Name: ____ Date: ____________________________

BLM U2–2

Unit 2 Test

Multiple Choice

For #1 to #7, choose the best answer.

1. The point (–3, –4) lies on the terminal arm of an angle θ in standard position. Which is the value of cos (2θ)?

A $\frac{-7}{25}$ **B** $\frac{7}{25}$

C 1 **D** –1

2. If $\tan \theta = \frac{-5}{12}$ and sin θ > 0, which is the value of 2 sin θ cos θ?

A $\frac{120}{169}$ **B** $-\frac{60}{169}$

C $\frac{60}{169}$ **D** $-\frac{120}{169}$

3. Consider the functions $f(x) = -2 \cos x$ and $g(x) = 2 \cos x$. Which statement is true?

A The graphs of $f(x)$ and $g(x)$ have the same domain and range.

B The graphs of $f(x)$ and $g(x)$ have the same range but different domains.

C The graphs of $f(x)$ and $g(x)$ have the same amplitude but different ranges.

D The graphs of $f(x)$ and $g(x)$ have the same range but different amplitudes.

4. Which are the x-intercepts of the function $f(x) = 2 \sin [4(x + 15°)]$?

A 30° + 90°n, 75° + 90°n, $n \in$ I

B 30° + 180°n, 75° + 180°n, $n \in$ I

C 30° + 270°n, 75° + 270°n, $n \in$ I

D 30° + 360°n, 75° + 360°n, $n \in$ I

5. Which expression gives the minimum value of $y = A \sin (2x + \pi) - D$?

A $A + D$

B $A - D$

C $D - A$

D $A + 2D$

6. The graph of a sine function $f(x) = \sin (px + q)$ has a period of $\frac{7\pi}{4}$ and a phase shift of $\frac{\pi}{4}$ left. Which are the values of p and q?

A $p = \frac{8}{7}, q = \frac{\pi}{4}$ **B** $p = \frac{8}{7}, q = \frac{2\pi}{7}$

C $p = \frac{7}{8}, q = \frac{7\pi}{32}$ **D** $p = \frac{7}{8}, q = -\frac{\pi}{4}$

7. Which expression is equivalent to $\frac{\cos x}{1 + \sin x} + \tan x$?

A sin x

B cos x

C tan x

D sec x

Numerical Response

Complete the statements in #8 to #14.

8. The length of the arc that subtends an angle of 100° at the centre of a circle with radius 1.25 m is □, to the nearest hundredth of a metre.

9. The exact value of $\cos 750° + \sin \left(\frac{-17\pi}{6}\right)$ is □.

10. The general solution, in radians, to the equation $3 \csc^2 \theta = 4$ is □.

11. In one cycle of a sinusoidal function, a maximum occurs at (3, 10) and a minimum occurs at (8, –2). The equation of the function in the form $y = a \cos (b(x - c)) + d$ in radians is □.

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(continued)

12. The value of the expression
(csc A + tan A)(csc A − tan A) +
(sec A + cot A)(sec A − cot A) is ☐.

13. An expression of the non permissible values for the identity $\frac{\sin B}{1-\cos B}=\frac{1+\cos B}{\sin B}$ is ☐.

14. ☐ is an expression for $\frac{\tan 125° - \tan 65°}{1+\tan 125° \tan 65°}$ as a single trigonometric function. The exact value of the expression is ☐.

Written Response

15. Consider the function $f(\theta)=\cos\left(\frac{1}{2}\theta+2\right)$.

a) Determine the period and phase shift of the graph of the function.

b) What happens to the graph of $f(\theta)$ if θ is replaced with $\theta+\frac{\pi}{2}$?

c) Solve the equation $\cos\left(\frac{1}{2}x+2\right)=\frac{1}{2}$ for the domain $-\pi \le x \le 2\pi$. Express your answer to the nearest tenth.

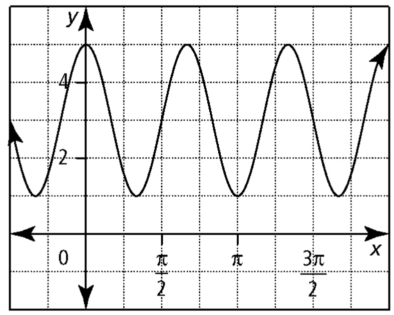
16. Consider the identity $\frac{1-\tan^2\theta}{1+\tan^2\theta}=\cos 2\theta$.

a) Verify the identity for $\theta = 30°$.

b) Prove the identity algebraically.

c) State the restrictions on θ.

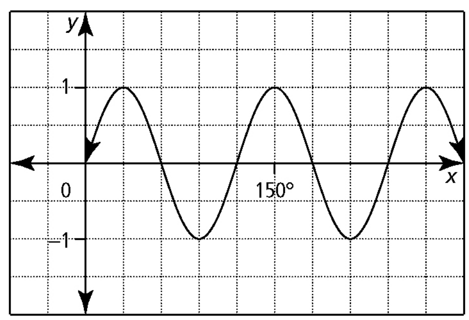
17. Consider the following graph.



a) State the amplitude and range of the graph. How do your answers relate to the parameters in the equation : $y = a \sin (b(x - c)) + d$?

b) State the equation of the function in the forms $y = a \sin (b(x - c)) + d$ and $y = a \cos (b(x - c)) + d$.

18. A partial graph of $y = \sin bx$, $b \in N$, is shown below:



a) Determine the value of b. Round your answer to the nearest whole number.

b) How does the graph change if the value of b changes to $\frac{1}{2}$? Explain.

19. Mikayla solved the trigonometric equation $2\sin^2 x - \sin x - 1 = 0$ by graphing the functions $y = 2\sin^2 x - \sin x - 1$. John solved the same equation by graphing the functions $y = 2\sin x + 1$ and $y = \sin x - 1$.

a) Can both methods lead to a correct solution? Explain.

b) Solve the equation algebraically over the domain $0° \le x \le 360°$