GSE Algebra I

Name_____

4.6 - Homework

Date_____

Solve each equation by completing the square.

1) $x^2 - 4x - 89 = 0$

$\left(\frac{-4}{2}\right)^2 = 4$

$+89 \quad +89$

$x^2 - 4x + 4 = 89 + 4$

$\sqrt{(x-2)^2} = \sqrt{93}$

$x - 2 = \pm\sqrt{93}$

$+2 \quad +2$

$x = 2 \pm \sqrt{93}$

2) $x^2 - 20x + 51 = 0$

$x = 17$ $x = 3$

3) $x^2 - 2x - 99 = 0$

$\left(\frac{-2}{2}\right)^2 = 1$

$+99 \quad +99$

$x^2 - 2x + 1 = 99 + 1$

$\sqrt{(x-1)^2} = \sqrt{100}$

$x - 1 = \pm 10$

$x - 1 = 10$ $\quad$ $x - 1 = -10$

$+1 \quad +1$ $\quad$ $+1 \quad +1$

$x = 11$ $\quad$ $x = -9$

4) $x^2 + 2x - 59 = 0$

$x = -1 \pm 2\sqrt{15}$

5) $n^2 + 8n + 11 = 7$

$\left(\frac{8}{2}\right)^2 = 16$

$-11 \quad -11$

$n^2 + 8n + 16 = -4 + 16$

$\sqrt{(n+4)^2} = \sqrt{12}$

$n + 4 = \pm 2\sqrt{3}$

$-4 \quad -4$

$n = -4 \pm 2\sqrt{3}$

6) $p^2 + 2p + 36 = 4$

No solution

7) $r^2 - 4r - 24 = -3$

$\left(\frac{-4}{2}\right)^2 = 4$

$+24 \quad +24$

$r^2 - 4r + 4 = 21 + 4$

$\sqrt{(r-2)^2} = \sqrt{25}$

$r - 2 = \pm 5$

$r - 2 = 5$ $\quad$ $r - 2 = -5$

$+2 \quad +2$ $\quad$ $+2 \quad +2$

$r = 7$ $\quad$ $r = -3$

8) $x^2 - 18x + 63 = -2$

$x = 13$ $x = 5$

9) $x^2 + 75 = 20x$

$\left(\frac{-20}{2}\right)^2 = 100$

$x^2 - 20x + 100 = -75 + 100$

$\sqrt{(x-10)^2} = \sqrt{25}$

$x - 10 = \pm 5$

$x - 10 = 5$ $\quad$ $x - 10 = -5$

$+10 \quad +10$ $\quad$ $+10 \quad +10$

$x = 15$ $\quad$ $x = 5$

10) $n^2 = -26 - 16n$

$x = -8 \pm \sqrt{38}$

Name: _____ Date: _____

Solving Quadratic Equations by Completing the Square

Error Analysis: Circle the error. Then, describe and correct the error in solving by completing the square.

Problem	Description of Error	Rework
$x^2+8x=10$ $x^2+8x+16=10$ (+16) $(x+4)^2=10$ $x+4=\pm\sqrt{10}$ $x=-4\pm\sqrt{10}$	This person did not add 16 to BOTH sides.	$x^2+8x+16=10+16$ $\sqrt{(x+4)^2}=\sqrt{26}$ $x+4=\pm\sqrt{26}$ $x=-4\pm\sqrt{26}$
$x^2+4x=12$ $x^2+4x+4=16$ $(x+2)^2=16$ $x+2=\pm4$ $x=\pm2$	This person did not split the problem to +4 and −4	$x+2=\pm4$ $x+2=4$ (−2 −2) $x=2$ $x+2=-4$ (−2 −2) $x=-6$
$x^2-6x=10$ $x^2-6x+9=19$ $(x+3)^2=19$ $x+3=\pm\sqrt{19}$ $x=-3\pm\sqrt{19}$	This person used a positive 3 in their factor, instead of −3.	$x^2-6x+9=19$ $\sqrt{(x-3)^2}=\sqrt{19}$ $x-3=\pm\sqrt{19}$ $x=3\pm\sqrt{19}$

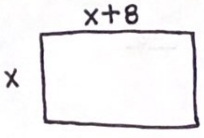
Find all values of b for which $x^2+bx+25$ is a perfect square trinomial. Explain how you found your answer. −10 or 10 would both work for b.

Both $(\frac{-10}{2})^2$ and $(\frac{10}{2})^2=25$.

Your friend says the equation $x^2+10x=-20$ can be solved by either factoring or completing the square. Is your friend correct? Explain.

No, you cannot factor. If you set the problem equal to 0, $(x^2+10x+20=0)$, you see that no factors of 20 will add to be 10. (ie $4+5=9$ $20+1=21$ $2+10=12$)

A length of a rectangle is 8 cm longer than the width. If the area of the rectangle is 50 cm², then what are the approximate dimensions of the rectangle?



$x(x+8)=50$

$x^2+8x+16=50+16$

$\sqrt{(x+4)^2}=\sqrt{66}$

$x+4=\pm\sqrt{66}$

$x=-4\pm\sqrt{66}$

$x\approx4.12$

width: 4.12 cm
length: 12.12 cm