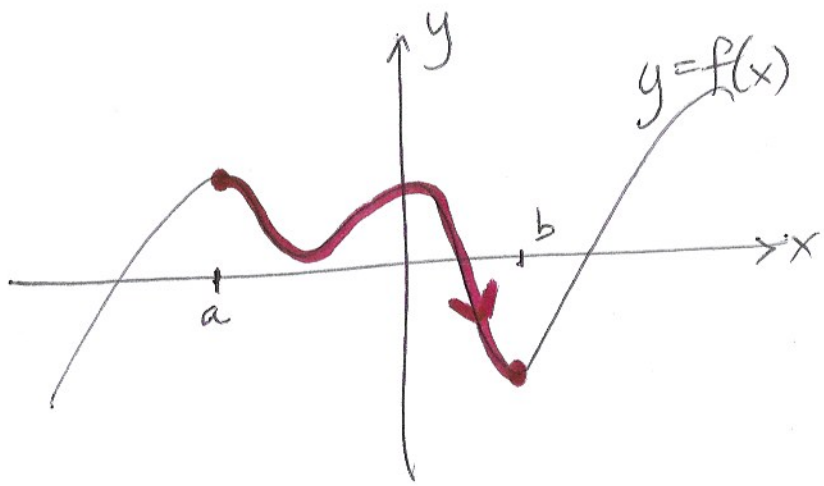
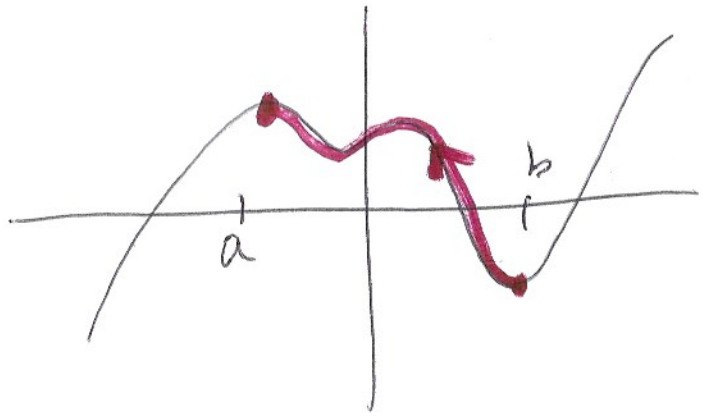
CONSIDER PART OF GRAPH OF $y=f(x)$ FROM $x=a$ TO $x=b$

