Consider the function \( y = a|x - h| + k \). Use a calculator to graph the following:

**Begin by graphing** \( y = |x| \)  
**Now graph** \( y = |x - 2| \)  
**How about** \( y = |x + 4| \)  

I wonder… \( y = |x| + 3 \)  
**Try** \( y = |x| - 2 \)  
**Maybe graph** \( y = 2|x| \)  

Finally graph \( y = -\frac{1}{3}|x| \)  
**Now graph** \( y = 2|x - 2| - 3 \)  
**Finally graph** \( y = 3|x + 4| + 2 \)  

Returning to \( y = a|x - h| + k \), how does each variable effect the parent function \( y = |x| \)?

- \( a > 0 \):
- \( h > 0 \):
- \( k > 0 \):
- \( a < 0 \):
- \( h < 0 \):
- \( k < 0 \):

The point where the two linear pieces intersect is known as the **vertex**. Using the variables above, the vertex can always be found at what point?
Describe the transformations to the parent function \( y = |x| \) to create the following functions.

1. \( y = |x - 2| \)
   Transformation:

2. \( y = |x| + 3 \)
   Transformation:

3. \( y = 2|x + 3| \)
   Transformation:

4. \( y = 3|x| \)
   Transformation:

5. \( y = -2|x + 3| - 1 \)
   Transformation:

6. \( y = 2|x + 8| \)
   Transformation:

Write an equation for the absolute function described.

7. The parent function \( y = |x| \) flipped vertically, and shifted up 3 units.
   Equation:

8. The parent function \( y = |x| \) squeezed vertically by a factor of 2, shifted left 3 units and down 4 units.
   Equation:

Write an equation for the graphs shown below. Parent function is \( y = |x| \).

9. Equation:

10. Equation:

11. Equation: