3. The inequality $|a-b| < c < a+b$ is called the triangle inequality, where a, b, and c are the side lengths of a triangle. Explain the restrictions on a triangle represented by the triangle inequality.

   The inequality $|a-b| < c$ means that the difference between two sides of the triangle cannot be greater than the length of the third side. The inequality $c < a+b$ means the sum of two sides cannot be greater than the length of the third side.

Practice Solutions – II

1. Complete the following table of values.

x	$f(x)$	$\lvert f(x)\rvert$
–5	20.5	20.5
–4	14	14
–3	8.5	8.5
–2	4	4
–1	0.5	0.5
0	–2	2
1	–3.5	3.5
2	–4	4
3	–3.5	3.5
4	–2	2
5	0.5	0.5

2. Consider the equation of the function $y = |x^2 - 4|$.

   a. Determine any x-intercepts and y-intercepts on the graph of the function.

   The x-intercepts of $y = |x^2 - 4|$ are the same as the x-intercepts of $y = x^2 - 4$.

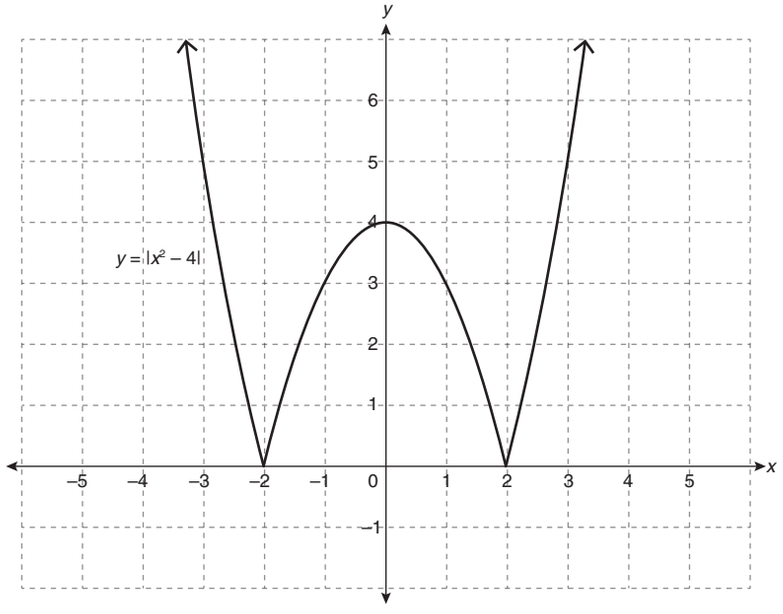
   $y = x^2 - 4$
   $0 = x^2 - 4$
   $4 = x^2$
   $\pm 2 = x$

   The x-intercepts are –2 and 2.

   $y = |x^2 - 4|$
   $y = |0^2 - 4|$
   $y = |-4|$
   $y = 4$

   The y-intercept is 4.

   b. Graph the function.



c. State the domain and range of the function.

Domain: $\{x \mid x \in \mathrm{R}\}$

Range: $\{y \mid y \geq 0, y \in \mathrm{R}\}$

d. Express the function using piecewise notation.

The function is defined by $y = x^2 - 4$ when $x^2 - 4$ is positive, and by $y = -(x^2 - 4)$ when $x^2 - 4$ is negative, so:

$$y = \begin{cases} x^2 - 4 \text{ for } x \leq -2 \text{ or } x \geq 2 \\ 4 - x^2 \text{ for } -2 < x < 2 \end{cases}$$

3. Describe a process that can be used to write any absolute value function as a piecewise function.

Let $y = |f(x)|$.

Determine any x-intercepts. These will split the function into intervals, where $|f(x)| = f(x)$ or $|f(x)| = -f(x)$.

Determine whether $|f(x)| = f(x)$ or $|f(x)| = -f(x)$ is true for each interval.

Summarize the information in piecewise form. In general,

$$y = \begin{cases} f(x) \text{ for values of } x \text{ such that } f(x) \geq 0 \\ -f(x) \text{ for values of } x \text{ such that } f(x) < 0 \end{cases}$$

Please complete *Lesson 6.1: Explore Your Understanding Assignment* located in *Workbook 6A* before proceeding to *Lesson 6.2*.