

Lesson Plan

Grade 10 Academic Math

Lesson: 5 - 1

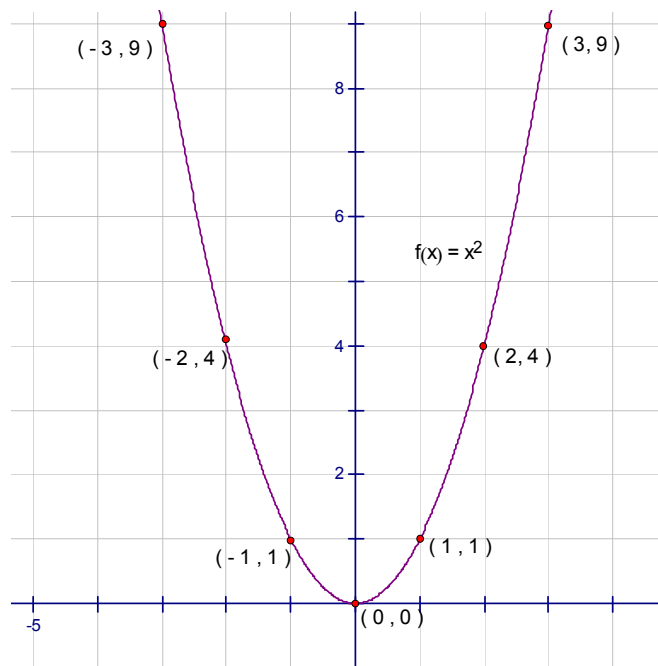
Unit: Transformations of Quadratic

Topic: Stretching and Reflecting

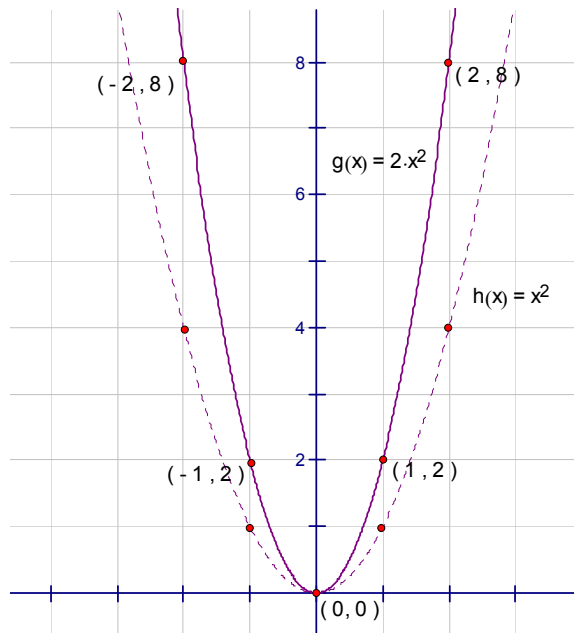
✚ *homework check:* none

✚ *note:* Stretching and Reflecting Quadratic Relations

Draw the curve of $y = x^2$ using a table of values if necessary.



Compare the quadratic $y = 2x^2$ to $y = x^2$ (which can be drawn using a table of values).



