

**Intermediate Algebra**  
**Chapter 3/4 Test**

1. Solve a system of equations

Solve using substitution:	Solve using addition (elimination):
$5x - 2y = 4$ $y - 3x = -3$	$3x - 2y = 13$ $4x + y = 21$
<div style="background-color: #f0f0f0; padding: 10px;"> <p style="text-align: center;">Sub.</p> <math display="block">5x - 2y = 4</math> <math display="block">y - 3x = -3</math>   <math display="block">\textcircled{1} y = 3x - 3</math> <math display="block">\textcircled{2} 5x - 2y = 4</math> <math display="block">5x - 2(3x - 3) = 4</math> <math display="block">5x - 6x + 6 = 4</math> <math display="block">-1x + 6 = 4</math> <math display="block">-x = 4 - 6</math> <math display="block">-x = -2</math> <math display="block">\frac{-1}{-1} = \frac{-2}{-1}</math> <math display="block">x = 2</math>   <math display="block">\textcircled{3} y = 3x - 3</math> <math display="block">y = 3(2) - 3</math> <math display="block">y = 6 - 3</math> <math display="block">y = 3</math>   <math display="block">(2, 3)</math> </div>	<div style="background-color: #f0f0f0; padding: 10px;"> <p style="text-align: center;"><del>Sub.</del> Elim.</p> <math display="block">3x - 2y = 13</math> <math display="block">4x + y = 21 \quad \text{By } 2</math>   <math display="block">3x - 2y = 13</math> <math display="block">\underline{8x + 2y = 42}</math> <math display="block">11x = 55</math> <math display="block">\frac{11x}{11} = \frac{55}{11}</math> <math display="block">x = 5</math>   <math display="block">4x + y = 21</math> <math display="block">4(5) + y = 21</math> <math display="block">20 + y = 21</math> <math display="block">y = 21 - 20</math> <math display="block">y = 1</math>   <math display="block">(5, 1)</math> </div>

2. Add or subtract polynomials

$(5x^2 - 7x + 2) + (3x^2 - 2x + 4)$	$(8x^2 - 2x + 1) - (5x^2 - 4x - 7)$
$(5x^2 - 7x + 2) + (3x^2 - 2x + 4)$	$(8x^2 - 2x + 1) - (5x^2 - 4x - 7)$
$5x^2 - 7x + 2 + 3x^2 - 2x + 4$	$8x^2 - 2x + 1 - 5x^2 + 4x + 7$
$8x^2 - 9x + 6$	$3x^2 + 2x + 8$

3. Multiply polynomials

$(4x - 1)(7x + 2)$	$4x(x^2 - 3x + 1)$
$(4x - 1)(7x + 2)$	$4x(x^2 - 3x + 1)$
$4x(7x) + 4x(2) - 1(7x) - 1(2)$	$4x(x^2) + 4x(-3x) + 4x(1)$
$28x^2 + 8x - 7x - 2$	$4x^3 - 12x^2 + 4x$
$28x^2 + x - 2$	

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4. Find the special product

$$(x-3)^2$$

$$(x-3)^2$$

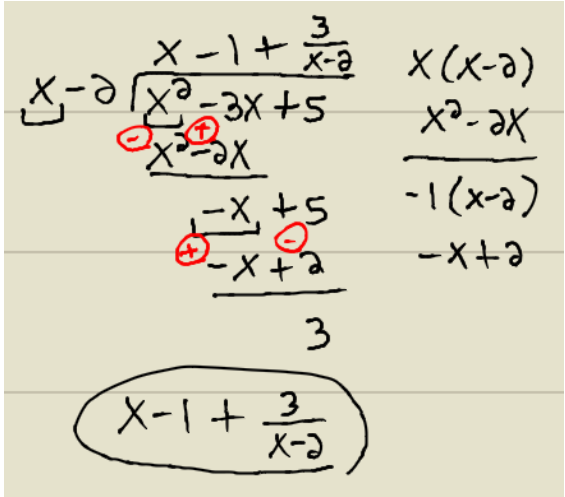
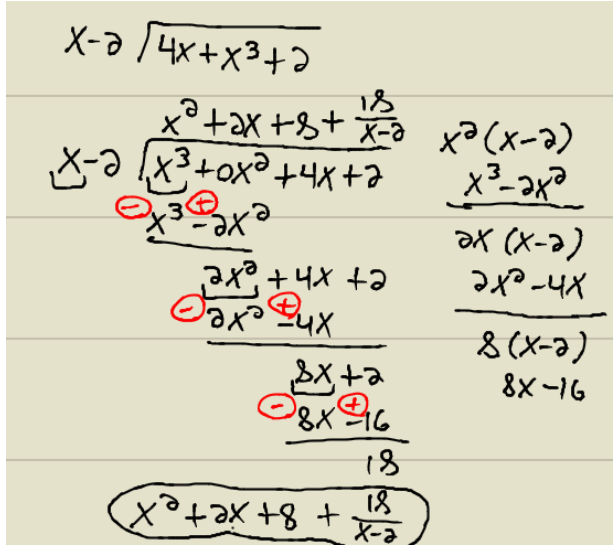
$$(x-3)(x-3)$$

