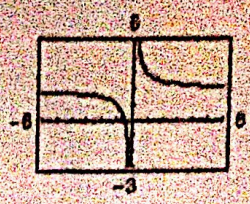
Honors Pre-Calculus
6.3 Practice/Review

Name_____
Date_____ Block____

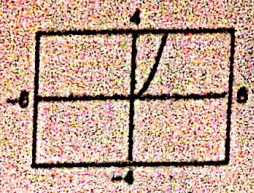
Match the set of parametric equations with its graph.

1. $x = t$, $y = t + 2$ C
2. $x = t^2$, $y = t - 2$ D
3. $x = \sqrt{t}$, $y = t$ B
4. $x = \frac{1}{t}$, $y = t + 2$ A
5. $x = \ln t$, $y = \frac{1}{2}t - 2$ F
6. $x = -2\sqrt{t}$, $y = e^t$ E

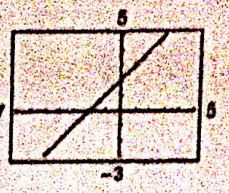
(a)



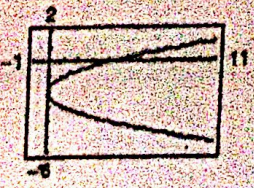
(b)



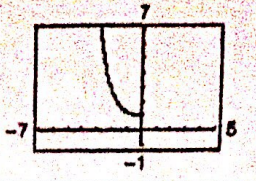
(c)



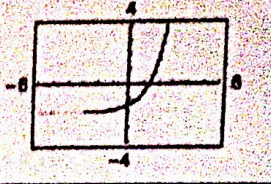
(d)



(e)



(f)



Eliminate the parameter and state the domain restriction if one exists. Then describe the graph.

7.) $x = t^2 - 4$, $y = \frac{1}{2}t$

$2y = t$

$x = 4y^2 - 4$

Parabola - opens right $V(-4, 0)$

8. $x = 2t + 5$, $y = t^2$; $0 \le t \le 10$

$t = \frac{1}{2}x - \frac{5}{2}$

$x(0) = 5$

$x(10) = 25$

$5 \le x \le 2$

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

part of parabola.

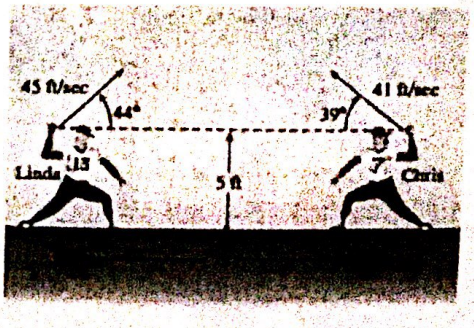
9. $x = -1 + 3\cos\theta$, $y = 2 + 4\sin\theta$, $0 \le t \le 2\pi$

$\frac{(x+1)^2}{9} = \cos^2\theta$ $\frac{(y-2)^2}{16} = \sin^2\theta$

$\frac{(x+1)^2}{9} + \frac{(y-2)^2}{16} = 1$

Ellipse - Center $(-1, 2)$ $w = 3$ $h = 4$

10.) Chris and Linda warm up in the outfield by tossing softballs to each other. Suppose both tossed a ball at the same time from the same height, as illustrated in the figure. Find the minimum distance between the two balls and when this minimum distance occurs. [46]



$x = 45\cos 44T$ $x = 78 - 41\cos 39T$

$y = -16T^2 + 45\sin 44T + 5$ $y = -16T^2 + 41\sin 39T + 5$

$45\cos 44T = 78 - 41\cos 39T$

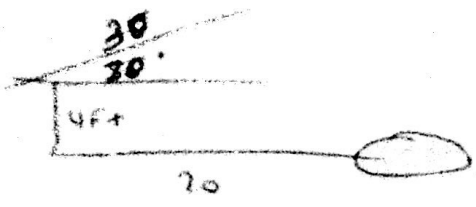
$64.23T = 78$

$T = 1.21$ seconds

$y(1.21) = 19.37$ Ft $y(1.21) = 12.74$

$19.37 - 12.74 =$ (6.63 Feet)

11.) Tony and Sue are launching lawn darts 20 feet from the front edge of a circular target of radius 18 in on the ground. If Tony throws the dart directly at the target, and releases it 3 feet above the ground with an initial velocity of 30 ft/sec at a 70 degree angle, will the dart hit the target? [47]



$x = 30 \cos 70 T$

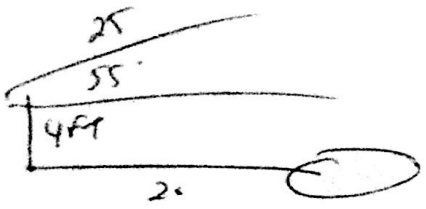
$y = -16T^2 + 30 \sin 70 T + 3$

$T = 1.86$ seconds (hits ground)

$x = 30 \cos 70 (1.86) = 19.08$ ft.

Nope... not happening!

12.) In the game of darts described in #11, Sue releases the dart 4 feet above the ground with an initial velocity of 25 ft/sec at a 55 degree angle. Will the dart hit the target? [48]



$x = 25 \cos 55 T$

$y = -16T^2 + 25 \sin 55 T + 4$

$T = 1.452$ seconds (hits ground)

$x = 25 \cos 55 (1.452) = 20.82$ feet

YES!

13.) Caroline hits golf balls off the practice tee with an initial velocity of 180 ft/sec with four different clubs. Each club hits the ball at a different angle. How far down the fairway does the ball hit the ground if it comes off the club making the specified angle? (50)

a) Write a set of parametric equations for the path of the golf ball.

$x = 180 \cos \theta T$

$y = -16T^2 + 180 \sin \theta T$

b) Use *y(t)* to find an expression for time when Height = 0.

$0 = -16T^2 + 180 \sin \theta T$

$0 = -16T (T - 11.25 \sin \theta)$

$-16T = 0$, $T = 0$

$T = 11.25 \sin \theta$

c) Substitute into *x(t)* and simplify. Because this function represents the distance the ball goes and when it hits the ground y =0. This general equation will simplify the calculations to find the distance at each angle.

	2.91	3.85	4.75	5.625
Club angle	15°	20°	25°	30°
Distance traveled (ft)	506.25	650.82	775.62	876.85

90 Feet

4.) The quarterback of a football team releases a pass at a height of 7 feet above the playing field, and the football is caught by a receiver at a height of 4 feet, 30 yards directly downfield. The pass is released at an angle of 35° with the horizontal.

a) Write a set of parametric equations for the path of the football.

$x = v \cos 35 T$

$y = -16T^2 + v \sin 35 T + 7$

$\frac{90}{\cos 35 T} = v$

$4 = -16T^2 + \frac{90 \sin 35 T}{\cos 35 T} + 7$

$T = 2.03$ seconds

$\left[\frac{-16T^2}{-16} = \frac{-66.01867}{-16}\right]$

$T = 2.03$

b) Find the speed of the football when it is released.

$90 = v \cos 35 \cdot 2.03$

$v = 54.1$ ft/sec

c) Estimate the maximum height of the football.

$t = \frac{-b}{2a} = \frac{-54.1 \sin 35}{-32} = .9697$ seconds

$y(.9697) = 22$ feet

d) Find the time the receiver has to position himself after the quarterback releases the football.

$90 = 54.1 \cos 35 T$

$T = 2.03$ seconds