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VCE Specialist Mathematics $\frac{1}{2}$
Advanced Trigonometric Functions [3.4]
Test

20.5 Marks. 23 Minutes Writing.

Results:

Test Questions	_____ / 20.5
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Section A: Test Questions (20.5 Marks)

Question 1 (3.5 marks)

Tick whether the following statements are **true** or **false**.

Statement	True	False
a. Secant graphs have a vertical asymptote whenever sine is equal to 0.		
b. Cotangent graphs have an x -intercept when the tangent is undefined.		
c. $\sec(x)$, 1 and $\tan(x)$ form the sides of a right-angle triangle on a unit circle.		
d. Compound angle formula for $\cos(2x - y)$ is given by $\cos(2x)\sin(y) + \sin(2x)\cos(y)$.		
e. Double angle formula can be used to find the value of $\tan\left(\frac{\pi}{16}\right)$ without technology.		
f. $\cos^{-1}(x)$ has a range of $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$.		
g. The range of $\frac{\pi}{2} - \cos^{-1}(2x - 1)$ is given by $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$.		

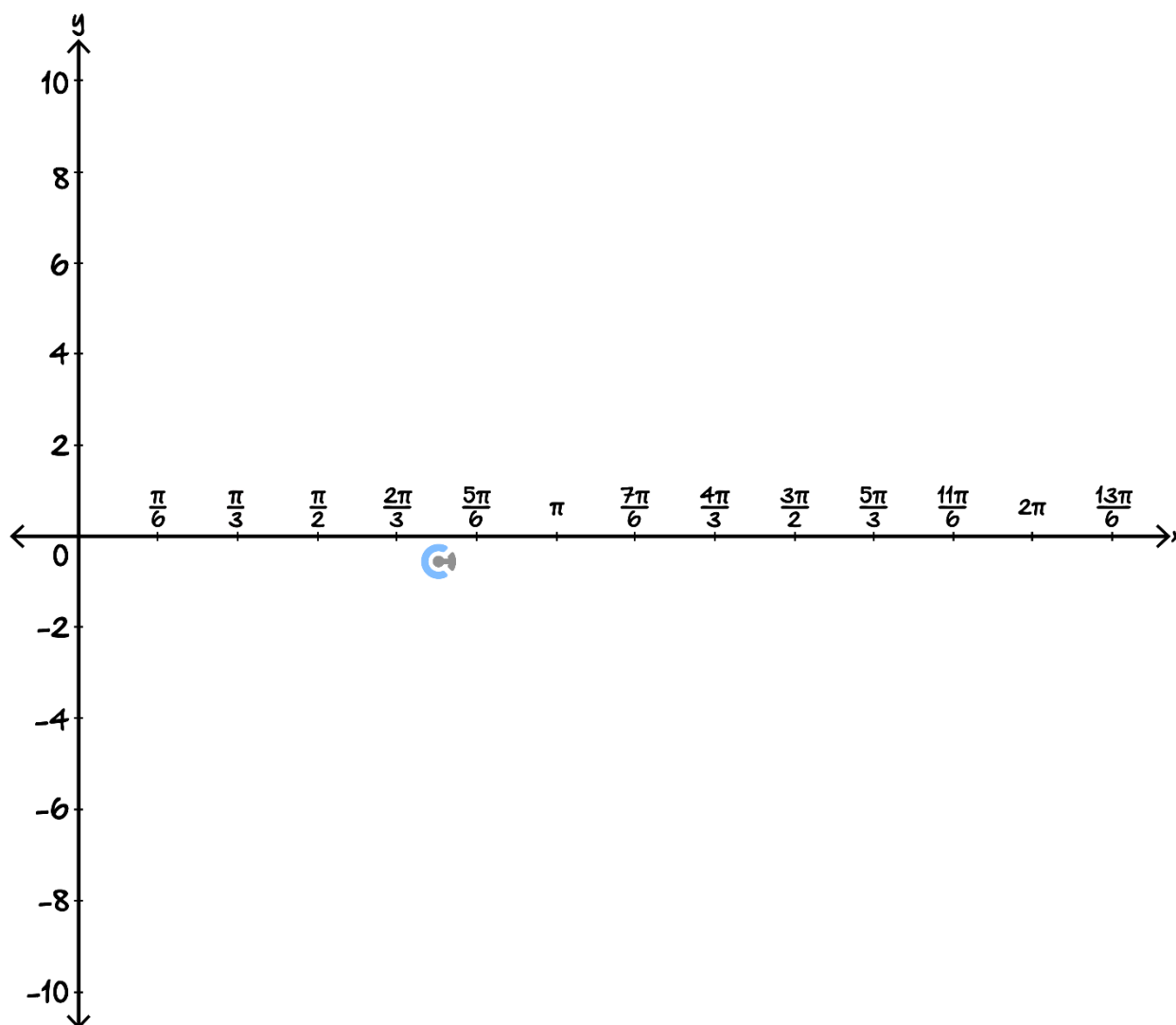
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Question 2 (7 marks)

Consider the function $f(x) = -3 + 2 \sec\left(2x - \frac{\pi}{3}\right)$ for $x \in [0, 2\pi]$.

