

Transformations of Parabolas Guided Notes

1. The graph of $f(x) = a(x-h)^2 + k$, where $a \neq 0$, is a _____ of _____ form,
With (_____,_____) as a vertex.
2. If $a > 0$, then the graph of the parabola is vertically _____.
3. If $_____ < a < _____$, then the graph of the parabola is vertically _____.
4. If $a < 0$ then the graph does a _____ across the x-axis.
5. The axis of symmetry of a parabola in vertex form is the line $x = _____$.
6. The _____ of a parabola is the point (h, k) .
7. write the standard form $y = 2x^2 - 4x + 5$ in vertex form:

$$y - ______ = 2x^2 - 4x$$

keep x^2 and x-terms in one side.

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

factor out the leading coefficient since we want 1 as leading coefficient.

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

put the coefficient of x term in half and square it inside the parenthesis. The same product should also appear in left hand side.

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

find the perfect square and simplify.

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

Write in vertex form

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Answers

1. The graph of $f(x) = a(x-h)^2 + k$, where $a \neq 0$, is a **parabola** of **vertex** form. With **(h,k)** as a vertex.

2. If $a > 0$, then the graph of the parabola is vertically **stretched**.

3. If $0 < a < 1$, then the graph of the parabola is vertically **compressed**.

4. If $a < 0$ then the graph does a **reflection** across the x-axis.

5. The axis of symmetry of a parabola in vertex form is the line $x = h$.

6. The **vertex** of a parabola is the point (h, k).

7. Write the standard form $y = 2x^2 - 4x + 5$ in vertex form:

$$y - 5 = 2x^2 - 4x \quad \text{keep } x^2 \text{ and } x\text{-terms in one side.}$$

$$y - 5 = (2)(x^2 - 2x) \quad \text{factor out the leading coefficient since we want 1 as leading coefficient.}$$

$$y - 5 + 2(1) = 2(x^2 - 2x + 1) \quad \text{put the coefficient of } x \text{ term in half and square it inside the parenthesis. The same product should also appear in left hand side.}$$

$$y - 3 = 2(x - 1)^2 \quad \text{find the perfect square and simplify.}$$

$$y = 2(x - 1)^2 + 3 \quad \text{Write in vertex form}$$