

Homework #41

Solve each Equation:

<p>1) $x^2 - 3x + 2 = 0$</p> $(x-2)(x-1) = 0$ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$x-2=0$ +2 -2</td> <td style="padding: 5px;">$x-1=0$ +1 -1</td> </tr> <tr> <td style="text-align: center; border: 1px solid black;">$x=2$</td> <td style="text-align: center; border: 1px solid black;">$x=1$</td> </tr> </table> <p style="text-align: center; margin-top: 20px;">$\{1, 2\}$</p>	$x-2=0$ +2 -2	$x-1=0$ +1 -1	$x=2$	$x=1$	<p>2) $m^2 + 10m + 9 = 0$</p> $(m+9)(m+1) = 0$ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$m+9=0$ -9 -9</td> <td style="padding: 5px;">$m+1=0$ -1 -1</td> </tr> <tr> <td style="text-align: center; border: 1px solid black;">$m=-9$</td> <td style="text-align: center; border: 1px solid black;">$m=-1$</td> </tr> </table> <p style="text-align: center; margin-top: 20px;">$\{-9, -1\}$</p>	$m+9=0$ -9 -9	$m+1=0$ -1 -1	$m=-9$	$m=-1$	<p>3) $x^2 - 49 = 0$</p> $(x+7)(x-7) = 0$ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$x+7=0$ -7 -7</td> <td style="padding: 5px;">$x-7=0$ +7 +7</td> </tr> <tr> <td style="text-align: center; border: 1px solid black;">$x=-7$</td> <td style="text-align: center; border: 1px solid black;">$x=7$</td> </tr> </table> <p style="text-align: center; margin-top: 20px;">$\{-7, 7\}$</p>	$x+7=0$ -7 -7	$x-7=0$ +7 +7	$x=-7$	$x=7$		
$x-2=0$ +2 -2	$x-1=0$ +1 -1															
$x=2$	$x=1$															
$m+9=0$ -9 -9	$m+1=0$ -1 -1															
$m=-9$	$m=-1$															
$x+7=0$ -7 -7	$x-7=0$ +7 +7															
$x=-7$	$x=7$															
<p>4) $3x^2 - 12 = 0$</p> $3(x^2 - 4) = 0$ $3(x-2)(x+2) = 0$ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$3 \neq 0$</td> <td style="padding: 5px;">$x-2=0$ +2 -2</td> <td style="padding: 5px;">$x+2=0$ -2 -2</td> </tr> <tr> <td></td> <td style="text-align: center; border: 1px solid black;">$x=2$</td> <td style="text-align: center; border: 1px solid black;">$x=-2$</td> </tr> </table> <p style="text-align: center; margin-top: 20px;">$\{-2, 2\}$</p>	$3 \neq 0$	$x-2=0$ +2 -2	$x+2=0$ -2 -2		$x=2$	$x=-2$	<p>5) $s^2 - s = 0$</p> $s(s-1) = 0$ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$s=0$</td> <td style="padding: 5px;">$s-1=0$ +1 -1</td> </tr> <tr> <td></td> <td style="text-align: center; border: 