The Ultimate Step by Step Guide to Preparing for the CLEP Calculus AB Exam

Test taker's #1 Choice

CLEP Calculus 2026 for Beginners

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- Transform Complex Concepts into Clear Understandings
- Your Pathway to Mastering CLEP Calculus
- Fun, Interactive, and Concrete Learning

Reza Nazari

✓Recommended by teachers & students

CLEP Calculus for Beginners

The Ultimate Step by Step Guide to Preparing for the CLEP Calculus Exam

By

Reza Nazari

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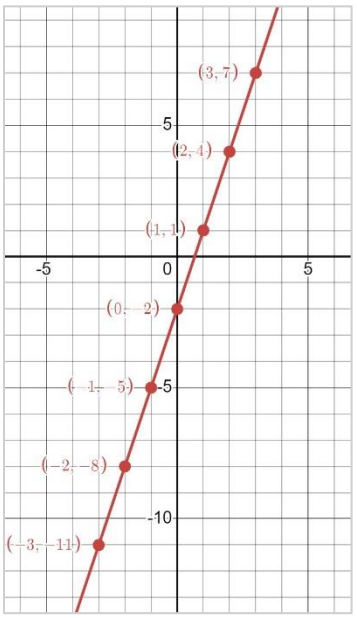
Graphing Functions

- Graphing functions is a way to show the function on the coordinate plane and to achieve this purpose, you can draw a line or a curve that represents a given function on the coordinate plane. A graph represents a function when each point on the line (or curve) of the graph can be an answer to the function equation.
- To graph linear functions and quadratic functions, first determine the shape of the graph. If it's a linear function and it's in form $f(x) = ax + b$, then this graph should be a line. If it's a quadratic function and it's in form $f(x) = ax^2 + bx + c$, then this graph should be a parabola.
- To graph linear functions, consider some random points on it, then substitute some random x −values in the equation and find the related y −values of the equation, to be able to graph the ordered pairs.
- To graph a quadratic function, you can consider some random points on it. But the graph of a quadratic function is a perfect U −shape, so to find a perfect U −shaped parabola, you should find its vertex. This means finding the point that the curve is turning. The next step after finding the vertex is finding 2 or 3 random points on every side of the vertex and then graphing the parabola.

Example:

Graph the following function: $y = 3x - 2$.

Solution: First, consider some random x −values, make an input-output table, and find their ordered pairs. These ordered pairs satisfy the function. Now, use the ordered pairs and draw a line that passes through all the points.



x	$y = 3x - 2$	(x, y)
-3	$3(-3) - 2 = -11$	$(-3, -11)$
-2	$3(-2) - 2 = -8$	$(-2, -8)$
-1	$3(-1) - 2 = -5$	$(-1, -5)$
0	$3(0) - 2 = -2$	$(0, -2)$
1	$3(1) - 2 = 1$	(1,1)
2	$3(2) - 2 = 4$	(2,4)
3	$3(3) - 2 = 7$	(3,7)

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Parent Functions

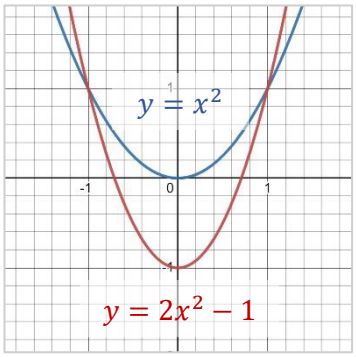
- The parent function is the simplest form of representation of any function without transformations.
- The most important parent functions include constant, linear, absolute-value, polynomials, rational, radical, exponential, and logarithmic functions.
- For the function $f(x)$ and constant number $k > 0$, the transformations of functions in which the properties of the parent function are preserved are as follows:

$y = f(x) + k$ If $k > 0$, shifted up If $k < 0$, shifted down	$y = f(x - k)$ If $k > 0$, shifted to the right If $k < 0$, shifted to the left	$y = -f(x)$ is symmetric to the function $y = f(x)$ with respect to the x −axis.
$y = kf(x)$ If $k > 1$, $f(x)$ is stretched vertically. If $0 < k < 1$, $f(x)$ is compressed vertically	$y = f(kx)$ If $k > 1$, $f(x)$ is compressed horizontally. If $0 < k < 1$, $f(x)$ is stretched horizontally	$y = f(-x)$ is symmetric to the function $y = f(x)$ with respect to the y −axis.

