Converting From General Form To Standard Form

Practice Questions

Convert the first 3 questions from General Form to Standard Form.

1. $y = x^2 + 20x + 113$

2. $y = 4x^2 - 40x + 92$

3. $y = 2x^2 - x + \frac{7}{8}$

4. Given the quadratic function, $y = -5x^2 + 10x + 7$, determine:
   - i) The vertex
   - ii) The maximum or minimum value and the value of x where it occurs
   - iii) The range

5. If the y-intercept of the quadratic equation $y = \left(\frac{1}{3}\right)x^2 + 2x + \mathbf{c}$ is 1, find the equation of the axis of symmetry.

6. Match each quadratic equation with the correct corresponding statement.

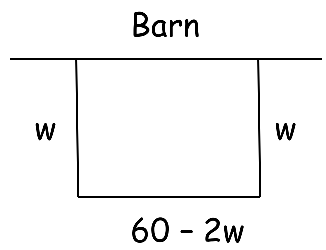
i)	$y = 6(x - 9)^2 - 12$	A.	The y-intercept is -966
ii)	$y = -12(x + 9)^2 + 6$	B.	The range is $y \leq 9$
iii)	$y = 9(x - 12)^2 - 6$	C.	The minimum value is -9
iv)	$y = -6(x + 12)^2 + 9$	D.	The vertex is (9,-12)
v)	$y = 12(x - 6)^2 - 9$	E.	The equation of the axis of symmetry is $x = 12$

Statement A matches with Equation ___
Statement B matches with Equation ___
Statement C matches with Equation ___
Statement D matches with Equation ___
Statement E matches with Equation ___

7. The point (2,12) lies on the graph of $y = x^2 - 10x + \mathbf{c}$. Find the vertex.

8. Does the quadratic function shown here in factored form, $y = 10(x - 1)(x - 2)$, have a maximum or a minimum value? What is this value and for what value of x does it occur?

9. A farmer wishes to enclose a rectangular space with 60 m of fencing. One side of the rectangle is bounded by a barn. What are the dimensions of the largest possible lot.



10. When Pascal was converting $-2x^2 - 12x - 26$ to standard form, he ran into some difficulties. He was supposed to state the range. Identify and correct any errors he may have made.

Step 1	$-2(x^2 - 6x + \_\_\_ - \_\_\_) - 26$
Step 2	$-2(x^2 - 6x + 9 - 9) - 26$
Step 3	$-2(x^2 - 6x + 9) - 9 - 26$
Step 4	$-2(x - 9)^2 - 27$
Step 5	$y \geq -27$

Converting From General Form To Standard Form

Practice Questions Answers

Convert the first 3 questions from General Form to Standard Form.

1. $y = x^2 + 20x + 113$

   $y = (x^2 + 20x + \_\_\_\_ - \_\_\_\_) + 113$

   $y = (x^2 + 20x + 100 - 100) + 113$

   $y = (x^2 + 20x + 100) - 100 + 113$

   $y = (x + 10)^2 + 13$

2. $y = 4x^2 - 40x + 92$

   $y = 4(x^2 - 10x + \_\_\_\_ - \_\_\_\_) + 92$

   $y = 4(x^2 - 10x + 25 - 25) + 92$

   $y = 4(x^2 - 10x + 25) - 100 + 92$

   $y = 4(x - 5)^2 - 8$

3. $y = 2x^2 - x + \frac{7}{8}$

   $y = 2(x^2 - \frac{1}{2}x + \_\_\_\_ - \_\_\_\_) + \frac{7}{8}$

   Take $\left(\frac{1}{2}\right)$ of $\left(\frac{-1}{2}\right)$, and then square it.

   $\left(\frac{-1}{4}\right)^2 = \frac{1}{16}$

$y = 2(x^2 - \frac{1}{2}x + \frac{1}{16} - \frac{1}{16}) + \frac{7}{8}$

$y = 2(x^2 - \frac{1}{2}x + \frac{1}{16}) - \left(\frac{2}{16}\right) + \frac{7}{8}$

$y = 2(x - \frac{1}{4})^2 + \frac{6}{8}$

$y = 2(x - \frac{1}{4})^2 + \frac{3}{4}$

4. Given the quadratic function, $y = -5x^2 + 10x + 7$, determine:
   - i) The vertex
   - ii) The maximum or minimum value and the value of x where it occurs
   - iii) The range

$Y = -5(x^2 - 2x + \_\_\_\_ - \_\_\_\_) + 7$

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

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

$Y = -5(x - 1)^2 + 12$

- i) The vertex is (1,12)
- ii) There is a maximum value of 12 that occurs when $x = 1$
- iii) The range is $y \leq 12$

5, If the y-intercept of the quadratic equation $y = \left(\frac{1}{3}\right)x^2 + 2x + \mathbf{c}$ is 1, find the equation of the axis of symmetry.

