Working in Standard Form

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PRE-CALCULUS 11
ANALYZING QUADRATIC FUNCTIONS
WORKING IN STANDARD FORM (GRAPHING FORM)

A. Definitions

1. **general form:** any quadratic function that can be written in the form:
$y = ax^2 + bx + c$ or $f(x) = ax^2 + bx + c$.
2. **standard form:** any quadratic function that can be written in the form:
$y = a(x-p)^2 + q$ or $f(x) = a(x-p)^2 + q$
3. **perfect square trinomial:** a trinomial that has two equal factors.
4. **completing the square:** a method of solving a quadratic equation that is not easily factored.

B. In order to take a quadratic function in General Form and change it into Standard Form we need to complete the square. This method is similar the one taught when we solved a quadratic equation.

1) Write the following equations in Standard Form $y = a(x-p)^2 + q$, and determine the coordinates of the vertex.

a) $y = x^2 + 8x$

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

$y + 16 = (x+4)^2 - 16$

$y = (x+4)^2 - 16$

vertex $(-4, -16)$

To Solve
a) move the "c" value to the opposite side.
b) factor out the "a" value if it is any number other than one.
c) Complete the square and balance both sides.
d) factor the perfect square trinomial.
e) shift the number on left back to the right side.

b) $y = x^2 - 6x + 2$

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

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

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

Vertex $(3, -7)$

c) $y = -x^2 + 4x + 10$

$y - 10 = -x^2 + 4x$

$y - 10 = -(x^2 - 4x)$

$y - 10 = -(x^2 - 4x + 4)$

$y - 14 = -(x-2)^2 + 14$

$y = -(x-2)^2 + 14$

Vertex $(2, 14)$

Assignment: Working in Standard Form Assignment #1 – 8

PRE-CALCULUS 11
QUADRATIC FUNCTIONS
WORKING IN STANDARD FORM ASSIGNMENT

A. Change each of the following Quadratic Functions into Standard Form $y = a(x-p)^2 + q$.

1) $y = x^2 - 2x$

2) $y = x^2 + 10x$

3) $y = x^2 + 8x - 8$

4) $y = -x^2 + 6x + 7$

5) $y = x^2 + 12x + 9$

6) $y = x^2 - 10x - 22$

7) $y = x^2 - 2x + 6$

8) $y = -x^2 + 4x + 2$

Answers

1) $y=(x-1)^2-1$

2) $y=(x+5)^2-25$

3) $y=(x+4)^2-24$

4) $y=-(x-3)^2+16$

5) $y=(x+6)^2-27$

6) $y=(x-5)^2-47$

7) $y=(x-1)^2+5$

8) $y=-(x-2)^2+6$