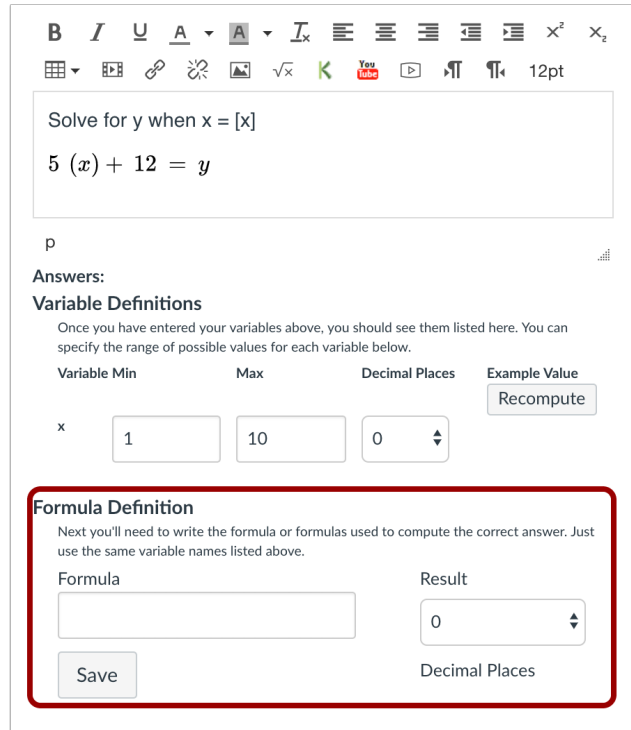


Canvas requires users to manually input formulas when creating formula quiz questions with variables. The **Formula Definition** section of the formula quiz question builder includes a text field where users must define the quiz question formula (see image below).



**Answers:**

**Variable Definitions**

Once you have entered your variables above, you should see them listed here. You can specify the range of possible values for each variable below.

Variable	Min	Max	Decimal Places	Example Value
x	1	10	0	Recompute

**Formula Definition**

Next you'll need to write the formula or formulas used to compute the correct answer. Just use the same variable names listed above.

Formula:

Result:

Decimal Places:

Save

For more information about using the Math Editor in the Rich Content Editor to build formula quiz questions, view additional PDF resources: [How do I use the Math Editor in the Rich Content Editor?](#), [Canvas Equation Editor Tips: Basic View](#) and [Canvas Equation Editor Tips: Advanced View](#).

## Helper Functions

Use the helper functions listed below to build formulas in the Formula Definition section of the Formula question quiz question creator.

### Notes:

- All functions accept only numeric parameters.
- All trigonometric function calculations are performed in radians. To convert to or from degrees, use the `deg_to_rad()` or `rad_to_deg()` functions.
- The Formula Definition text field does not designate definable variables with square brackets.
- Variables must start with a letter and may be followed by any combination of letters and numbers. Keep in mind that variable names are case sensitive and characters other than letters and numbers are not recognized.
- In the Formula Definition text field, Canvas translates the entry of the letter “e” as the constant e.

- Helper functions can be nested. For an example of nested helper functions, see the entry for At in the table below.
- Several functions operate on a list of numbers. Unless otherwise noted, the list parameter is defined with a comma-separated list of values or with a nested reverse( ) or sort( ) function. For example, use either median(x1, x2, x3) or median(reverse(x3,x2,x1)).
- To negate an expression in the Formula Definition field, multiply the function by -1. For example, type -1\*sqrt(5x).

