

Sketching Other Graphs

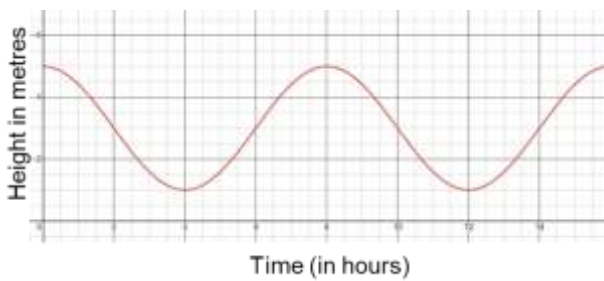
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Did you know?

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Trigonometric functions can be used to model many things that repeat over a time period.

Examples include: Tides, springs, harmonic strings and hours of daylight.





Sketching Other Graphs 1



1. What is the mathematical name for the graph of $y = \frac{1}{x}$?
2. What are the maximum and minimum values for the graph $y = \cos\theta$?
3. Sketch the graph of $y = 2^x$.
Label the y and x intercepts.
4. Using a sketch of the graphs
 $y = \frac{1}{x}$ and $y = x$
5. What is the name for this type of graph?
6. What is the y intercept of the graph
 $y = (x + 2)(x - 3)(x + 5)$?
7. What are the x intercepts of the graph
 $y = (x + 2)(x - 3)(x + 5)$?
8. Sketch the graph of
 $y = (x - 3)(x + 2)(x + 5)$

Show how many solutions there will be to the equation $\frac{1}{x} = x$



Sketching Other Graphs 2



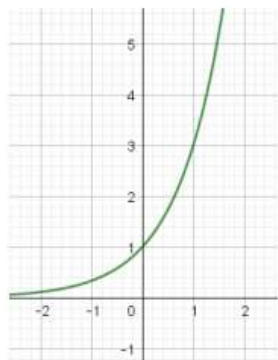
1. What is the mathematical name for graphs of the form of $x^2 + y^2 = 9$?
2. Sketch the graph of $y = \sin\theta$ between 0° and 360° , labelling x and y intercepts
3. On your sketch for Q2 draw in the line
 $y = 0.5$
How many solutions are there to
 $\sin\theta = 0.5$?
Can you say what they are?
4. Sketch the graph $y = x^3$, labelling any intersections
5. Sketch the graph of the equation in Q1, label any intersections with the x and y axis
6. What is the y intercept of the graph
 $y = (x + 1)(x + 1)(x - 1)$?
7. What are the x intercepts of the graph
 $y = (x + 1)(x + 1)(x - 1)$?
8. Sketch the graphs of
 $x^2 + y^2 = 4$
 $y = x + 1$
Use the sketch to determine how many solutions there are when those equations are solved simultaneously



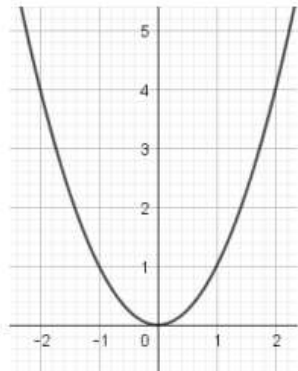
Which is which?

Match the graphs to the equations - there are more equations than you need!

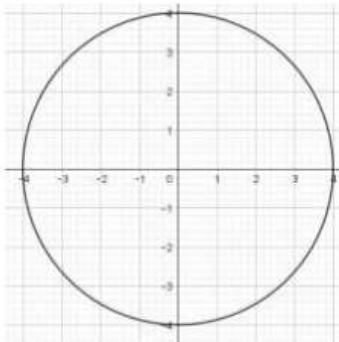
A



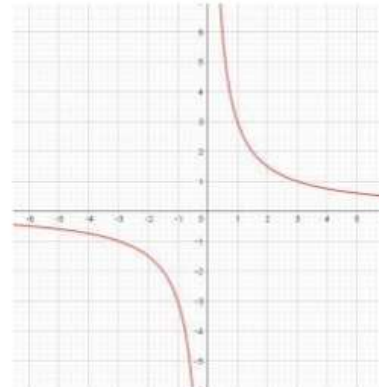
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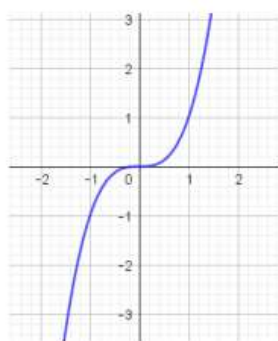
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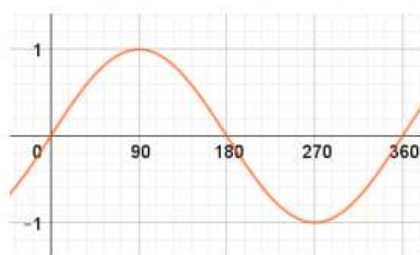
D



E



F



- $y = 3^x$
- $y^2 + x^2 = 16$
- $y = \frac{3}{x}$
- $y = x^2$
- $y = \sin\theta$
- $y = x^3$
- $y = 2x^2$
- $y = \frac{1}{x}$
- $y = \tan\theta$
- $y = x^2 + 3$



Shortest Distance

Find the shortest distance between the following curves:

$$\begin{aligned} x^2 + y^2 &= 9 \\ y &= x^2 + 7 \end{aligned}$$



How fast?

A car is initially travelling at 300m/min, it speeds up over a 20 second interval with a constant acceleration to achieve a speed of 400m/min.

It travels at this speed for 3 minutes before slowing to a stop via constant de-acceleration over a period of 30 seconds.

- What is the car's average speed for the first 20 seconds of travel?
- What is the car's deceleration?



A square in a circle.

A square is placed inside a circle (C_1) so that the corners perfectly touch the circle's circumference.

Another circle (C_2) is now placed inside this square so that its circumference perfectly touches the square's sides.

What is the ratio of the lengths of the radius of C_1 and the radius of C_2 ?

Hint: Assume C_2 has a radius of 1 unit



A Triggly Problem!

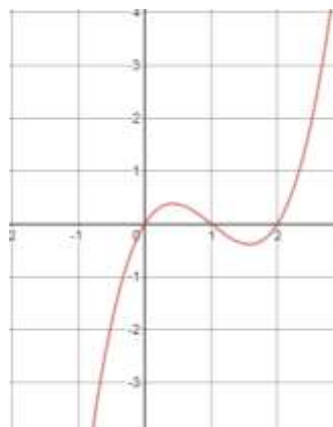
Solve $(\sin x + 1)(2\cos x - 1) = 0$ for $0 < x < 360^\circ$



A cubic match up

Which one of the equations below describes the graph?

1. $y = (x + 1)(x - 1)(x - 2)$
2. $y = -x(x - 1)(x + 1)$
3. $y = x(x - 1)(x + 1)$



Catching Stars

Go to [Student.Desmos.com](https://student.desmos.com) (use classroom code: **FENFZP**) to try an Exponential Marbleslides Challenge.

You will be investigating the features of exponential graphs whilst trying to catch as many stars as possible.

You can join the activity without signing in or entering your real name.