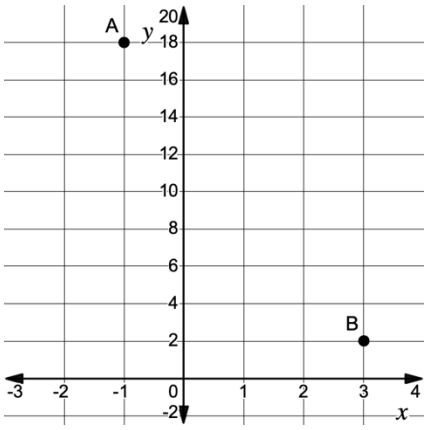
Chili Pepper Function Challenge

Points A and B are shown below on the coordinate plane. The challenges below should be solved **without a calculator.** Choose which challenges you want to complete so that you earn a total of 15 chili peppers. Use Desmos to verify your equation satisfies the challenge.



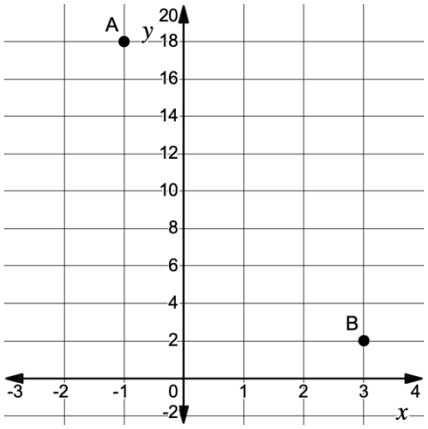
Challenge 1:
Write an equation for a linear function f that passes through A and B.

Challenge 2:
Write an equation for your function f from Challenge 1 in an alternate, but equivalent, form.

Challenge 3:
Write an equation for an exponential function g that passes through A and B.

Challenge 4:
Write at least three equivalent forms for your function g from Challenge 3.

Challenge 5:
Write an equation for a quadratic function h that passes through A and B where $\lim_{x\to\infty} h(x) = \infty$. How many such functions are possible?



Challenge 6:
Write an equation for a quadratic function k that has a maximum at point A and passes through point B.

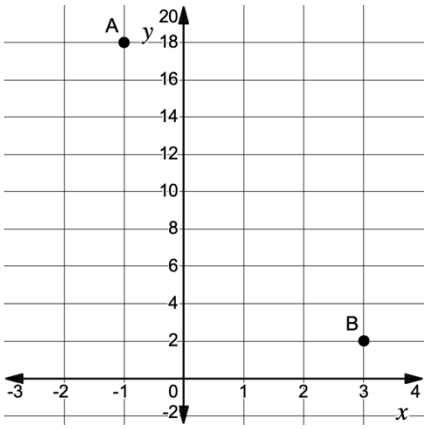
Challenge 7:
Write an equation for your function k from Challenge 6 in an alternate, but equivalent, form.

Challenge 7:
Write an equation for a piecewise function s where one sub-function passes through A and the other sub-function passes through B. Be sure to give the domain restriction of each sub-function.

Challenge 8:
Write an equation for a sinusoidal function j that has a maximum at point A and a minimum at point B.

Challenge 9:
Write an equation for a sinusoidal function m that has a midline passing through A and a minimum at point B.

Challenge 10:
Rewrite your equation for function j in Challenge 8 using a different trig function.



Challenge 11:
Write an equation for an even function d that passes through A and B.

Challenge 13:
Write an equation for a rational function w that passes through A and B.

Challenge 14:
Write an equation for a cubic function z that has a relative maximum at point A and a relative minimum at point B. (You can investigate with Desmos for this one!)