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

$$x^2 - 3x - 3x + 9$$

$$x^2 - 6x + 9$$

5. Divide using long division

$\frac{x^2 - 3x + 5}{x - 2}$  <p style="text-align: center;"><math>x - 1 + \frac{3}{x-2}</math></p>	$\frac{4x + x^3 + 2}{x - 2}$  <p style="text-align: center;"><math>x^2 + 2x + 8 + \frac{18}{x-2}</math></p>
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6. Divide using synthetic division

$\frac{x^3 - 4x^2 + 8x - 1}{x + 1}$ <div style="background-color: #f0f0f0; padding: 5px; margin: 5px 0;"> <math display="block">\frac{x^3 - 4x^2 + 8x - 1}{x + 1}</math> </div> <p>① <math>x + 1 = 0</math> <math>x = -1</math></p> <p>②</p> <table style="margin-left: 20px;"> <tr> <td></td> <td><math>x^3</math></td> <td><math>x^2</math></td> <td><math>x</math></td> <td>no <math>x</math></td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 5px;">-1</td> <td style="padding: 0 5px;">1</td> <td style="padding: 0 5px;">-4</td> <td style="padding: 0 5px;">8</td> <td style="padding: 0 5px;">-1</td> </tr> <tr> <td></td> <td></td> <td style="padding: 0 5px;">-1</td> <td style="padding: 0 5px;">5</td> <td style="padding: 0 5px;">-13</td> </tr> <tr style="border-top: 1px solid black;"> <td></td> <td style="padding: 0 5px;">1</td> <td style="padding: 0 5px;">-5</td> <td style="padding: 0 5px;">13</td> <td style="padding: 0 5px;">-14</td> </tr> <tr> <td></td> <td><math>x^2</math></td> <td><math>x</math></td> <td>no <math>x</math></td> <td>REM</td> </tr> </table> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block; margin-top: 10px;"> <math>x^2 - 5x + 13 + \frac{-14}{x+1}</math> </div>		$x^3$	$x^2$	$x$	no $x$	-1	1	-4	8	-1			-1	5	-13		1	-5	13	-14		$x^2$	$x$	no $x$	REM	$\frac{x^5 - 4}{x - 2}$ <div style="background-color: #f0f0f0; padding: 5px; margin: 5px 0;"> <math display="block">\frac{x^5 - 4}{x - 2}</math> </div> <p>① <math>x - 2 = 0</math> <math>x = 2</math></p> <p>②</p> <table style="margin-left: 20px;"> <tr> <td></td> <td><math>x^5</math></td> <td><math>x^4</math></td> <td><math>x^3</math></td> <td><math>x^2</math></td> <td><math>x</math></td> <td>no <math>x</math></td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 5px;">2</td> <td style="padding: 0 5px;">1</td> <td style="padding: 0 5px;">0</td> <td style="padding: 0 5px;">0</td> <td style="padding: 0 5px;">0</td> <td style="padding: 0 5px;">0</td> <td style="padding: 0 5px;">-4</td> </tr> <tr> <td></td> <td></td> <td style="padding: 0 5px;">2</td> <td style="padding: 0 5px;">4</td> <td style="padding: 0 5px;">8</td> <td style="padding: 0 5px;">16</td> <td style="padding: 0 5px;">32</td> </tr> <tr style="border-top: 1px solid black;"> <td></td> <td style="padding: 0 5px;">1</td> <td style="padding: 0 5px;">2</td> <td style="padding: 0 5px;">4</td> <td style="padding: 0 5px;">8</td> <td style="padding: 0 5px;">16</td> <td style="padding: 0 5px;">28</td> </tr> <tr> <td></td> <td><math>x^4</math></td> <td><math>x^3</math></td> <td><math>x^2</math></td> <td><math>x</math></td> <td>no <math>x</math></td> <td>REM</td> </tr> </table> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block; margin-top: 10px;"> <math>x^4 + 2x^3 + 4x^2 + 8x + 16 + \frac{28}{x-2}</math> </div>		$x^5$	$x^4$	$x^3$	$x^2$	$x$	no $x$	2	1	0	0	0	0	-4			2	4	8	16	32		1	2	4	8	16	28		$x^4$	$x^3$	$x^2$	$x$	no $x$	REM
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7. Factor using Difference of Two Squares and Grouping:

$6x^2 - 2ax - 3bx + ab$  $6x^2 - 2ax - 3bx + ab$ $2x(3x - a) - b(3x - a)$ $(3x - a)(2x - b)$	$9x^2 - 16$  $9x^2 - 16$ $(3x)^2 - (4)^2$ $(3x + 4)(3x - 4)$
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8. Factor using the P-S-D method

