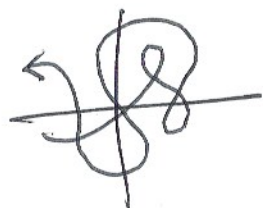
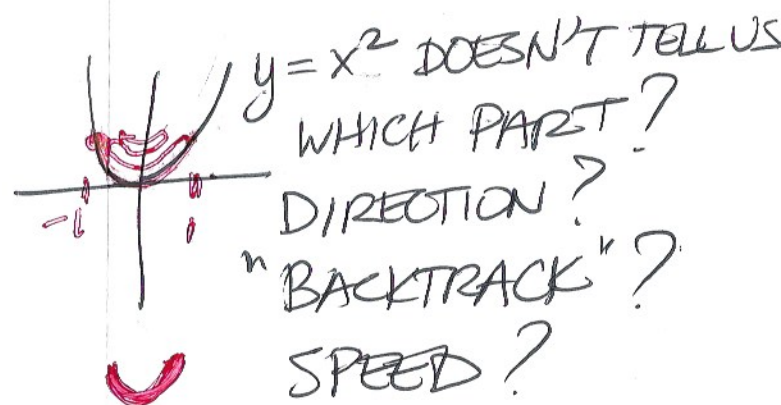


106 PARAMETRIC CURVES

PARAMETRIC EQUATIONS $\begin{cases} x = f(t) \\ y = g(t) \end{cases}$

t CALLED "THE PARAMETER"
 $\hookrightarrow$ "TIME"

 $y = f(x)$
 $f(x, y) = 0$

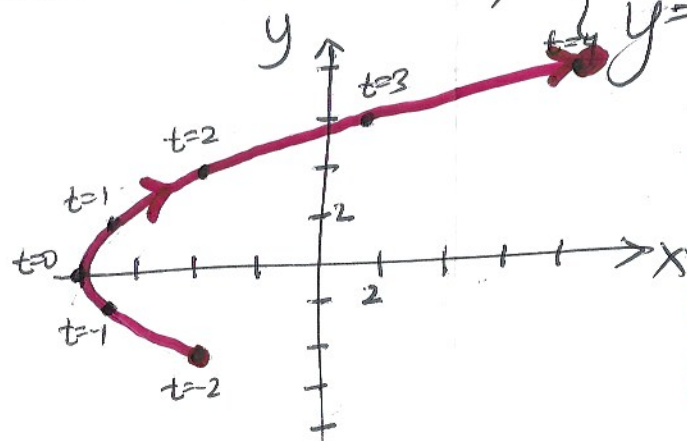


A PARAMETRIC CURVE IS THE LOCUS OF POINTS $(f(t), g(t))$ FOR t IN SOME CONTIGUOUS INTERVAL

SKETCH THE PARAMETRIC CURVE GIVEN BY $\begin{cases} x = t^2 - 8 \\ y = 2t \end{cases} t \in [-2, 4]$

BY PLOTTING POINTS

t	x	y	(x, y)
-2	-4	-4	$(-4, -4)$
-1	-7	-2	$(-7, -2)$
0	-8	0	$(-8, 0)$
1	-7	2	$(-7, 2)$
2	-4	4	$(-4, 4)$
3	-1	6	$(-1, 6)$
4	8	8	$(8, 8)$



LOOKS LIKE PART OF A PARABOLA, BUT IS IT REALLY?

ELIMINATING THE PARAMETER

METHOD 1: SOLVE FOR t IN ONE OF THE PARAMETRIC EQ'NS

$$x = t^2 - 8$$

$$y = 2t \rightarrow t = \frac{1}{2}y$$

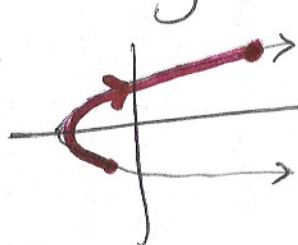
$$t \in [-2, 4]$$

SUBSTITUTE INTO THE EQ'N AND SIMPLIFY

$$x = \left(\frac{1}{2}y\right)^2 - 8$$

$$\star x = \frac{1}{4}y^2 - 8 \leftarrow \text{PARABOLA}$$

OPENS SIDWAYS TO THE RIGHT



$$\downarrow$$
$$x =$$

$$\downarrow$$
$$\frac{1}{4} > 0$$

(SIMILAR TO SOLVING EQUATIONS BY SUBSTITUTION)

ELIMINATE THE PARAMETER

eg. $x = 4t^2 - 8, y = 4t, t \in [-2, 4]$

$$\downarrow$$
$$t = \frac{1}{4}y$$

$$x = 4\left(\frac{1}{4}y\right)^2 - 8$$

$$x = 4\left(\frac{1}{16}y^2\right) - 8$$

$$\star x = \frac{1}{4}y^2 - 8$$

