

Accuplacer Study Modules

TOPIC: Factor Trinomials when the Leading Coefficient is NOT 1

<p>1. Factor <math>6x^2 + x - 2</math> completely.</p> <p><math>6x^2 + x - 2</math>      <b>GCF=1</b></p> <p><math>a=6</math>   <math>c=-2</math>   <math>6 \cdot -2 = -12</math> (a.c)</p> <p><b>Factors:</b> (of -12)</p> <table border="0"> <tr><td>-1 x 12</td><td>1 x -12</td></tr> <tr><td>-2 x 6</td><td>2 x -6</td></tr> <tr><td>-3 x 4</td><td>3 x -4</td></tr> </table> <p><b>Sums:</b></p> <table border="0"> <tr><td>-1 + 12 = 11</td><td>1 + -12 = -11</td></tr> <tr><td>-2 + 6 = 4</td><td>2 + -6 = -4</td></tr> <tr><td><u>-3 + 4 = 1</u></td><td>3 + -4 = -1</td></tr> </table> <p><math>6x^2 - 3x + 4x - 2</math>      Split the middle term.</p> <p><math>3x(2x-1) + 2(2x-1)</math>      Factor by grouping.</p> <p><math>(2x-1)(3x+2)</math></p>	-1 x 12	1 x -12	-2 x 6	2 x -6	-3 x 4	3 x -4	-1 + 12 = 11	1 + -12 = -11	-2 + 6 = 4	2 + -6 = -4	<u>-3 + 4 = 1</u>	3 + -4 = -1	<p>2. Factor <math>36x^3 + 33x^2 + 6x</math> completely.</p> <p><math>36x^3 + 33x^2 + 6x</math>      <b>Factor out the GCF.</b></p> <p><math>3x(12x^2 + 11x + 2)</math>      <b>Factor out the GCF.</b></p> <p><math>a=12</math>   <math>c=2</math>   <math>12 \cdot 2 = 24</math> (a.c)</p> <p><b>Factors:</b> (of 24)</p> <table border="0"> <tr><td>1 x 24</td><td>-1 x -24</td></tr> <tr><td>2 x 12</td><td>-2 x -12</td></tr> <tr><td>3 x 8</td><td>-3 x -8</td></tr> <tr><td>4 x 6</td><td>-4 x -6</td></tr> </table> <p><b>Sums:</b></p> <table border="0"> <tr><td>1 + 24 = 25</td><td>-1 + -24 = -25</td></tr> <tr><td>2 + 12 = 14</td><td>-2 + -12 = -14</td></tr> <tr><td><u>3 + 8 = 11</u></td><td>-3 + -8 = -11</td></tr> <tr><td>4 + 6 = 10</td><td>-4 + -6 = -10</td></tr> </table> <p><math>3x(12x^2 + 3x + 8x + 2)</math>      Split the middle term.</p> <p><math>3x(3x(4x+1) + 2(4x+1))</math>      Factor by grouping.</p> <p><math>3x(4x+1)(3x+2)</math></p>	1 x 24	-1 x -24	2 x 12	-2 x -12	3 x 8	-3 x -8	4 x 6	-4 x -6	1 + 24 = 25	-1 + -24 = -25	2 + 12 = 14	-2 + -12 = -14	<u>3 + 8 = 11</u>	-3 + -8 = -11	4 + 6 = 10	-4 + -6 = -10																												
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<p>3. Factor <math>12x^2 - 29x + 15</math> completely.