$x^2 - 16x - 80$ <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <math>x^2 - 16x - 80</math> <table style="margin-left: 100px; border-collapse: collapse;"> <tr> <td style="text-align: right; padding-right: 10px;">80</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">P</td> <td style="text-align: center;">S</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">1.80</td> <td style="text-align: center;">81</td> <td style="text-align: center;">79</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">2.40</td> <td style="text-align: center;">42</td> <td style="text-align: center;">38</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;"><u>4.20</u></td> <td style="text-align: center;">24</td> <td style="text-align: center;">(16)</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">5.16</td> <td style="text-align: center;">21</td> <td style="text-align: center;">11</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">8.10</td> <td style="text-align: center;">18</td> <td style="text-align: center;">2</td> </tr> </table> </div>	80			P	S	D	1.80	81	79	2.40	42	38	<u>4.20</u>	24	(16)	5.16	21	11	8.10	18	2	$x^2 + 34x + 120$ <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <math>x^2 + 34x + 120</math> <table style="margin-left: 100px; border-collapse: collapse;"> <tr> <td style="text-align: right; padding-right: 10px;">120</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">P</td> <td style="text-align: center;">S</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">1.120</td> <td style="text-align: center;">121</td> <td style="text-align: center;">119</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">2.60</td> <td style="text-align: center;">62</td> <td style="text-align: center;">58</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">3.40</td> <td style="text-align: center;">43</td> <td style="text-align: center;">37</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;"><u>4.30</u></td> <td style="text-align: center;">(34)</td> <td style="text-align: center;">26</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">5.24</td> <td style="text-align: center;">29</td> <td style="text-align: center;">19</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">6.20</td> <td style="text-align: center;">26</td> <td style="text-align: center;">14</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">8.15</td> <td style="text-align: center;">23</td> <td style="text-align: center;">7</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">10.12</td> <td style="text-align: center;">22</td> <td style="text-align: center;">2</td> </tr> </table> </div>	120			P	S	D	1.120	121	119	2.60	62	58	3.40	43	37	<u>4.30</u>	(34)	26	5.24	29	19	6.20	26	14	8.15	23	7	10.12	22	2
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9. Factor using the Key # method

$30x^2 - 23x + 2$ <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <math>30x^2 - 23x + 2</math> <table style="margin-left: 100px; border-collapse: collapse;"> <tr> <td style="text-align: right; padding-right: 10px;"><math>ac = 30(2)</math></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right; padding-right: 10px;"><math>= 60</math></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">P</td> <td style="text-align: center;">S</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">1.60</td> <td style="text-align: center;">61</td> <td style="text-align: center;">59</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">2.30</td> <td style="text-align: center;">32</td> <td style="text-align: center;">28</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;"><u>3.20</u></td> <td style="text-align: center;">(23)</td> <td style="text-align: center;">17</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">4.15</td> <td style="text-align: center;">19</td> <td style="text-align: center;">11</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">5.12</td> <td style="text-align: center;">17</td> <td style="text-align: center;">7</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">6.10</td> <td style="text-align: center;">16</td> <td style="text-align: center;">4</td> </tr> </table> </div>	$ac = 30(2)$			$= 60$			P	S	D	1.60	61	59	2.30	32	28	<u>3.20</u>	(23)	17	4.15	19	11	5.12	17	7	6.10	16	4	$9x^2 - 29x + 6$ <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <math>9x^2 - 29x + 6</math> <table style="margin-left: 100px; border-collapse: collapse;"> <tr> <td style="text-align: right; padding-right: 10px;"><math>ac = 9(6)</math></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right; padding-right: 10px;"><math>= 54</math></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">P</td> <td style="text-align: center;">S</td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">1.54</td> <td style="text-align: center;">55</td> <td style="text-align: center;">53</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;"><u>2.27</u></td> <td style="text-align: center;">(29)</td> <td style="text-align: center;">25</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">3.18</td> <td style="text-align: center;">21</td> <td style="text-align: center;">15</td> </tr> <tr> <td style="text-align: right; padding-right: 10px;">6.9</td> <td style="text-align: center;">15</td> <td style="text-align: center;">3</td> </tr> </table> </div>	$ac = 9(6)$			$= 54$			P	S	D	1.54	55	53	<u>2.27</u>	(29)	25	3.18	21	15	6.9	15	3
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10. Solve equations using zero factor property

$$x^2 + 2x - 80 = 0$$

$x^2 + 2x - 80 = 0$       80  
 $(x - 8)(x + 10) = 0$

	<u>P</u>	<u>S</u>	<u>D</u>
1 · 80	81	79	
2 · 40	42	38	
4 · 20	24	16	
5 · 16	21	11	
8 · 10	18	2	⊖

$x - 8 = 0$        $x + 10 = 0$   
 $x = 8$        $x = -10$

$$15x^2 - 11x = -2$$

$15x^2 - 11x = -2$        $ac = 15(-2) = -30$   
 $15x^2 - 11x + 2 = 0$

	<u>P</u>	<u>S</u>	<u>D</u>
1 · 30	31	29	
2 · 15	17	13	
3 · 10	13	7	
5 · 6	11	1	

$15x^2 - 6x - 5x + 2 = 0$   
 $3x(5x - 2) - 1(5x - 2) = 0$   
 $(5x - 2)(3x - 1) = 0$   
 $5x - 2 = 0$        $3x - 1 = 0$   
 $5x = 2$        $3x = 1$   
 $x = \frac{2}{5}$        $x = \frac{1}{3}$