

## Parametric Equations (1.4)

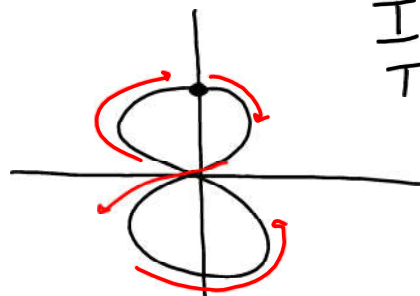
$x$  and  $y$  are functions of a third variable,  $t$ .

$t$  is the parameter.

Ex)  $x = 3 \sin 2t$

①  $y = 1.5 \cos t$

$0 \leq t \leq 2\pi$



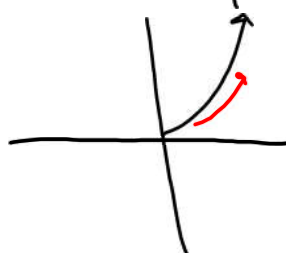
$I: (0, 1.5)$

$T: (0, 1.5)$

②  $x = \sqrt{t}$

$y = t$

$t \geq 0$



$I: (0, 0)$

$T: \text{none}$

Eliminate the parameter to make Cartesian.

$x = \sqrt{t}$

$x^2 = t$

$x^2 = y, x \geq 0$

③  $x = 3t$

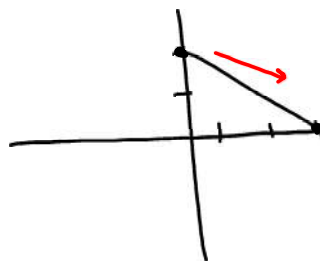
$y = 2 - 2t$

$0 \leq t \leq 1$

$\frac{x}{3} = t$

$y = 2 - 2\left(\frac{x}{3}\right)$

$= 2 - \frac{2}{3}x$



$I: (0, 2)$

$T: (3, 0)$

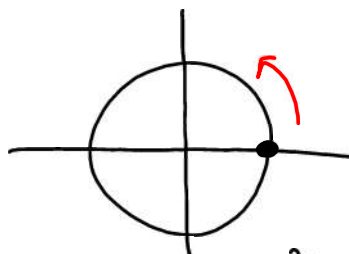
④  $x = \cos t$

$y = \sin t$

$0 \leq t \leq 2\pi$

$x^2 + y^2 = 1$

$\cos^2 t + \sin^2 t = 1$



$\left. \begin{array}{l} x = 3 \cos t \\ y = 2 \sin t \end{array} \right\} \text{ellipse}$

p. 10

45. Table 1.2 shows the mean annual compensation of construction workers.

**Table 1.2 Construction Workers' Average Annual Compensation**

Year	Annual Total Compensation (dollars)
1999	42,598
2000	44,764
2001	47,822
2002	48,966

Source: U.S. Bureau of the Census, *Statistical Abstract of the United States, 2004-2005*.

$$y = 2216.2x - 4387470.6$$

- (a) Find the linear regression equation for the data.  
 (b) Find the slope of the regression line. What does the slope represent?  
 (c) Superimpose the graph of the linear regression equation on a scatter plot of the data.  
 (d) Use the regression equation to predict the construction workers' average annual compensation in the year 2008. about \$62,659

STAT - Edit

put in data L1, L2

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— Table "Ask"

HW: p 34 #4, 5, 9, 18 + WS 1.4 (#1-1)

p 10 #53, p 28 #39 p. 44 #49

\$4

In Exercises 49 and 50, let  $x = 0$  represent 1990,  $x = 1$  represent 1991, and so forth.

**50. Natural Gas Production**

- (a) Find a natural logarithm regression equation for the data in Table 1.17 and superimpose its graph on a scatter plot of the data.

**Table 1.17 China's Natural Gas Production**

Year	Cubic Feet (trillions)
1997	0.75
1998	0.78
1999	0.85
2000	0.96
2001	1.07

*Source: Statistical Abstract of the United States, 2004-2005.*

- (b) Estimate the number of cubic feet of natural gas produced by China in 2002. Compare with the actual amount of 1.15 trillion cubic feet in 2002. *1.10 trillion; the estimate is an under estimate of the actual amount by 0.05 trillion cubic feet*
- (c) Predict when China's natural gas production will reach 1.5 trillion cubic feet. *sometime during 2011*

