Math -2 Unit # 3 quadratic equation

How to solve quadratic equation

There are many ways to solve quadratic equations, and in this unit we will study four methods:

A- Method #1 solving quadratic equation by Factoring.

Follow the following steps:

1- Write the quadratic equation in Slandered form $a X^2 + bX + C = 0$.
2- Open two ( ) ( ) that equal zero , then factor $a X^2$ to a X and X **or** $a_1 X$ and $a_2 X$ where . $a_1 X$ times $a_2 X = a X$.
3- Factor C to C_1 and C_2 where C_1 times $C_2 = C$, but be careful for choosing C_1 and C_2 because when you add C_1 and C_2 the result must be equal to b (the factor of X) .
$a X^2 + bX + C = 0$.
(a X +/- C_1) (X +/ - C_2) = 0 plus or minus depends on the sign of b and c

B- Method #2 solving quadratic equation by completing the square.(If a=1)

This method is use when it is hard to factor C.

Follow the following steps:

1- Move C to the other side of equal sign (=) and flip it sign, so – C become + C and +C become – C.
2- Find your square value ▢ = $(b/2)^2$ and add it to both sides of equation.
3- Factor the equation using method # 1 above (Factoring)
$a X^2 + bX + C = 0$.
$a X^2 + bX = - C$
$a X^2 + bX + (b/2)^2 = -- C + (b/2)^2$ then Factor.

C-Method #3 using quadratic formula.

This method can solve any quadratic equation. And the formula is X= $\frac{-b \pm \sqrt{b^2-4ac}}{2a}$

D- Method # 4 using graphs.

1-With this method you should construct a table and assign some values for X around the origin (0,0) so X= 0, -1 ,-2 , 2 , 4 ….etc. and substitute X value in the equation , then find Y values

2- graph X and Y you should have parabola shape, then find zeros (X-intercepts) from the graph.

3-If the vertex Max or min or above or below X- axis, that means you have two real solutions. If the vertex is the origin (0, 0) , that means you have one real solution . IF the vertex is(0, +Y) up or (0, -Y) down, that means you have two non-real solutions.