$(a<b)$



$x=t$

$y=f(t)$ $\quad t\in[a,b]$



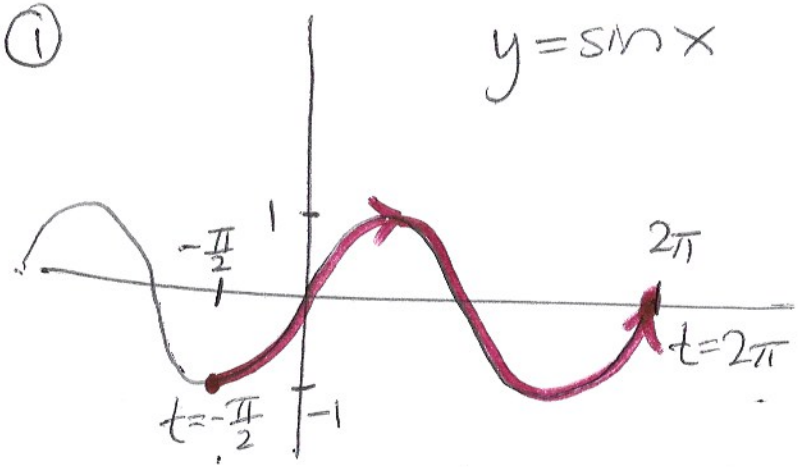
$x=t$

$y=f(t)$ $\quad t\in[b,a]$

$b\neq a$

WRITE PARAMETRIC EQUATIONS FOR CURVE BELOW

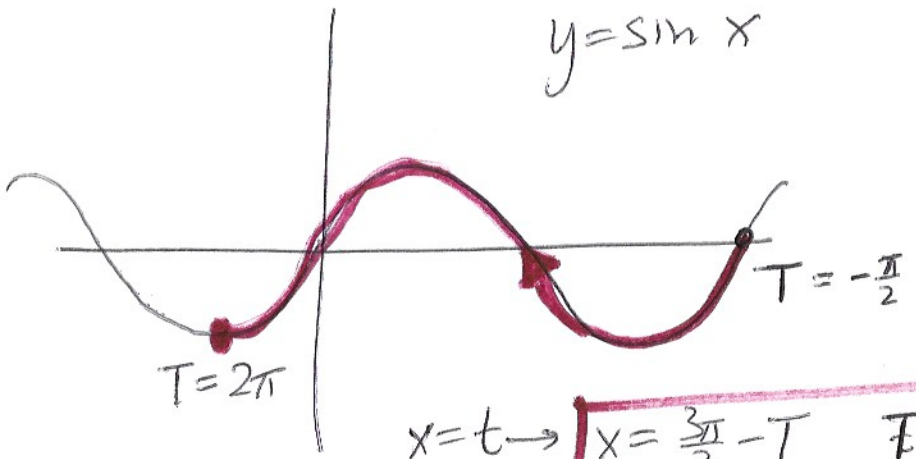
① $y = \sin x$



$x = t$

$y = \sin t$ $\quad t \in [-\frac{\pi}{2}, 2\pi]$

② $y = \sin x$



WHEN $t_1 = -\frac{\pi}{2}$, $T_1 = 2\pi$

$t_2 = 2\pi$, $T_2 = -\frac{\pi}{2}$

$y = mx+b$

$m = \frac{\Delta y}{\Delta x}$

WANT $t = f(T)$

GUESS $t = mT + b$ $\quad m = \frac{\Delta t}{\Delta T} = \frac{t_2 - t_1}{T_2 - T_1}$

$t = -T + b$ $\quad = \frac{2\pi - -\frac{\pi}{2}}{-\frac{\pi}{2} - 2\pi}$

$-\frac{\pi}{2} = -2\pi + b$ $\quad = -1$

$b = \frac{3\pi}{2}$

$t = -T + \frac{3\pi}{2}$

$\boxed{t = \frac{3\pi}{2} - T}$

$x = t \rightarrow$ $\boxed{x = \frac{3\pi}{2} - T \quad T \in [-\frac{\pi}{2}, 2\pi]}$

$y = \sin t \rightarrow$ $\boxed{y = \sin(\frac{3\pi}{2} - T)}$

$x = \frac{3\pi}{2} - T$ $\quad T \in [-\frac{\pi}{2}, 2\pi]$

$y = -\cos T$

$\sin(\frac{3\pi}{2} - T) = \sin\frac{3\pi}{2}\cos T - \cos\frac{3\pi}{2}\sin T$ ($\sin\frac{3\pi}{2} = -1$, $\cos\frac{3\pi}{2} = 0$)

$= -\cos T$

HW: TEMPLATES FOR PARAMETRIC EQUATIONS FOR

LINES + LINE SEGMENT

ELLIPSES

HYPERBOLAS

PROJECTILE MOTION

9.1 SEQUENCES

A SEQUENCE IS A LIST OF NUMERIC OR ALGEBRAIC EXPRESSIONS IN WHICH THE ORDER IS RELEVANT

eg. $2, 5, 8, 11, 14, 17, 20$

$8, 5, 2, 20, 17, 14, 11$ → BOTH SEQUENCES BUT NOT THE SAME (BECAUSE ORDER IS DIFFERENT)

$1+1, 6-1, 4*2, 13-2, 2*7, 4^2+1, 4\frac{1}{2}+4$ SAME SEQUENCE AS FIRST SEQUENCE

SEQUENCE $a = \{2, 5, 8, 11, 14, 17, 20\}$

EACH EXPRESSION IN A SEQUENCE IS CALLED A TERM

a_n = n-TH TERM IN SEQUENCE a

(TERM IN POSITION n OF SEQUENCE a)

eg. $a_3 = 3^{RD}$ TERM IN SEQ a $= 8$ IF $a_n = 14$, $n = 5$

THE GENERAL FORMULA OF SEQUENCE a GIVES THE VALUE OF a_n USING n WITHOUT EXPLICITLY REFERRING TO ANY OTHER TERMS

$$a_n = f(n)$$

eg. LIST THE FIRST 5 TERMS OF SEQUENCE WITH GENERAL FORMULA $a_n = 2n^2 + n$

$a_1 = 2(1)^2 + 1 = 3$

$a_2 = 2(2)^2 + 2 = 10$

$a_3 = 2(3)^2 + 3 = 21$

$a_4 = 2(4)^2 + 4 = 36$

$a_5 = 2(5)^2 + 5 = 55$

3, 10, 21, 36, 55

FIND THE 100^{TH} TERM OF THE ABOVE SEQUENCE

$$a_{100} = 2(100)^2 + 100 = 20100$$

GENERAL FORMULA

EASY TO USE TO FIND TERMS

HARD TO DETERMINE FORMULA