Practice Final

Math 373

Last Name	First Name	Date

This assignment is closed books, closed notes.

All your scratch work will be collected with the test and discarded.

All electronic devices besides trig-capable nongraphing calculators are prohibited.

Fully justify your answers and show all work
in order to maximize your partial credit.

Leave your answers with simplified radicands and fractions in lowest terms.

Do not round anything unless directed.

1 (6 points). The shown triangle ABC is equilateral, with AX perpendicular to BC, and ZX parallel to AC.
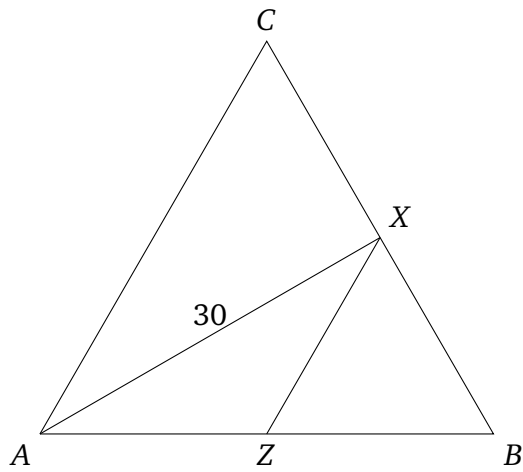
(a) Find the exact radian measure of the angle AZX.

(b) If $AX = 30$ inches, find the exact length of the segment ZX (do not round).

2 (6 points). Let θ be the angle in the standard position with the point $(8, -10)$ on its terminal side. Find the following in simplified form, do not round:

(a) $\cos(\theta) =$

(b) $\csc(\theta) =$

(c) $\tan(\theta) =$

3 (8 points). Find the exact values of the following, do not round.

(a) $\sin(-7\pi/4)$

(b) $\tan(-5\pi/6)$

(c) $\cot(2\pi/3)$

(d) $\sec(9\pi/4)$

4 (6 points). Apply trigonometric identities one by one to the left side of the equation until it turns into the right side.

$$(1 + \sin \psi)(1 + \sin(-\psi)) = \cos^2 \psi$$

5 (6 points). Apply trigonometric identities one by one to the left side of the equation until it turns into the right side.

$$\sin(2\theta) \csc\left(\frac{\pi}{2} - \theta\right) = 2\sin(\theta)$$

6 (6 points). Zara is standing 786 meters away from Burj Khalifa, and she measures the angle of elevation to the top of the building to be 46.49°. Find how tall is Burj Khalifa. Make a sketch and show all work by stating an equation and solving it. Round your answer to 3 significant digits.

7 (6 points). Solve the right triangle ABC with the right angle C, side $b = 19$, and side $c = 24$. Round your answers to 3 significant digits. State the answers on the left side, and show your work on the right.

Sketch the triangle:

$A =$

$B =$

$a =$

8 (8 points). The terminal side of the angle β contains the point $(21, -13)$ and
$$\frac{3\pi}{2} \leq \beta \leq 2\pi$$
For this question, round your answers to 3 significant digits.

    (a) Find the radian measure of the angle β.

    (b) Find the coordinates of the point where the terminal side of the angle β meets the unit circle.

9 (9 points). Sketch a plot of the function
$$y(x) = 2\sin(x/3) + 1$$
Plot at least one full period, and scale it so that 5 distinct points within that period are located at the grid intersections.

Period: Amplitude: Midline (vertical shift):

10 (10 points). Solve the equation. Round the answers to 3 significant digits.