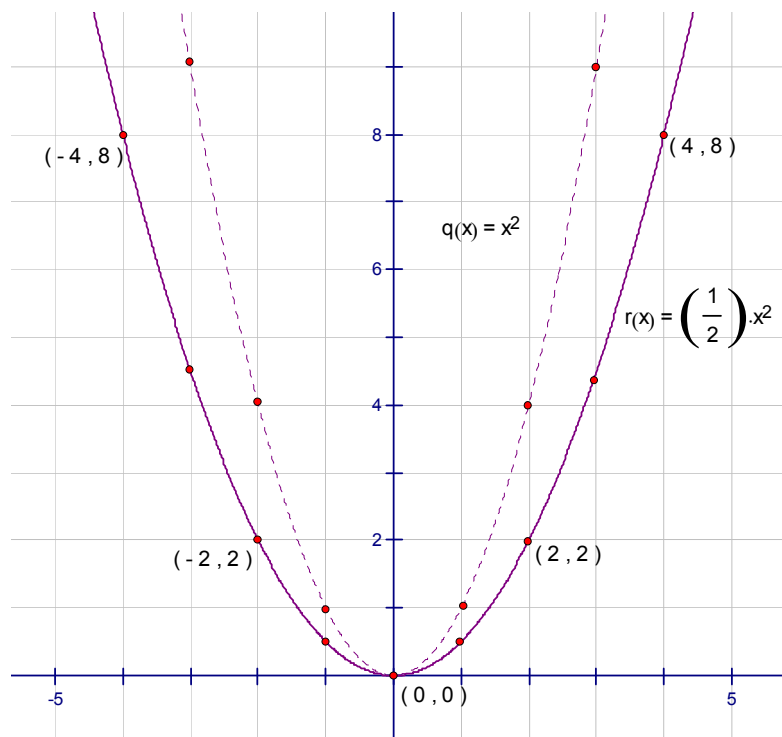
How are these quadratics similar?

How are these quadratics different?

What has happened to the y values in the second quadratic?

We describe this transformation as a vertical stretch by 2 because the y values have been multiplied by 2 when compared to the original $y = x^2$. If we look at these two graphs together, we can see the stretch of the y values in noticing that the second quadratic increases much faster.

Compare $y = \frac{1}{2}x^2$ to the original graph.



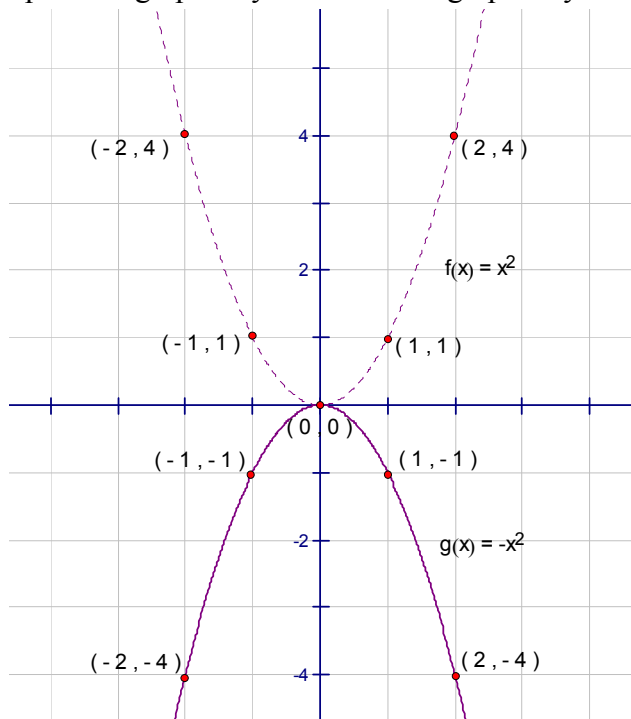
How are these quadratics similar?

How are these quadratics different?

What has happened to the y values in the second quadratic?

We describe this transformation a vertical compression by $\frac{1}{2}$ because the y values have been multiplied by $\frac{1}{2}$ (or divided by 2) when compared to the original $y = x^2$. If we look at these two graphs together, we can see the compression of the y values in noticing that the second quadratic does not increase as fast as the original.

Compare the graph of $y = x^2$ with the graph of $y = -x^2$.



How are these quadratics similar?

How are these quadratics different?

What has happened to the y values in the second quadratic?

We describe this transformation a vertical reflection because the y values have multiplies by (-1) when compared to the original $y = x^2$. If we look at these two graphs together, we can see the reflection of the y values in noticing that the second quadratic opens down instead of up like the original.

The value of 'a' in the quadratic equation controls each of these transformations. If $a > 1$, the parabola is stretched by that number. If $0 < a < 1$, the parabola is compressed by that number. If $a < 0$, the parabola is reflected but can still be either stretched or compressed as well. It is important to note that only the y values are affected by these transformations.

📌 homework assignment: Principles of Mathematics 10 p. 256 # 1, 2, 4, 5, 7, 8, 11