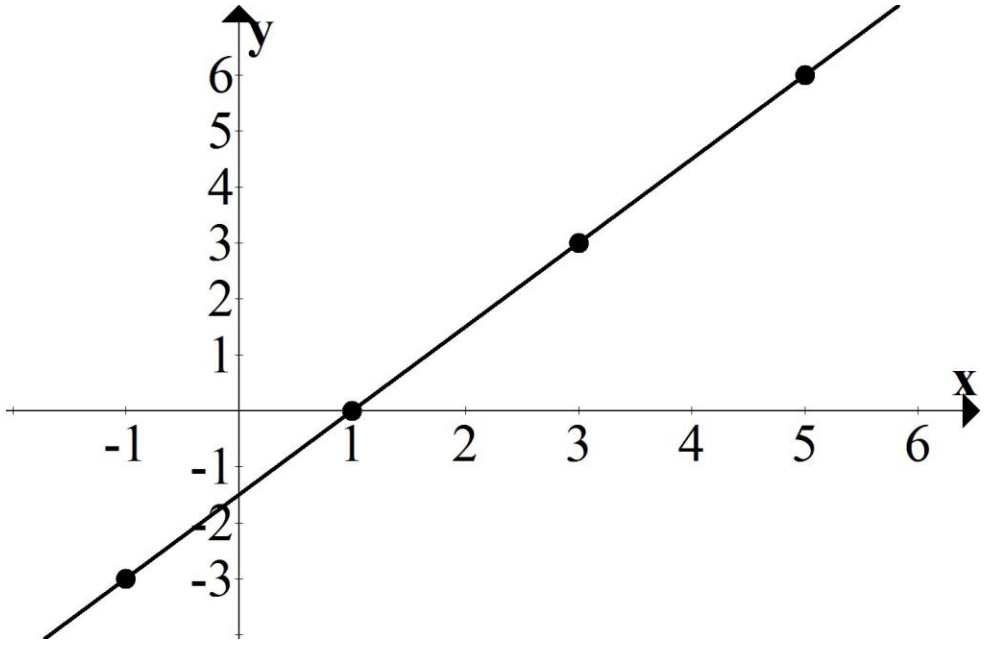
Closing Fri, Jan 8: 10.1
Closing Mon, Jan 11: 2.1
Closing Wed, Jan 13: 2.2
Closing Fri, Jan 15: 2.3
Go to course website and read announcements and all postings. (review sheets, unit circle, etc…)

Today: **Parametric and Ch. 2 Intro**

Entry Task: (**Uniform linear motion**)
Consider $x = 1 + 2t$, $y = 3t$

(1) Plug in $t = -1$ to get an (x,y) point. Do the same for $t = 0$, 1, and 2.
(2) Plot these (x,y) points in the xy-plane and connect the dots.

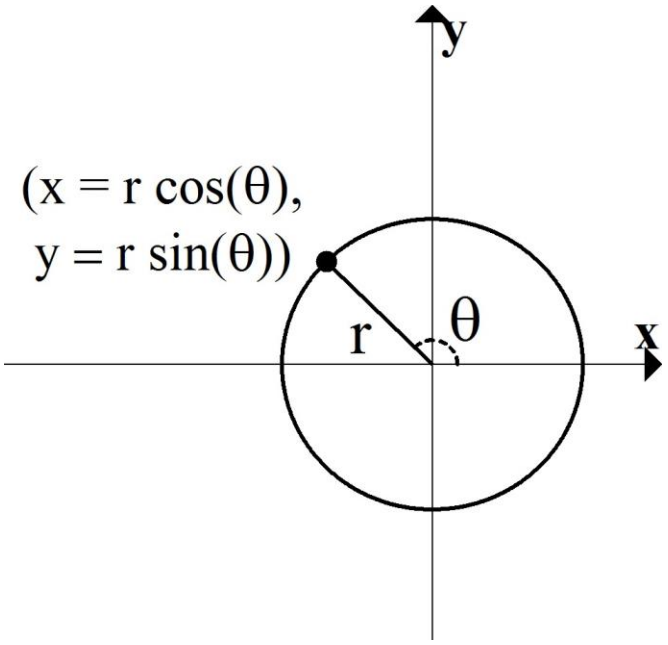
t	x = 1 + 2t	y = 3t
-1	x = 1+2(-1) = **-1**	y = 3(-1) = **-3**
0	x = 1+2(0) = **1**	y = 3(0) = **0**
1	x = 1+2(1) = **3**	y = 3(1) = **3**
2	x = 1+2(2) = **5**	y = 3(2) = **6**



Since x = 1 + 2t, we have t = ½ (x-1).
So y = 3t = 3/2(x-1) is the equation of the line's path.

Uniform Circular motion

Remember the fundamental connection between trig and circles:



If an object is traveling at a constant speed around a circle, then we first have to find θ before we can use the fact above.

Note: $\boldsymbol{\theta = wt + \theta_0}$, where

θ_0 = the starting angle (radians)

w = angular speed (rad/time)

t = time

Example:

A bug runs along a circular path that is 7 inches in radius. It starts at the west-most edge and rotates counterclockwise at a constant 10 revolutions per minute. Give the equations for motion in terms of time *t*.

r = ??

θ_0 = ?? (give in radians)

w = ?? (give in radians/min)

Ch. 2 Limits and Derivatives

2.1 Motivation

The foundation of calculus is “limiting processes”, where a procedure “approaches the exact answer” through better and better approximations.

Calculus is also primarily about “rates”. It could be called the study of rates.
Recall:

rate = (change in quantity)/(change in time)

Example: The distance traveled by an object is recorded at various times:

t (seconds)	0	1	2	3
Dist (meters)	0	1.2	4.5	10.4

1. What is the average velocity from t = 1 to t = 3?
2. What is the average velocity from t = 2 to t = 3?
3. What is the instantaneous velocity at t = 3?