To find the value of **c** substitute the point (0,1) into the equation.

$1 = \left(\frac{1}{3}\right)(0)^2 + 2(0) + \mathbf{c}$

$1 = c$

$y = \left(\frac{1}{3}\right)x^2 + 2x + 1$

$y = \left(\frac{1}{3}\right)(x^2 + 6x + \_\_\_\_ - \_\_\_\_) + 1$

$y = \left(\frac{1}{3}\right)(x^2 + 6x + 9 - 9) + 1$

$y = \left(\frac{1}{3}\right)(x^2 + 6x + 9) - 3 + 1$

$y = \left(\frac{1}{3}\right)(x + 3)^2 - 2$

The equation of the axis of symmetry is $x = -3$.

6,Match each quadratic equation with the correct corresponding statement.

i)	$y = 6(x - 9)^2 - 12$	A.	The y-intercept is -966
ii)	$y = -12(x + 9)^2 + 6$	B.	The range is $y \leq 9$
iii)	$y = 9(x - 12)^2 - 6$	C.	The minimum value is -9
iv)	$y = -6(x + 12)^2 + 9$	D.	The vertex is (9,-12)
v)	$y = 12(x - 6)^2 - 9$	E.	The equation of the axis of symmetry is $x = 12$

Statement A matches with Equation ii
Statement B matches with Equation iv
Statement C matches with Equation v
Statement D matches with Equation i
Statement E matches with Equation iii

7. The point (2,12) lies on the graph of $y = x^2 - 10x + \mathbf{c}$. Find the vertex.

$12 = (2)^2 - 10(2) + \mathbf{c}$
$12 = 4 - 20 + \mathbf{c}$
$12 = -16 + \mathbf{c}$
$28 = \mathbf{c}$
$y = x^2 - 10x + 28$
$y = (x^2 - 10x +$ ____ - ____ $) + 28$
$y = (x^2 - 10x + 25 - 25) + 28$
$y = (x^2 - 10x + 25) - 25 + 28$
$y = (x - 5)^2 + 3$
The vertex is (5,3).

8. Does the quadratic function shown here in factored form, $y = 10(x - 1)(x - 2)$, have a maximum or a minimum value? What is this value and for what value of x does it occur?

$y = 10(x^2 - 3x + 2)$

$y = 10x^2 - 30x + 20$

$y = 10(x^2 - 3x + \_\_\_\_ - \_\_\_\_) + 20$

$y = 10(x^2 - 3x + \frac{9}{4} - \frac{9}{4}) + 20$

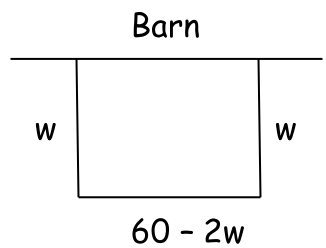
$y = 10(x^2 - 3x + \frac{9}{4}) - \frac{90}{4} + \frac{80}{4}$

$y = 10(x - \frac{3}{2})^2 - \frac{10}{4}$

$y = 10(x - \frac{3}{2})^2 - \frac{5}{2}$

The function has a minimum value of -2.5, which occurs for an x value of 1.5.

9. A farmer wishes to enclose a rectangular space with 60 m of fencing. One side of the rectangle is bounded by a barn. What are the dimensions of the largest possible lot.



$A = w(60 - 2w)$

$A = -2w^2 + 60w$

$A = -2(w^2 - 30w + \_\_\_\_ - \_\_\_\_)$

$A = -2(w^2 - 30w + 225 - 225)$

$A = -2(w^2 - 30w + 225) + 450$

$A = -2(w - 15)^2 + 450$

There is a maximum area of 450 m^2, which occurs when w = 15.
The dimensions yielding the largest possible lot are 15 x 30.

10. When Pascal was converting $-2x^2 - 12x - 26$ to standard form, he ran into some difficulties. He was supposed to state the range. Identify and correct any errors he may have made.

Step 1	$-2(x^2 - 6x + \_\_\_ - \_\_\_) - 26$
Step 2	$-2(x^2 - 6x + 9 - 9) - 26$
Step 3	$-2(x^2 - 6x + 9) - 9 - 26$
Step 4	$-2(x - 9)^2 - 27$
Step 5	$y \geq -27$

The first error is in step 1. The sign in front of the 6 should be positive.
Other than the incorrect sign, step 2 is fine.
Step 3 should read: $-2(x^2 + 6x + 9) +18 - 26$
Step 4 should read: $-2(x + 3)^2 - 8$
If step 4 were correct, the error in step 5 would be the inequality sign.
Since 'a' is negative, the range should be $y \leq 27$.
Since step 4 was not correct, the correct range is $y \leq -8$.