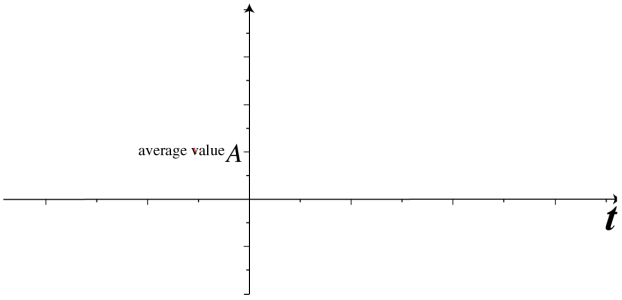
Graphing Trigonometric Functions

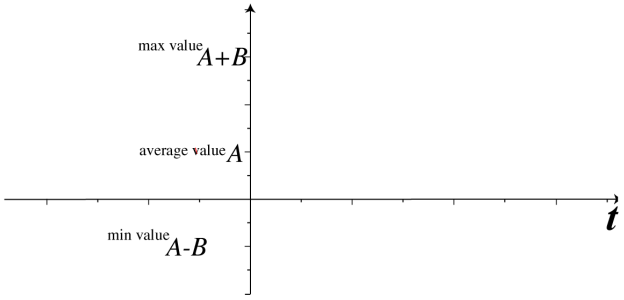
$$f(t) = A + B\cos\left(\tfrac{2\pi}{T}(t-\phi)\right)$$

0. You may have to rewrite the formula to express it in the above *standard form* (example on other side).

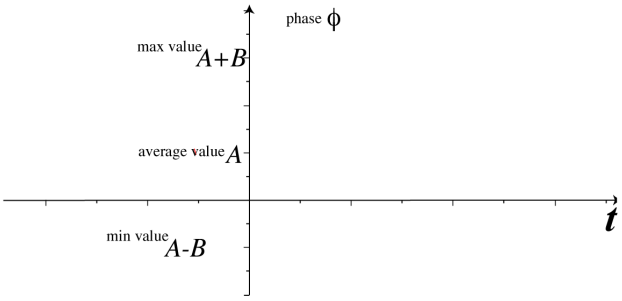
1. A: average value



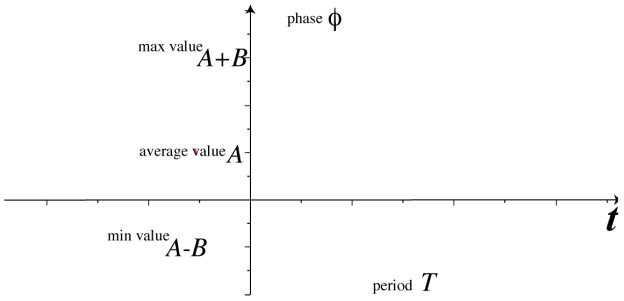
2. B: amplitude; $A+B$: max value; $A-B$: min value



