Name: key

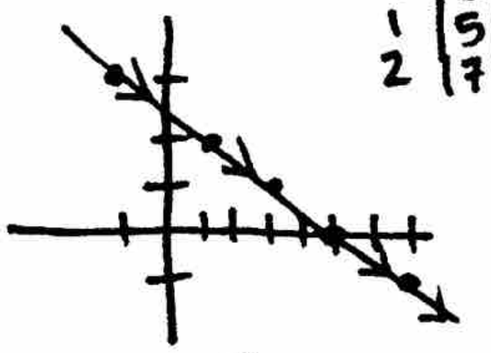
Parametric Test Review

No calculator:

Graph the parametric equations (show direction with arrows) and eliminate the parameter to find a rectangular equation

1. $x = 2t + 3$, $y = -t + 1$

t	x	y
-2	-1	3
-1	1	2
0	3	1
1	5	0
2	7	-1



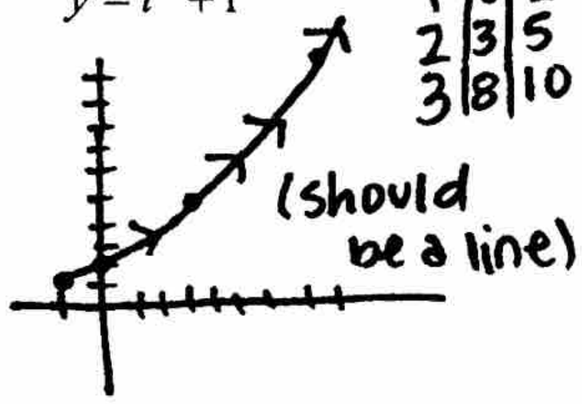
$t = \frac{x-3}{2}$

$y = -\left(\frac{x-3}{2}\right) + 1$

$\boxed{y = -\frac{x}{2} + \frac{5}{2}}$

2. $x = t^2 - 1$, $y = t^2 + 1$, $t \geq 0$

t	x	y
0	-1	1
1	0	2
2	3	5
3	8	10



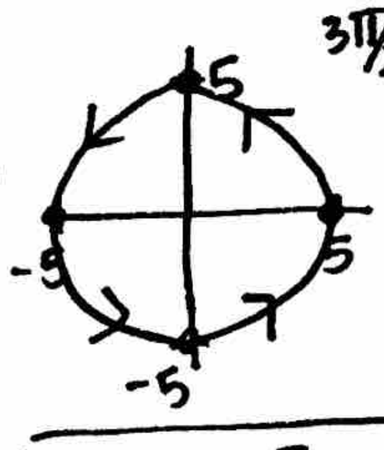
$t = \pm\sqrt{x+1}$

$y = (\sqrt{x+1})^2 + 1$

$\boxed{y = x + 2}$

3. $x = 5\cos(t)$, $y = 5\sin(t)$

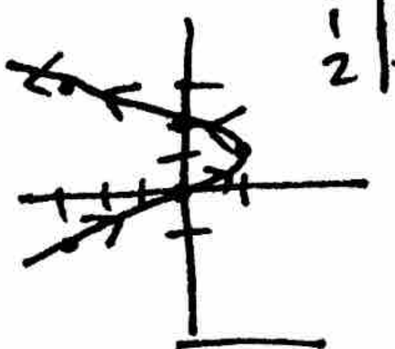
t	x	y
0	5	0
$\pi/2$	0	5
π	-5	0
$3\pi/2$	0	-5



$\boxed{x^2 + y^2 = 25}$

4. $x = 1 - t^2$, $y = 1 + t$

t	x	y
-2	-3	-1
-1	0	0
0	1	1
1	0	2
2	-3	3

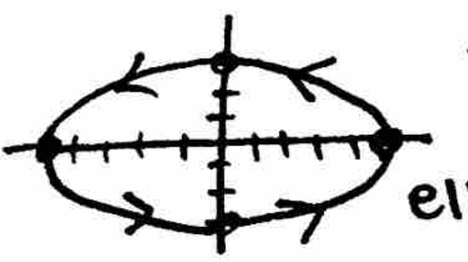


$t = \pm\sqrt{1-x}$

$\boxed{y = \pm\sqrt{1-x} + 1}$

5. $x = 5\cos(t)$, $y = 3\sin(t)$

t	x	y
0	5	0
$\pi/2$	0	3
π	-5	0
$3\pi/2$	0	-3

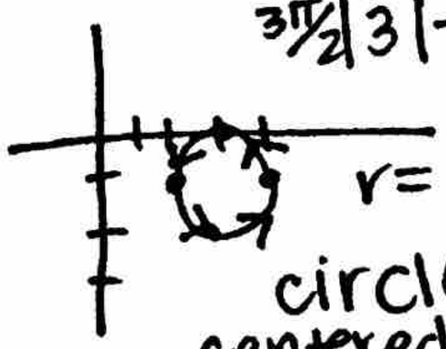


ellipse

$\boxed{\frac{x^2}{25} + \frac{y^2}{9} = 1}$

6. $x = \cos(t) + 3$, $y = \sin(t) - 1$

t	x	y
0	4	-1
$\pi/2$	3	0
π	2	-1
$3\pi/2$	3	-2



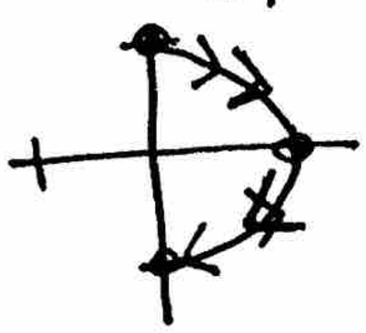
r = 1

circle centered @ (3, -1)

