

Advanced Algebra Unit 4 Assignment #9

I can solve a quadratic equation

Not all quadratics factorize easily. For example, x^2+4x+1 can not be factored so we need another approach to solve for the roots. You can easily put any quadratic with a leading coefficient of 1 into vertex form by "Completing the Square"

A great form for solving a quadratic is when it is in the form $(x-2)^2=22$

All we need to do is take the square root of both sides and then add two.

$X=2\pm\sqrt{22}$ Which gives us $2+4.69$ and $2-4.69$ which gives us 6.69 and -2.69

Example Together $x^2+4x+1=0$

Solve the following for the exact values of x. This means leave in radical form.

1) $(x+5)^2=2$

$$x = -5 \pm \sqrt{2}$$

4) $(x-8)^2=7$

$$x = 8 \pm \sqrt{7}$$

7) $(x+1)^2+1 = 11$

$$(x+1)^2 = 10$$

$$x = -1 \pm \sqrt{10}$$

2) $(x+6)^2=-11$

~~$x = -6 \pm \sqrt{-11}$~~
 does not cross
 No solution

5) $2(x+3)^2=10$

$$x = -3 \pm \sqrt{5}$$

8) $(2x+1)^2=3$

$$2x+1 = \pm\sqrt{3}$$

$$2x = -1 \pm \sqrt{3}$$

$$x = \frac{-1 \pm \sqrt{3}}{2}$$

3) $(x-4)^2=8$

$$x = 4 \pm \sqrt{8}$$

6) $3(x-2)^2=18$

$$(x-2)^2 = 6$$

$$x = 2 \pm \sqrt{6}$$

9) $(1-3x)^2-7=0$

$$1-3x = \pm\sqrt{7}$$

$$-3x = -1 \pm \sqrt{7}$$

$$x = \frac{-1 \pm \sqrt{7}}{-3}$$

Key Point: Make sure to get everything to one side!!

Solve by completing the square. (This means you will get them to look like the first 9 problems you did and then you can solve)

10) $x^2 - 4x + 1 = 0$

$$(x^2 - 4x + 4) - 4 + 1 = 0$$

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

$$x = 2 \pm \sqrt{3}$$

11) $x^2 + 6x + 2 = 0$

$$(x^2 + 6x + 9) - 9 + 2 = 0$$

$$(x + 3)^2 - 7 = 0$$

$$x = -3 \pm \sqrt{7}$$

12) $x^2 - 14x + 46 = 0$

$$(x^2 - 14x + 49) - 49 + 46 = 0$$

$$(x - 7)^2 - 3 = 0$$

$$x = 7 \pm \sqrt{3}$$

13) $x^2 = 4x + 3$

$$x^2 - 4x - 3 = 0$$

$$(x^2 - 4x + 4) - 4 - 3 = 0$$

$$(x - 2)^2 - 7 = 0$$

$$x = 2 \pm \sqrt{7}$$

14) $x^2 + 6x + 7 = 0$

$$(x^2 + 6x + 9) - 9 + 7 = 0$$

$$(x + 3)^2 - 2 = 0$$

$$x = -3 \pm \sqrt{2}$$

15) $x^2 = 2x + 6$

$$x^2 - 2x - 6 = 0$$

$$(x^2 - 2x + 1) - 1 - 6 = 0$$

$$(x - 1)^2 - 7 = 0$$

$$x = 1 \pm \sqrt{7}$$

16) $x^2 + 6x = 2$

$$x^2 + 6x - 2 = 0$$

$$(x^2 + 6x + 9) - 9 - 2 = 0$$

$$(x + 3)^2 - 11 = 0$$

$$x = -3 \pm \sqrt{11}$$

17) $x^2 + 10 = 8x$

$$x^2 - 8x + 10 = 0$$

$$(x^2 - 8x + 16) - 16 + 10 = 0$$

$$(x - 4)^2 - 6 = 0$$

$$x = 4 \pm \sqrt{6}$$

18) $x^2 + 6x = -11$

$$x^2 + 6x + 11 = 0$$

$$(x^2 + 6x + 9) - 9 + 11 = 0$$

$$(x + 3)^2 + 2 = 0$$

No solution

Factoring Review: factor the following problems

1) $x^2 + 9x + 20$

$$(x + 5)(x + 4)$$

2) $x^2 + 10x + 21$

$$(x + 7)(x + 3)$$

3) $x^2 + 1x - 12$

$$(x + 4)(x - 3)$$

4) $x^2 - 8x - 20$

$$(x - 10)(x + 2)$$

5) $x^2 + 2x - 24$

$$(x + 6)(x - 4)$$

6) $x^2 - 7x - 18$

$$(x - 9)(x + 2)$$

7) $x^2 + 4x - 32$

$$(x + 8)(x - 4)$$

8) $x^2 + 9x - 36$

$$(x + 12)(x - 3)$$

9) $x^2 + 7x - 30$

$$(x + 10)(x - 3)$$