

SOLUTIONS

141-002 Exam I - Version I
July 11, 2007

To receive credit, show ALL of your work.

1. (10 points) Express the area of a circle as a function of its circumference, given that $C = 2\pi r$.

$$A = \pi r^2 \quad C = 2\pi r$$

$$r = \frac{C}{2\pi}$$

$$A = \pi \left(\frac{C}{2\pi} \right)^2$$

2. (20 points) Given $f(x) = \ln(x + 7)$

- (a) State the domain and range of $f(x)$

domain: $x > -7$

range: all real #'s

- (b) Find $f^{-1}(x)$

$$f(x) = \ln(x+7)$$

$$y = \ln(x+7)$$

$$e^y = e^{\ln(x+7)}$$

$$e^y = x+7$$

$$x = e^y - 7$$

$$f^{-1}(x) = e^x - 7$$

3. (7 points) a) Eliminate the parameter to find a Cartesian equation given $x = 2\sin t$ and $y = 5\cos t$ and $0 \leq t \leq \pi$.

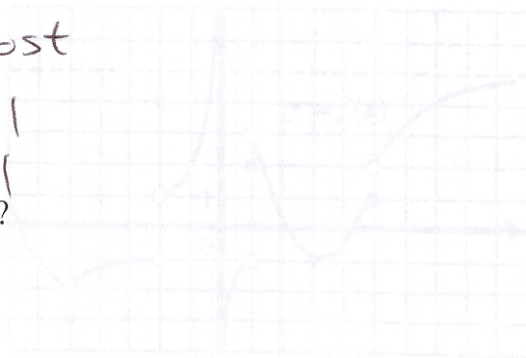
$$\frac{x}{2} = \sin t \quad \frac{y}{5} = \cos t$$

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

$$\left(\frac{x}{2}\right)^2 + \left(\frac{y}{5}\right)^2 = 1$$

- (2 points) b) What is this the equation for?

ellipse



- (6 points) c) Fill in the chart.

t	x	y
0	0	5
$\frac{\pi}{2}$	2	0
π	0	-5

- (5 points) d) Graph the function including the points from the above chart and draw an arrow on the curve to indicate direction of increasing t

