

Warm up

1. Write the three Pythagorean identities.

$$\sin^2 x + \cos^2 x = 1 \quad \sec^2 x = \tan^2 x + 1$$

$$1 + \cot^2 x = \csc^2 x$$

2. Write the equations of the vertex form of a parabola and the standard form of a circle, ellipse and a hyperbola.

$$P: y = a(x-h)^2 + k$$

$$H: \frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$$

$$E: \frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

$$C: (x-h)^2 + (y-k)^2 = r^2$$

3. Define domain and range.

D: x values

R: y values

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GO COUGARS!



Homework Questions

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9.5 Parametric Equations

The relation of all ordered pairs $(x(t), y(t))$ for all t in some interval I , t is called the parameter.

For example: A parabola tells an action of an object over the horizontal distance from the origin and height from the origin but it does not include time. Time would be the parameter of the parabolic equation.

Another example: If a ball was suspended by a piece of string above the floor and was swinging back and forth as if it were a pendulum, we can represent the equation of the ball's position in space with respect to time.

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Example 1: Convert the parametric equations $(x(t), y(t))$ into a rectangular equation (x, y) .

$$x = 1 + t \quad y = 2t$$

Linearish

Step 1. Determine the domain for each parametric equation and find the 't' overlap or 't bucket' interval.

$$D_x (-\infty, \infty) \quad D_y (-\infty, \infty) \quad (-\infty, \infty)$$

Step 2. Make a (t, x, y) table of values. We'll call this the "t" table.

t	x	y
-2	-1	-4
-1	0	-2
0	1	0
1	2	2
2	3	4

Step 3. Solve for t in terms of x in the x -parameter equation (make it $t =$).

$$x = t + 1$$

get t alone $(x-1) = t$

Step 4. Substitute the $t =$ for t in the y -parameter equation.

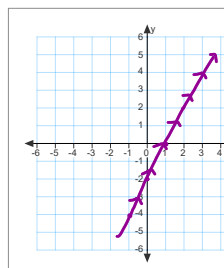
$$y = 2(x-1) \Rightarrow y = 2x - 2$$

Step 5. Graph the equation from your (x, y) values from your table.

Step 6. State the domain and range of your rectangular equation.

$$D (-\infty, \infty) \quad R (-\infty, \infty)$$

Step 7. Check on your graphing calculator.



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Example 2 *parabolic* Ψ

$x = -2 + t^2$ $y = 1 + 2t^2$

$D: (-\infty, \infty)$ $D: (-\infty, \infty)$

$R: [-2, \infty)$ $R: [1, \infty)$

t bucket $(-\infty, \infty)$

get t alone

$x = -2 + t^2$
 $x + 2 = t^2$
 $y = 1 + 2(x + 2)$
 $y = 1 + 2x + 4$
 $y = 2x + 5$

~~$D: (-\infty, \infty)$ $R: (-\infty, \infty)$~~

Range of the x parameter \rightarrow Domain of the rectangular equation
 Range of the y parameter \rightarrow Range of the rectangular equation

t	x	y
-2	2	9
-1	-1	3
0	-2	1
1	-1	3
2	2	9

$D: [-2, \infty)$
 $R: [1, \infty)$

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Example 3 $\sqrt{\quad}$

$x = \sqrt{t-2}$ $D: [2, \infty)$ $R: [0, \infty)$

$y = t - 3$ ~~$D: (-\infty, \infty)$ $R: (-\infty, \infty)$~~
 $[2, \infty)$ $[-1, \infty)$

t bucket $[2, \infty)$

$x = \sqrt{t-2}$
 $x^2 + 2 = t$
 $y = x^2 - 3 + 2$
 $y = x^2 - 1$

$R_x \rightarrow D_r [0, \infty)$
 $R_y \rightarrow R_r [-1, \infty)$

t	x	y
2	0	-1
3	1	0
6	2	3

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HOMWORK



p 704

1 - 6 all, 11 -19 odd

Feb 2-9:51 PM

Example 1: Convert the parametric equations $(x(t), y(t))$ into a rectangular equation (x, y) .

$$x = 1 + t \quad y = 2t$$

Step 1. Determine the domain and range for each parametric equation.

$$D_x = (-\infty, \infty) \quad D_y = (-\infty, \infty)$$

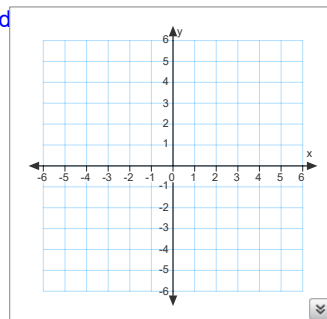
Step 2. Determine the domain and range of the rectangular equation.

Step 3. Solve for t in terms of x .

Step 4. Substitute for t in the y equation.

Step 5. Graph the equation keeping in mind

Step 6. Check on Calculator.



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