$\boxed{(x-3)^2 + (y+1)^2 = 1}$

7. $x = \sin(t)$, $y = \cos(t)$, $0 \leq t \leq \pi$

t	x	y
0	0	1
$\pi/2$	1	0
$\pi/2$	1	0
π	0	-1



$\boxed{x^2 + y^2 = 1}$

8. $x = \cos(-t)$, $y = \sin(-t)$, $0 \leq t \leq \pi$

t	x	y
0	1	0
$\pi/2$	0	-1
π	-1	0

$\boxed{x^2 + y^2 = 1}$

Write a set of parametric equations to model the following situations

9. A line segment that goes through the points (2,5) and (5,11)

$m = \frac{11-5}{5-2} = \frac{6}{3} = \frac{2}{1}$

$x = t + 2$

$y = 2t + 5$

answers vary

10. The line y = 3x – 2

$m = \frac{3}{1}$

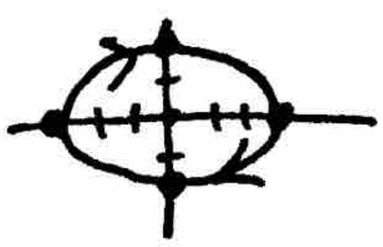
$(0, -2)$

$x = t$

$y = 3t - 2$

answers vary

11. An ellipse, centered at the origin, with end points (0,-2), (0,2), (-3,0), (3,0) that rotates *clockwise*



$x = 3\sin t$

$y = 2\cos t$

Write a set of parametric equations to model the following situations

12. A circle centered at (2,3) with a radius of 4 that rotates *counter-clockwise*

$x = 4\cos(t) + 2$

$y = 4\sin(t) + 3$

13. A wall 300 feet away that is 20 ft tall with

a) t-max 10

$x = 300$

$y = 2t$

b)t-max 2

$x = 300$

$y = 10t$

c)t-max 5

$x = 300$

$y = 4t$

14. A cannon shoots a ball from 5 feet off the ground at an initial velocity of 200 ft/sec at an angle of 39°, with a breeze blowing with the ball at 5 ft/sec

Adds to speed

$x = 200\cos(39)t + 5t$

$y = 200\sin(39)t - 16t^2 + 5$

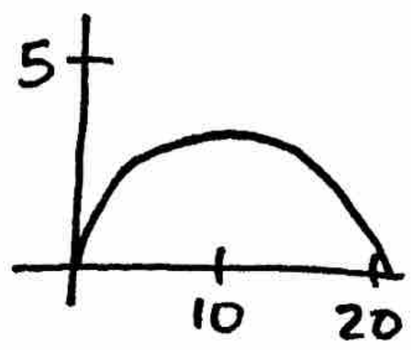
↑ feet

Calculator

15. A long jumper leaves the ground with an initial velocity of 31 ft/sec at an angle of 22-degrees. Determine the time of flight, the horizontal distance traveled, and the peak height of the long-jumper.

$x = 31\cos(22)t$

$y = 31\sin(22)t - 16t^2$



time: 0.72 sec

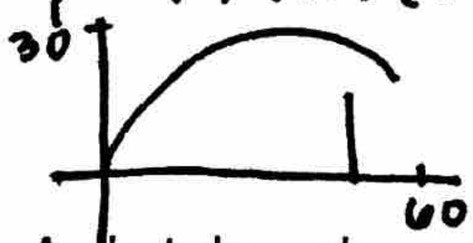
max height: 2.1 ft

distance: 20.7 ft

16. A football is kicked with an initial velocity of 44 ft/s at an angle of 55-degrees. If the cross bar of the goal post is 10 feet high and 45 feet away, will the kick be good? What if the wind was blowing in at 3 ft/s?

$x = 44\cos(55)t$

$y = 44\sin(55)t - 16t^2$



Yes!

goal post:

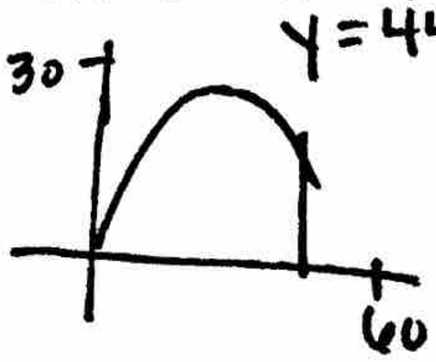
$x = 45$

$y = 5t$

$t_{max} = 2$

wind: $x = 44\cos(55)t - 3t$

$y = 44\sin(55)t - 16t^2$

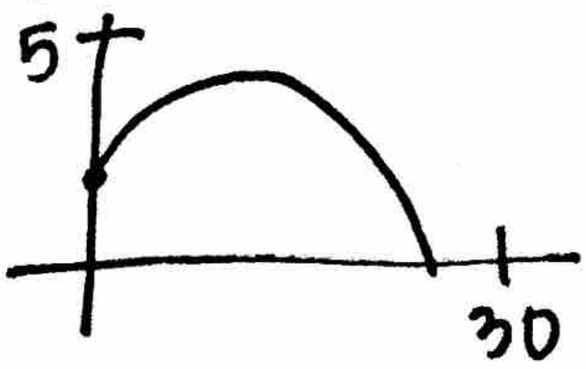


NO ☹

17. A skateboarder goes off a ramp at a speed of 37 ft/sec. The angle of elevation of the ramp is 13.5° and the ramp's height above the ground is 1.57 feet. Give the set of parametric equations for the skater's jump. Find the horizontal distance along the ground from the ramp to the point he lands

$x = 37\cos(13.5)°t$

$y = 37\sin(13.5)t - 16t^2 + 1.57$



distance 24.5 ft