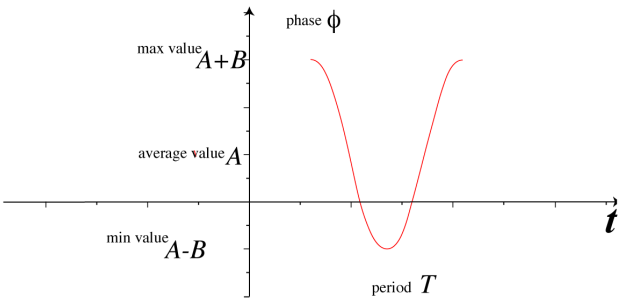
3. ϕ: phase



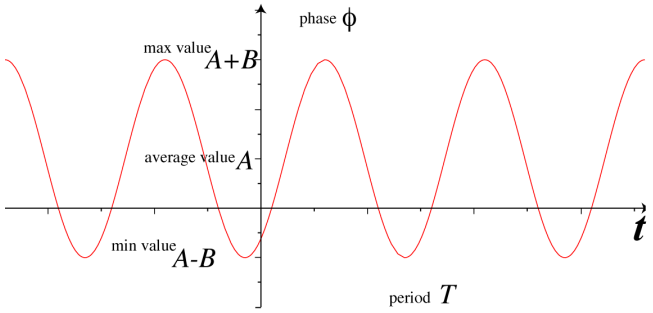
4. T: period



5. Add the standard *cosine squiggle*



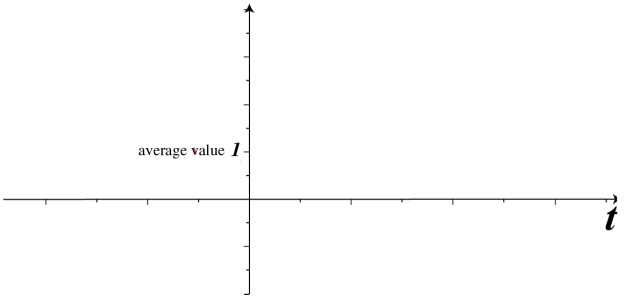
6. Extend to multiple periods



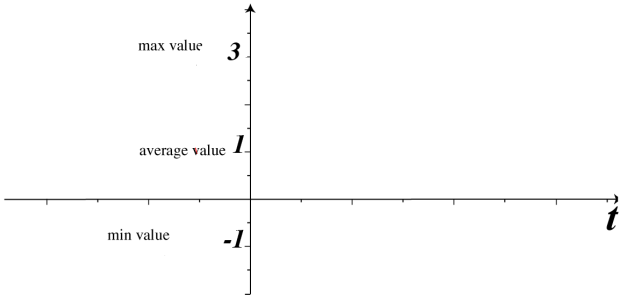
$$f(t) = 1 + 2\cos(2t - 4).$$

0. Rewrite to *standard form:*
$f(t) = 1 + 2\cos(2t-4) = 1 + 2\cos(2(t-2)) = 1 + 2\cos\left(\frac{2\pi}{\pi}(t-2)\right)$.

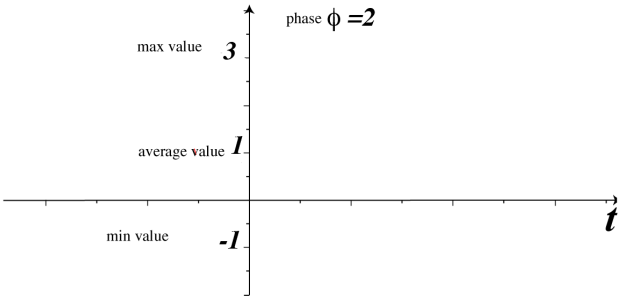
1. $A = 1$: average value



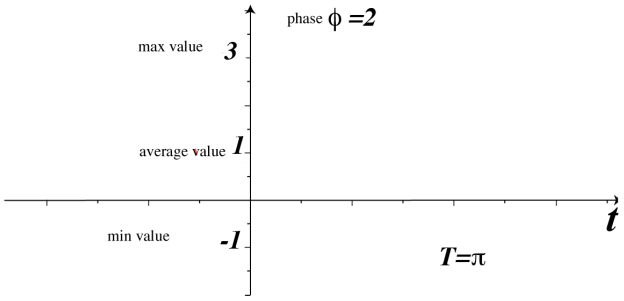
2. $B = 2$: amplitude; $A + B = 3$: max value; $A - B = -1$: min value



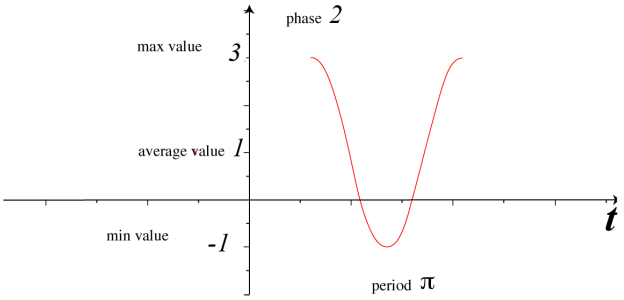
3. $\phi = 2$: phase



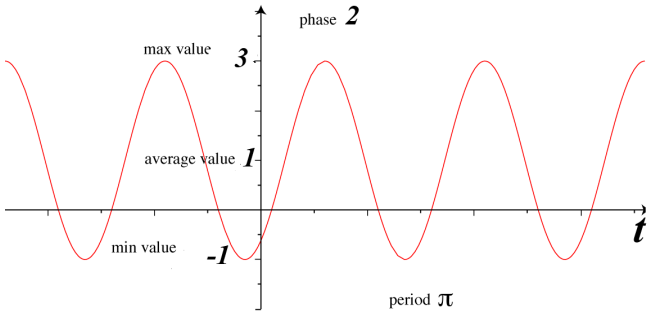
4. $T = \pi$: period



5. Add the standard *cosine squiggle*



6. Extend to multiple periods



Exercises

Graph

1. $-2 + 5\cos(\pi t - 5\pi)$
2. $-1 + 2\cos(\frac{2\pi}{3}t - \frac{4\pi}{3})$