Name	Helper Function	Notes
Absolute Value	abs(x)	<ul style="list-style-type: none"> <li>• Returns the absolute value of a given value</li> </ul>
Arccosine	acos(x)	<ul style="list-style-type: none"> <li>• Returns the inverse cosine of a real number <math>x</math> as a radian measure</li> </ul>
Arcsine	asin(x)	<ul style="list-style-type: none"> <li>• Returns the inverse sine of a real number <math>x</math> as a radian measure</li> </ul>
At	at(list, index)	<ul style="list-style-type: none"> <li>• Returns the indexed value in the given list</li> <li>• Create the list portion of this function by nesting the sort( ) or reverse( ) functions within the at( ) function. For example: at(reverse(x1, x2, x3), n-1)</li> <li>• The first value in the list is at index 0</li> </ul>
Arctangent	atan(x)	<ul style="list-style-type: none"> <li>• Returns the inverse tangent of a real number <math>x</math> as a radian measure</li> <li>• This function does not support two parameters</li> </ul>
Ceiling	ceil(x)	<ul style="list-style-type: none"> <li>• Returns the smallest integer greater than or equal to the given value</li> </ul>
Combination	comb(n, k)	<ul style="list-style-type: none"> <li>• Returns the number of combinations when <math>k</math> is chosen from a group of <math>n</math></li> </ul>
Cosine	cos(radians)	<ul style="list-style-type: none"> <li>• Returns the cosine of the given value</li> </ul>
Cosecant	cosec(radians)	<ul style="list-style-type: none"> <li>• Returns the cosecant of the given value</li> </ul>
Cotangent	cotan(radians)	<ul style="list-style-type: none"> <li>• Returns the cotangent of the given value</li> </ul>
Count	count(list)	<ul style="list-style-type: none"> <li>• Returns the number of items in the list</li> </ul>
Degrees to Radians	deg_to_rad(degrees)	<ul style="list-style-type: none"> <li>• Converts an angle <math>x</math> from degrees into radians by multiplying by <math>\pi/180</math></li> </ul>
Euler's Number, e	e	<ul style="list-style-type: none"> <li>• Returns the value for e</li> <li>• Though parentheses may be used with this function, Canvas translates the entry of the letter "e" as the constant e</li> </ul>
Factorial	fact(n)	<ul style="list-style-type: none"> <li>• Returns the factorial of the given integer</li> <li>• If <math>n</math> is not an integer, then only the numbers before the decimal point are used.</li> <li>• If <math>n</math> input is negative, then 1 is returned</li> </ul>
First	first(list)	<ul style="list-style-type: none"> <li>• Returns the first value in the list</li> </ul>
Floor	floor(x)	<ul style="list-style-type: none"> <li>• Returns the smallest integer less than or equal to the given value</li> </ul>

If	if(bool, success, fail)	<ul style="list-style-type: none"> <li>• If the first expression evaluates to a non-zero value, then it returns the second value, otherwise it returns the third value</li> </ul>
Last	last(list)	<ul style="list-style-type: none"> <li>• Returns the last value in the list</li> </ul>
Length	length(list)	<ul style="list-style-type: none"> <li>• Returns the number of arguments in the given list</li> </ul>
Logarithm (natural)	ln(x)	<ul style="list-style-type: none"> <li>• Returns the natural log of the given value</li> </ul>
Logarithm (common)	log(x, [base])	<ul style="list-style-type: none"> <li>• Returns the log of the given value with an optional base</li> </ul>
Maximum	max(list)	<ul style="list-style-type: none"> <li>• Returns the highest value in the list</li> </ul>
Mean	mean(list)	<ul style="list-style-type: none"> <li>• Returns the arithmetic mean or average of the values in the list</li> </ul>
Median	median(list)	<ul style="list-style-type: none"> <li>• Returns the median for the list of values</li> </ul>
Minimum	min(list)	<ul style="list-style-type: none"> <li>• Returns the lowest value in the list</li> </ul>
Permutation	perm(n, k)	<ul style="list-style-type: none"> <li>• Returns the permutation result for the given values</li> </ul>
Pi, $\pi$	pi( )	<ul style="list-style-type: none"> <li>• Returns the computed value of pi</li> </ul>
Radians to Degrees	rad_to_deg(radians)	<ul style="list-style-type: none"> <li>• Converts an angle <math>x</math> from radians to degrees by multiplying by <math>180/\pi</math></li> </ul>
Random	rand(x)	<ul style="list-style-type: none"> <li>• Returns a random number between zero and the range specified, or one if no number is given</li> </ul>
Range	range(list)	<ul style="list-style-type: none"> <li>• Returns the range for the list of values</li> </ul>
Reverse	reverse(list)	<ul style="list-style-type: none"> <li>• Reverses the order of the list of values</li> </ul>
Round	round(x)	<ul style="list-style-type: none"> <li>• Returns the given value rounded to the nearest whole number</li> </ul>
Secant	sec(radians)	<ul style="list-style-type: none"> <li>• Returns the secant of the given value</li> </ul>
Sine	sin(radians)	<ul style="list-style-type: none"> <li>• Returns the sine of the given value</li> </ul>
Sort	sort(list)	<ul style="list-style-type: none"> <li>• Returns the list of values, sorted from lowest to highest</li> </ul>
Square Root	sqrt(x)	<ul style="list-style-type: none"> <li>• Returns the square root of the given real number <math>x</math></li> <li>• To obtain the negative square root, use <math>-1*\text{sqrt}(x)</math></li> </ul>
Sum	sum(list)	<ul style="list-style-type: none"> <li>• Returns the sum of the list of values</li> </ul>
Tangent	tan(radians)	<ul style="list-style-type: none"> <li>• Returns the tangent of the given value</li> </ul>