

Unit 3 Assessment

Knowledge	/16	Application	/18	Thinking	/17	Communication	/18
-----------	-----	-------------	-----	----------	-----	---------------	-----

1. Determine the following: **[K4]**
 - a. Given a sector with an arc length of 4.5 cm and a radius of 3 cm, find the angle subtended by the arc.
 - b. Given a sector with an angle of 13 radians and a radius of 7 m, find the arc length.

2. Fill in the table. Show your work and keep answers exact. **[K4]**

Degrees	Radians
	$\frac{2\pi}{45}$
230°	

3. Determine the values of θ if $0 \leq \theta \leq 2\pi$ given that $\cos \theta = -0.3178$. Explain your process. **[K4], [C2]**

4. Determine exact values of θ if $0 \leq \theta \leq 2\pi$ given that $\tan \theta = -\sqrt{3}$. Explain your process. **[K4], [C2]**

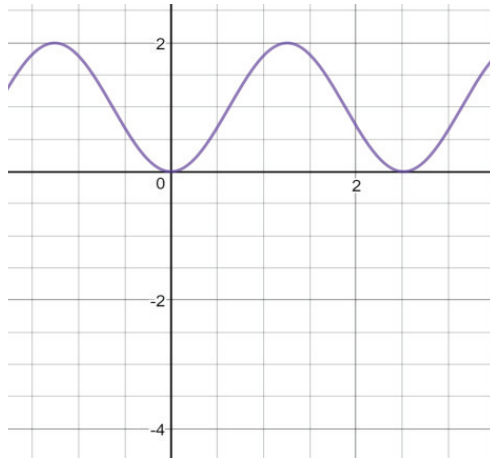
5. Describe the transformations on the given cosine function. **[C4]**

$$f(x) = 0.5\cos[0.5(x - \pi)] - 12$$

6. Find an equation for each function and explain your thought process.

- a. A sinusoidal function with an amplitude of 15 units, a period of $\frac{\pi}{2}$, a phase shift of $\frac{\pi}{7}$ radians to the right, axis at $y = 33$ **[A4] [C2]**

b. [A4] [C2]



7. Determine the exact value of $\tan \frac{5\pi}{12}$. [T4]

8. Determine a value of x for each of the following. Give answers in simplest exact form. [A6]

a. $\sin \frac{8\pi}{23} = \sin x$, $x \neq \frac{8\pi}{23}$

b. $\cos \frac{11\pi}{31} = \sin x$

c. $\tan \frac{\pi}{8} = \cot x$

9. Prove the following identity. Explain your thought process. **[T3] [C2]**

$$\cot^2 x = \frac{\cos^2 x}{1 - \cos^2 x}$$

10. Solve the following trigonometric equation for $0 \leq x \leq 2\pi$. Explain your process.
[A4] [C2]

$$\cos^2 x - 1 = 0$$

11. The depth of water in a harbour varies as a function of time. The maximum depth is 9 feet and the minimum depth is 1 foot. The depth can be modelled with a sinusoidal function that has a period of 12 hours. If the depth is 5 feet at 12 midnight, and is increasing,
- a. Create an algebraic model to predict the depth of the water as a function of time. Justify your reasoning. **[T4] [C2]**

b. The water must be at least 7 feet for Annie's fishing boat to safely navigate the harbour. She wants to enter the harbour during the afternoon.

i. Create a graph of this function using technology. **[T2]**

ii. What is the earliest time she can enter the harbour? **[T2]**

iii. How long can she safely stay in the harbour? **[T2]**