1px solid black;">$s=1$</td> </tr> </table> <p style="text-align: center; margin-top: 20px;">$\{0, 1\}$</p>	$s=0$	$s-1=0$ +1 -1		$s=1$	<p>6) $y^2 - 3y = 28$</p> $y^2 - 3y - 28 = 0$ $(y-7)(y+4) = 0$ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$y-7=0$ +7 +7</td> <td style="padding: 5px;">$y+4=0$ -4 -4</td> </tr> <tr> <td style="text-align: center; border: 1px solid black;">$y=7$</td> <td style="text-align: center; border: 1px solid black;">$y=-4$</td> </tr> </table> <p style="text-align: center; margin-top: 20px;">$\{-4, 7\}$</p>	$y-7=0$ +7 +7	$y+4=0$ -4 -4	$y=7$	$y=-4$
$3 \neq 0$	$x-2=0$ +2 -2	$x+2=0$ -2 -2														
	$x=2$	$x=-2$														
$s=0$	$s-1=0$ +1 -1															
	$s=1$															
$y-7=0$ +7 +7	$y+4=0$ -4 -4															
$y=7$	$y=-4$															
<p>7) $s^2 = -4s$</p> $s^2 + 4s = 0$ $s(s+4) = 0$ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$s=0$</td> <td style="padding: 5px;">$s+4=0$ -4 -4</td> </tr> <tr> <td></td> <td style="text-align: center; border: 1px solid black;">$s=-4$</td> </tr> </table> <p style="text-align: center; margin-top: 20px;">$\{-4, 0\}$</p>	$s=0$	$s+4=0$ -4 -4		$s=-4$	<p>8) $y^2 = 8y + 20$</p> $y^2 - 8y - 20 = 0$ $(y-10)(y+2) = 0$ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$y-10=0$ +10 +10</td> <td style="padding: 5px;">$y+2=0$ -2 -2</td> </tr> <tr> <td style="text-align: center; border: 1px solid black;">$y=10$</td> <td style="text-align: center; border: 1px solid black;">$y=-2$</td> </tr> </table> <p style="text-align: center; margin-top: 20px;">$\{-2, 10\}$</p>	$y-10=0$ +10 +10	$y+2=0$ -2 -2	$y=10$	$y=-2$	<p>9) $30 + x = x^2$</p> $x^2 - x - 30 = 0$ $(x-6)(x+5) = 0$ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$x-6=0$ +6 +6</td> <td style="padding: 5px;">$x+5=0$ -5 -5</td> </tr> <tr> <td style="text-align: center; border: 1px solid black;">$x=6$</td> <td style="text-align: center; border: 1px solid black;">$x=-5$</td> </tr> </table> <p style="text-align: center; margin-top: 20px;">$\{-5, 6\}$</p>	$x-6=0$ +6 +6	$x+5=0$ -5 -5	$x=6$	$x=-5$		
$s=0$	$s+4=0$ -4 -4															
	$s=-4$															
$y-10=0$ +10 +10	$y+2=0$ -2 -2															
$y=10$	$y=-2$															
$x-6=0$ +6 +6	$x+5=0$ -5 -5															
$x=6$	$x=-5$															

