \\ 4 \ 9 \\ 6 \ 6 \end{array}$$

$$13. 2v^2 + 14v - 36$$

$$2(v^2 + 7v - 18)$$

$$2(v+9)(v-2)$$

$$\begin{array}{r} 18 \\ 1 \ 18 \\ -2 \ 9 \\ \hline 3 \ 6 = 7 \end{array}$$

$$14. -2v^2 - 24v - 64$$

$$-2(v^2 + 12v + 32)$$

$$-2(v+8)(v+4)$$

$$\begin{array}{r} 32 \\ 1 \ 32 \\ 2 \ 16 \\ \hline +4 \ +8 = 12 \end{array}$$

$$15. 6p^2 - 24p - 72$$

$$6(p^2 - 4p - 12)$$

$$6(p-6)(p+2)$$

$$\begin{array}{r} 12 \\ 1 \ 12 \\ +2 \ -6 \\ \hline 3 \ 4 = -4 \end{array}$$

$$16. 6n^2 + 72n + 210$$

$$6(n^2 + 12n + 35)$$

$$6(n+7)(n+5)$$

$$\begin{array}{r} 35 \\ 1 \ 35 \\ +5 \ +7 \\ \hline = 12 \end{array}$$

$$17. 6r^2 + 30r - 84$$

$$6(r^2 + 5r - 14)$$

$$6(r+7)(r-2)$$

$$\begin{array}{r} 14 \\ 1 \ 14 \\ -2 \ +7 \\ \hline = 5 \end{array}$$

$$18. 5x^2 - 90x + 405$$

$$5(x^2 - 18x + 81)$$

$$5(x-9)(x-9)$$

$$\text{or} \\ 5(x-9)^2$$

$$\begin{array}{r} 81 \\ 1 \ 81 \\ 3 \ 27 \\ \hline -9 \ -9 = -18 \end{array}$$

$$19. 5x^2 + 15x - 270$$

$$5(x^2 + 3x - 54)$$

$$5(x+9)(x-6)$$

$$\begin{array}{r} 54 \\ 1 \ 54 \\ 2 \ 27 \\ 3 \ 18 \\ \hline -6 \ +9 = 3 \end{array}$$

$$20. 6m^2 + 18m - 108$$

$$6(m^2 + 3m - 18)$$

$$6(m-3)(m+6)$$

$$\begin{array}{r} 18 \\ 1 \ 18 \\ 2 \ 9 \\ \hline -3 \ +6 = 3 \end{array}$$