

Topic: Eliminating the parameter

Question: Eliminate the parameter.

$$x = t^3 - 4t$$

$$y = t^2 - 4$$

Answer choices:

A $x^2 = y^3 + 4y^2$

B $x^2 = y^3 - 4y^2$

C $x^2 = y^2 + 4y$

D $x^2 = y^2 - 4y$



Solution: A

To eliminate the parameter from a set of equations, we have a few options.
We can

1. Solve each equation for the parameter t , then set the equations equal to one another, or
2. Solve one equation for the parameter t , then plug that value into the second equation, or
3. Solve each equation for part of an identity, then plug both values into the identity.

In this case, we'll use the second option. Solving $y = t^2 - 4$ for the parameter t , we get

$$y = t^2 - 4$$

$$y + 4 = t^2$$

$$t = \sqrt{y + 4}$$

Plugging this value into $x = t^3 - 4t$, we get a new equation in terms of x and y .

$$x = \left(\sqrt{y + 4}\right)^3 - 4\sqrt{y + 4}$$

$$x = \sqrt{y + 4} \left[\left(\sqrt{y + 4}\right)^2 - 4 \right]$$

$$x = \sqrt{y + 4} (y + 4 - 4)$$



$$x = y\sqrt{y+4}$$

Squaring both sides to eliminate the square root, we get

$$x^2 = y^2(y+4)$$

$$x^2 = y^3 + 4y^2$$



Topic: Eliminating the parameter

Question: Eliminate the parameter.

$$x = 2 \cos t$$

$$y = 3 \sin t$$

Answer choices:

A $4x^2 + 9y^2 = 36$

B $9x^2 - 4y^2 = 36$

C $9x^2 + 4y^2 = 36$

D $4x^2 - 9y^2 = 36$



Solution: C

To eliminate the parameter from a set of equations, we have a few options. We can

1. Solve each equation for the parameter t , then set the equations equal to one another, or
2. Solve one equation for the parameter t , then plug that value into the second equation, or
3. Solve each equation for part of an identity, then plug both values into the identity.

In this case, we'll use the third option. Solving each equation for the square of the trigonometric function, we get

$$x = 2 \cos t$$

$$\frac{x}{2} = \cos t$$

$$\frac{x^2}{4} = \cos^2 t$$

and

$$y = 3 \sin t$$

$$\frac{y}{3} = \sin t$$

$$\frac{y^2}{9} = \sin^2 t$$



Since $\sin^2 x + \cos^2 x = 1$, we can say that

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

$$\frac{y^2}{9} + \frac{x^2}{4} = 1$$

$$9x^2 + 4y^2 = 36$$



Topic: Eliminating the parameter**Question:** Eliminate the parameter.

$$x = 4t$$

$$y = \sqrt{3 - t}$$

Answer choices:

A $x - 4y^2 = 12$

B $x + 4y^2 = 3$

C $x + 4y^2 = 12$

D $x + y^2 = 3$



Solution: C

To eliminate the parameter from a set of equations, we have a few options. We can

1. solve each equation for the parameter t , then set the equations equal to one another, or
2. solve one equation for the parameter t , then plug that value into the second equation, or
3. solve each equation for part of an identity, then plug both values into the identity.

In this case, we'll use the first option. Solving each of the given equations for the parameter t , we get

$$x = 4t$$

$$t = \frac{1}{4}x$$

and

$$y = \sqrt{3 - t}$$

$$y^2 = 3 - t$$

$$t = 3 - y^2$$

Setting the resulting equations equal to one another, we get a new equation in terms of x and y .



$$\frac{1}{4}x = 3 - y^2$$

$$x = 12 - 4y^2$$

$$x + 4y^2 = 12$$