$$\frac{10}{7}\sin(x) = \sin^2(x) + \cos^2(x)$$

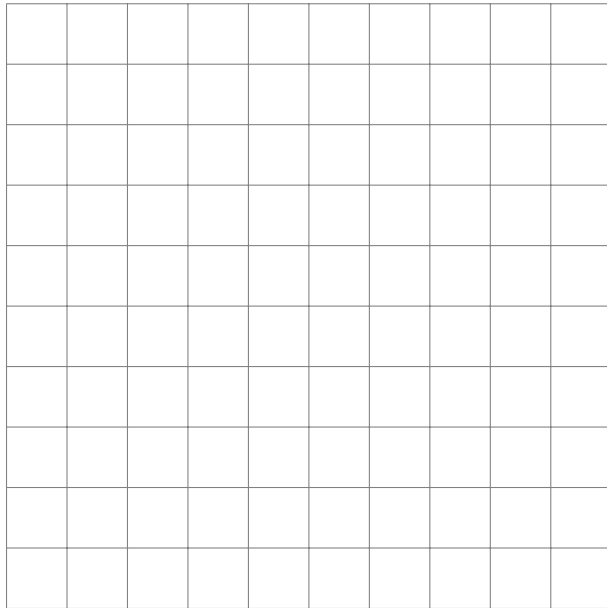Solution set:

All solution(s) in the interval $[0, 2\pi]$:

11 (10 points). Solve the equation. Do not round anything.

$$\cos(x) = 1 + 2\sec(x)$$

Solution set:

All solution(s) in the interval $[0, 2\pi]$:
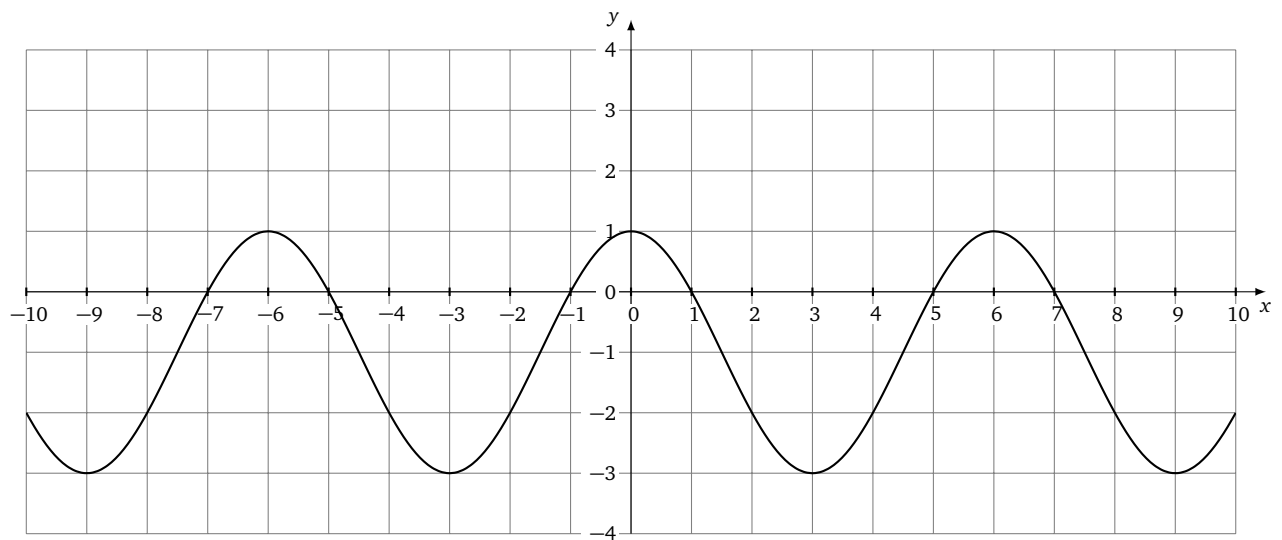
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12 (6 points). Plot $y = \cos^{-1}(x - 1)$

Domain:

Range:

13 (6 points). Find an expression for the shown trig function.

Period: Amplitude: Midline (vertical shift):

Expression:

14 (2 points). How many different triangles ABC can be constructed with $C = 30°$, $a = 200$ inches, and $c = 90$ inches?

15 (8 points). Solve the triangle with $B = 7\pi/11$, $A = \pi/5$, and $c = 20$ meters. Round the answers to 3 significant digits.

$C =$ $\qquad\qquad\qquad\qquad$ $a =$ $\qquad\qquad\qquad\qquad$ $b =$

16 (8 points). Solve the triangle with $a = 40$ km, $b = 35$ km, and $c = 58$ km. Round the answers to 3 significant digits.

$A =$ $B =$ $C =$