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# VCE Mathematical Methods ¾ Circular Functions I [3.2] Test

23.5 Marks. 1 Minute Reading. 19 Minutes Writing

#### **Results:**

Test Questions	/ 23.5	





### Section A: Test Questions (23.5 Marks)

**Question 1** (3.5 marks)

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

		True	False
a.	On the unit circle, the value of sin is represented by the <i>y</i> -value of the unit circle whereas the value of tan is represented by the gradient of the projection.		
b.	If you change the value of $x$ by the period in a tan function, the angle changes by $2\pi$ .		
c.	In a supplementary relationship, the values of sin change to values of cos and vice versa.		
d.	For a particular solution, the trigonometric equation must have a restricted domain.		
e.	For a general solution, the trigonometric equation must <b>NOT</b> have a restricted domain.		
f.	Angle $\theta$ reflected in the x-axis, y-axis and $y = x$ is given by $\frac{3\pi}{2} + \theta$ .		
g.	$\tan\left(\frac{7\pi}{2} + \theta\right) = -\frac{1}{\tan\left(\theta\right)}.$		

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Question 2 (5 marks)

It is known that  $cos(a) = -\frac{1}{7}$  where a is a second quadrant angle.

Evaluate the following:

**a.**  $\cos(\pi + a)$ . (1 mark)

**b.**  $\sin(\pi + a)$ . (2 marks)

c.  $\sin\left(\frac{3\pi}{2} + a\right)$ . (2 marks)

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Question 3 (2 marks)

State the smallest positive value of k such that  $x = \frac{3\pi}{4}$  is a solution of  $\tan(x) = \cos(kx)$ .

 $tan(\frac{30}{4}) = los(kx \frac{31}{4}) \qquad \frac{3k\pi}{4} = \pi \pm 2n\pi, n \in \mathbb{Z}$   $-1 = los(\frac{3k\pi}{4}) \qquad los(\frac{3k\pi}{4}) = \pi$   $k = \frac{4}{3}$ 

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Question 5 (6 marks)

**a.** Find the general solution to the equation below. (3 marks)

$$5\tan\left(4x - \frac{\pi}{3}\right) + 2 = -3$$

Let  $f(x) = 5 \tan \left(4x - \frac{\pi}{3}\right) + 5$  and  $g(x) = 5 \tan \left(4x - \frac{\pi}{3}\right) - 5$ .

**b.** Find the smallest horizontal distance between any two roots of f and g. (2 marks).



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c.	Hence, give a general formula for the distance between any two roots of $f$ and $g$ . (1 mark).	
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Question 6 (5 marks)		
Consider the equation below:		
$-2\sin^2\left(x+\frac{\pi}{3}\right)+3\cos\left(x+\frac{\pi}{3}\right)=0$		
Evaluate the following:		
<b>a.</b> Find the general solution for $x$ . (4 marks)		
<b>b.</b> Hence, find the values of $x \in [0, 2\pi]$ that satisfy the equation. (1 mark)		



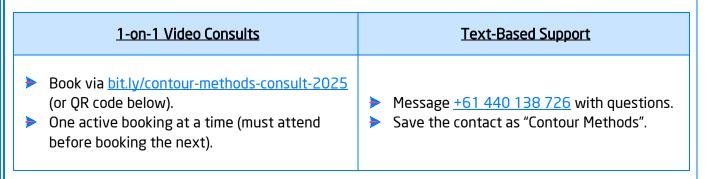
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