Example:

What is the parent graph of the following function and what transformations have taken place on it?

$$y = 2x^2 - 1$$



Solution: We know that the graph $y = f(x) + k$; $k < 0$, is shifted k units to the down of the graph $y = f(x)$. Then, $y = 2x^2 - 1$, is shifted 1 unit down of the graph $y = 2x^2$.

On the other hand, $y = kf(x)$; $k > 1$ is stretched vertically then the function $y = x^2$ is stretched vertically by a factor of 2.

Clearly, you can see that the function $y = x^2$ is the parent function of $y = 2x^2 - 1$.

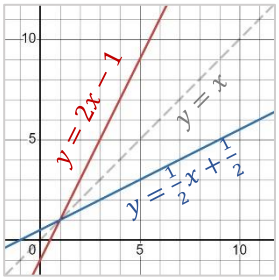
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Function Inverses

- An inverse function is a function that reverses another function: If the function f applied to an input x gives a result of y, then applying its inverse function g to y gives the result x. $f(x) = y$ if and only if $g(y) = x$.
- The inverse function of $f(x)$ is usually shown by $f^{-1}(x)$.
- $f(x)$ is symmetric to $f^{-1}(x)$ with respect to the line $y = x$
- $f^{-1}\big(f(x)\big) = x$, meaning the inverse function applied to the function, returns the original input.
- To find the inverse of a function, we need to switch the placement of x and y, and then solve for the new y, which is actually the $f^{-1}(x)$.

Examples:

Example 1. Find the inverse of the function: $f(x) = 2x - 1$.

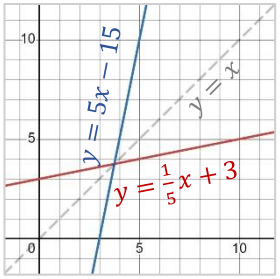


Solution: First, replace $f(x)$ with y: $y = 2x - 1$. Then, replace all x's with y and all y's with x: $x = 2y - 1$.

Now, solve for y: $x = 2y - 1 \Rightarrow x + 1 = 2y \Rightarrow \frac{1}{2}x + \frac{1}{2} = y$.

Finally, replace y with $f^{-1}(x)$: $f^{-1}(x) = \frac{1}{2}x + \frac{1}{2}$.

Example 2. Find the inverse of the function: $g(x) = \frac{1}{5}x + 3$.



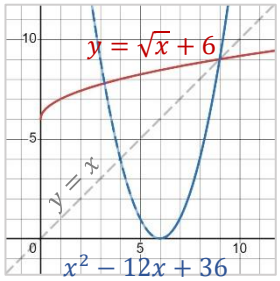
Solution: Replace $g(x)$ with y: $g(x) = \frac{1}{5}x + 3 \Rightarrow y = \frac{1}{5}x + 3$.

Then, replace all x's with y and all y's with x: $x = \frac{1}{5}y + 3$.

Now, solve for y: $x - 3 = \frac{1}{5}y \Rightarrow 5(x - 3) = y \Rightarrow y = 5x - 15$.

Therefore, $g^{-1}(x) = 5x - 15$.

Example 3. Find the inverse of the function: $h(x) = \sqrt{x} + 6$.



Solution: $h(x) = \sqrt{x} + 6 \Rightarrow y = \sqrt{x} + 6$, replace all x's with y and all y's with x:

$$x = \sqrt{y} + 6 \Rightarrow x - 6 = \sqrt{y} \Rightarrow (x - 6)^2 = \left(\sqrt{y}\right)^2$$

$$\Rightarrow x^2 - 12x + 36 = y \Rightarrow h^{-1}(x) = x^2 - 12x + 36.$$

(Notice how the curve of $h(x)$ is only half as $h^{-1}(x)$ is.

That's because a function has to have only one y for each x.)

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