- a. Find the equation(s) of any asymptotes of the function. (2 marks)

- b. Sketch the graph of f on the axes below, labelling all endpoints with their coordinates, and all asymptotes with their equations. (5 marks)



Question 3 (3 marks)

Given that $\sin(x - y) = \frac{3}{5}$, $\cos(x) = \frac{4}{5}$ and $\cos(y) = \frac{5}{13}$, find $\sin(x + y)$.

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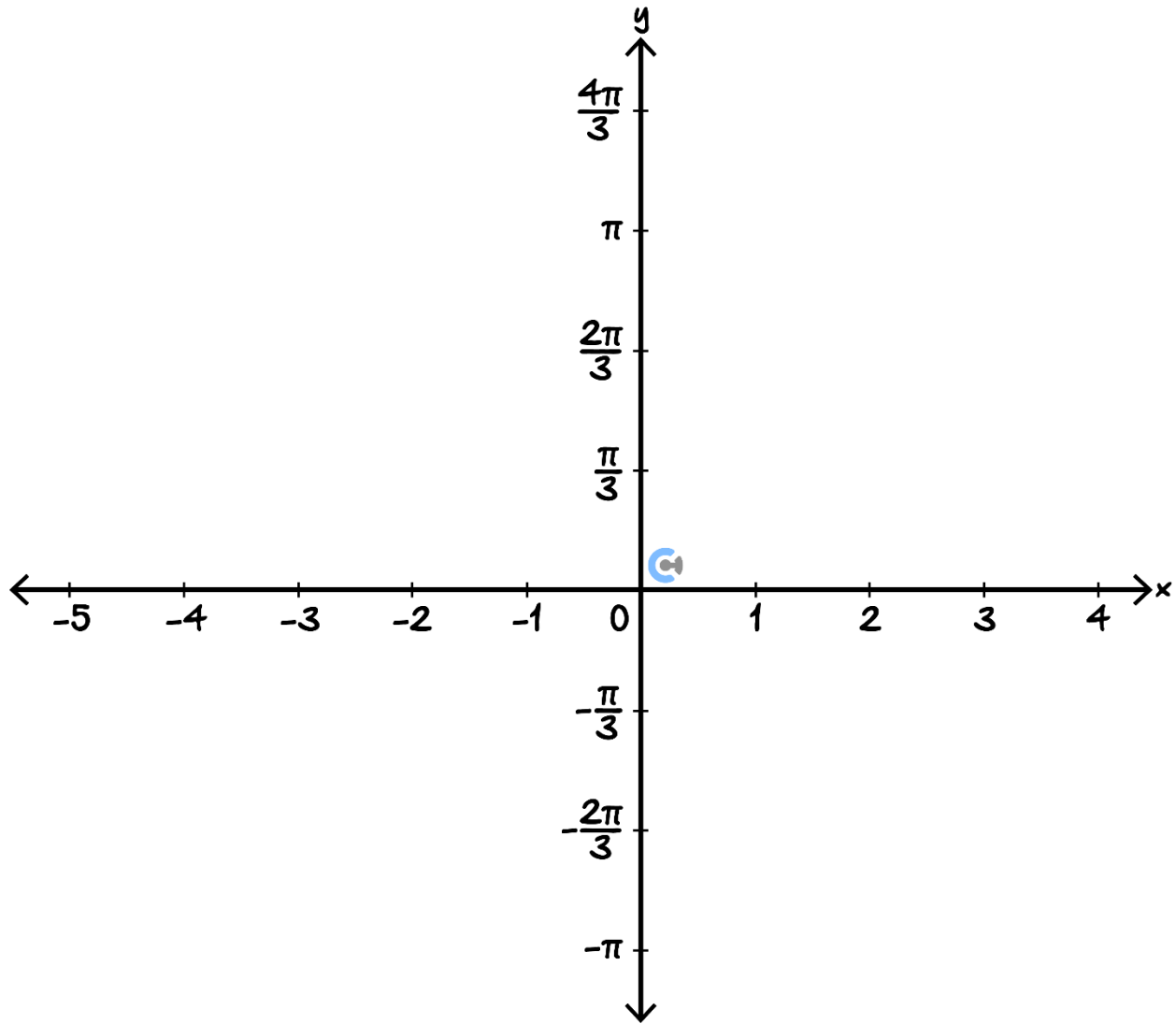
Question 4 (3 marks)

Show why $\arccos(x) + \arccos(-x) = \pi$ for all $x \in [-1, 1]$.

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Question 5 (4 marks)

State the maximal domain and the range of $y = 2 \arcsin\left(\frac{1}{2}(1+x)\right) + \frac{\pi}{3}$ and sketch the graph over its maximal domain, labelling endpoints with their coordinates.



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VCE Specialist Mathematics ½

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