</p> <p><math>12x^2 - 29x + 15</math>      <b>GCF=1</b></p> <p><math>a=12</math>   <math>c=15</math>   <math>12 \cdot 15 = 180</math> (a.c)</p> <p><b>Factors:</b> (of 180)</p> <table border="0"> <tr><td>1 x 180</td><td>6 x 30</td><td>-1 x -180</td><td>-6 x -30</td></tr> <tr><td>2 x 90</td><td>9 x 20</td><td>-2 x -90</td><td>-9 x -20</td></tr> <tr><td>3 x 60</td><td>10 x 18</td><td>-3 x -60</td><td>-10 x -18</td></tr> <tr><td>4 x 45</td><td>12 x 15</td><td>-4 x -45</td><td>-12 x -15</td></tr> <tr><td>5 x 36</td><td></td><td>-5 x -36</td><td></td></tr> </table> <p><b>Sums:</b></p> <table border="0"> <tr><td>1 + 180 = 181</td><td>6 + 30 = 36</td><td>-1 + -180 = -181</td><td></td></tr> <tr><td>2 + 90 = 92</td><td>9 + 20 = 29</td><td>-2 + -90 = -92</td><td><u>9 + -20 = -11</u></td></tr> <tr><td>3 + 60 = 63</td><td>10 + 18 = 28</td><td>-3 + -60 = -63</td><td>-10 + -18 = -28</td></tr> <tr><td>4 + 45 = 49</td><td>12 + 15 = 27</td><td>-4 + -45 = -49</td><td>-12 + -15 = -27</td></tr> <tr><td>5 + 36 = 41</td><td></td><td>-5 + -36 = -41</td><td></td></tr> </table> <p><math>12x^2 - 9x - 20x + 15</math>      Split the middle term.</p> <p><math>3x(4x-3) - 5(4x-3)</math>      Factor by grouping.</p> <p><math>(4x-3)(3x-5)</math></p>	1 x 180	6 x 30	-1 x -180	-6 x -30	2 x 90	9 x 20	-2 x -90	-9 x -20	3 x 60	10 x 18	-3 x -60	-10 x -18	4 x 45	12 x 15	-4 x -45	-12 x -15	5 x 36		-5 x -36		1 + 180 = 181	6 + 30 = 36	-1 + -180 = -181		2 + 90 = 92	9 + 20 = 29	-2 + -90 = -92	<u>9 + -20 = -11</u>	3 + 60 = 63	10 + 18 = 28	-3 + -60 = -63	-10 + -18 = -28	4 + 45 = 49	12 + 15 = 27	-4 + -45 = -49	-12 + -15 = -27	5 + 36 = 41		-5 + -36 = -41		<p>4. Factor <math>3x^2 - 3x - 90</math> completely.</p> <p><math>3x^2 - 3x - 90</math>      <b>Factor out the GCF.</b></p> <p><math>3(x^2 - x - 30)</math>      <b>Factor out the GCF.</b></p> <p><math>a=1</math>   <math>c=-30</math>   <math>1 \cdot -30 = -30</math> (a.c)</p> <p><b>Factors:</b> (of -30)</p> <table border="0"> <tr><td>-1 x 30</td><td>1 x -30</td></tr> <tr><td>-2 x 15</td><td>2 x -15</td></tr> <tr><td>-3 x 10</td><td>3 x -10</td></tr> <tr><td>-5 x 6</td><td>5 x -6</td></tr> </table> <p><b>Sums:</b></p> <table border="0"> <tr><td>-1 + 30 = 29</td><td>1 + -30 = -29</td></tr> <tr><td>-2 + 15 = 13</td><td>2 + -15 = -13</td></tr> <tr><td>-3 + 10 = 7</td><td>3 + -10 = -7</td></tr> <tr><td>-5 + 6 = 1</td><td><u>5 + -6 = -1</u></td></tr> </table> <p><math>3(x^2 + 5x - 6x - 30)</math>      Split the middle term.</p> <p><math>3(x(x+5) - 6(x+5))</math>      Factor by grouping.</p> <p><math>3(x-6)(x+5)</math></p>	-1 x 30	1 x -30	-2 x 15	2 x -15	-3 x 10	3 x -10	-5 x 6	5 x -6	-1 + 30 = 29	1 + -30 = -29	-2 + 15 = 13	2 + -15 = -13	-3 + 10 = 7	3 + -10 = -7	-5 + 6 = 1	<u>5 + -6 = -1</u>
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