<p>10) $x^2 + 3x - 4 = 50$ $-50 \quad -50$ $x^2 + 3x - 54 = 0$ $(x+9)(x-6) = 0$</p> <table border="1"> <tr> <td>$x+9=0$ -9 -9 $x = -9$</td> <td>$x-6=0$ +6 +6 $x = 6$</td> </tr> </table> <p>$\{-9, 6\}$</p>	$x+9=0$ -9 -9 $x = -9$	$x-6=0$ +6 +6 $x = 6$	<p>*11) $2x^2 + 7 = 5 - 5x$ $-5 + 5x \quad -5 + 5x$ $2x^2 + 5x + 2 = 0$ $(\frac{2x+4}{2})(\frac{2x+1}{2}) = 0$ $(x+2)(2x+1) = 0$</p> <table border="1"> <tr> <td>$x+2=0$ -2 -2 $x = -2$</td> <td>$2x+1=0$ -1 -1 $\frac{2x}{2} = \frac{-1}{2}$ $x = -\frac{1}{2}$</td> </tr> </table> <p>$\{-2, -\frac{1}{2}\}$</p>	$x+2=0$ -2 -2 $x = -2$	$2x+1=0$ -1 -1 $\frac{2x}{2} = \frac{-1}{2}$ $x = -\frac{1}{2}$	<p>12) $x(x+3) = 40$ $x^2 + 3x = 40$ $-40 \quad -40$ $x^2 + 3x - 40 = 0$ $(x+8)(x-5) = 0$</p> <table border="1"> <tr> <td>$x+8=0$ -8 -8 $x = -8$</td> <td>$x-5=0$ +5 +5 $x = 5$</td> </tr> </table> <p>$\{-8, 5\}$</p>	$x+8=0$ -8 -8 $x = -8$	$x-5=0$ +5 +5 $x = 5$
$x+9=0$ -9 -9 $x = -9$	$x-6=0$ +6 +6 $x = 6$							
$x+2=0$ -2 -2 $x = -2$	$2x+1=0$ -1 -1 $\frac{2x}{2} = \frac{-1}{2}$ $x = -\frac{1}{2}$							
$x+8=0$ -8 -8 $x = -8$	$x-5=0$ +5 +5 $x = 5$							
<p>13) $\frac{x+4}{-1} = \frac{4}{x}$ $x \neq 0$ $x(x+4) = -4$ $x^2 + 4x = -4$ $+4 \quad +4$ $x^2 + 4x + 4 = 0$ $(x+2)(x+2) = 0$</p> <table border="1"> <tr> <td>$x+2=0$ -2 -2 $x = -2$</td> <td>$x+2=0$ -2 -2 $x = -2$</td> </tr> </table> <p>$\{-2\}$</p>	$x+2=0$ -2 -2 $x = -2$	$x+2=0$ -2 -2 $x = -2$	<p>14) $\frac{2x-2}{x+3} = \frac{x-1}{x-2}$ $x \neq -3$ $x \neq 2$ $(2x-2)(x-2) = (x+3)(x-1)$ $2x^2 - 4x - 2x + 4 = x^2 - 1x + 3x - 3$ $2x^2 - 6x + 4 = x^2 + 2x - 3$ $-x^2 - 2x + 5 = -x^2 - 2x + 3$ $x^2 - 8x + 7 = 0$ $(x-7)(x-1) = 0$</p> <table border="1"> <tr> <td>$x-7=0$ +7 +7 $x = 7$</td> <td>$x-1=0$ +1 +1 $x = 1$</td> </tr> </table> <p>$\{1, 7\}$</p>	$x-7=0$ +7 +7 $x = 7$	$x-1=0$ +1 +1 $x = 1$	<p>15) $\frac{5+y}{2y} = \frac{y-3}{y}$ $y \neq 0$ $y(5+y) = 2y(y-3)$ $5y + y^2 = 2y^2 - 6y$ $-5y - y^2 = -2y^2 + 6y$ $y^2 - 11y = 0$ $y(y-11) = 0$</p> <table border="1"> <tr> <td>$y=0$ Reject can't divide by 0</td> <td>$y-11=0$ +11 +11 $y = 11$</td> </tr> </table> <p>$\{11\}$</p>	$y=0$ Reject can't divide by 0	$y-11=0$ +11 +11 $y = 11$
$x+2=0$ -2 -2 $x = -2$	$x+2=0$ -2 -2 $x = -2$							
$x-7=0$ +7 +7 $x = 7$	$x-1=0$ +1 +1 $x = 1$							
$y=0$ Reject can't divide by 0	$y-11=0$ +11 +11 $y = 11$							

16) The height h of a ball thrown into the air with an initial vertical velocity of 48 feet per second from a height of 5 feet above the ground is given by the equation: $h = -16t^2 + 48t + 5$ where t is the time in seconds that the ball has been in the air. After how many seconds is the ball at the height of 37 feet? Hint: Plug 37 in for h and then solve

$$h = -16t^2 + 48t + 5$$

$$37 = -16t^2 + 48t + 5$$

$$+16t^2 - 48t - 5 + 16t^2 - 48t - 5$$

$$16t^2 - 48t + 32 = 0$$

$$16(t^2 - 3t + 2) = 0$$

$$16(t-2)(t-1) = 0$$

$16 \neq 0$	$t-2=0$ +2 +2 $t = 2$	$t-1=0$ +1 +1 $t = 1$
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After 1 second + after 2 seconds