Venus

Question - Trigonometric identities

Given that $\cos(A) = \frac{3}{5}$, use a trigonometric identity of your choice to calculate the value of $\sin(A)$. i.e. not by using a calculator to find the angle A

Question - Angle addition formulae

(This is a pretty dry topic so only 1 question here)

Use the angle addition formula for $\cos(A - B)$ to simplify $\cos(\frac{3\pi}{2} - \theta)$.

Question - Hyperbolic identities

Calculate $\cosh^2(x) - \sinh^2(x)$ and $\cosh^2(x) + \sinh^2(x)$ to see what they equal.

(Use the e^x formulae for $\cosh(x)$ and $\sinh(x)$, e.g. $\cosh(x) = \frac{e^x + e^{-x}}{2}$ then do lots of algebra!)

How do the identities you discover compare to the equivalent identities with $\sin^2(x)$ and $\cos^2(x)$?

Question - Graph sketching

Sketch (by hand) the graph of $y(x) = x^2 + 1$ for x between -4 and 4. Use your sketch to describe when the gradient of y is negative, when it is 0 and when it is positive.

Question

Use the internet to sketch $y(x) = x^3 - 3x$ for x between -4 and 4. Use your sketch to describe when the gradient of y is negative, when it is 0 and when it is positive.

I recommend the online sketch program found at https://www.desmos.com/calculator

Follow-up

Use a Table of Standard Derivatives to first work out $\frac{dy}{dx}$, then by factorising this answer, work out exactly where the function's turning points are.

(*Turning points* are also called *stationary points*, *extremal points*, *extrema*, *maxima and minima* or even just *maxes and mins*!)