

Name: _____

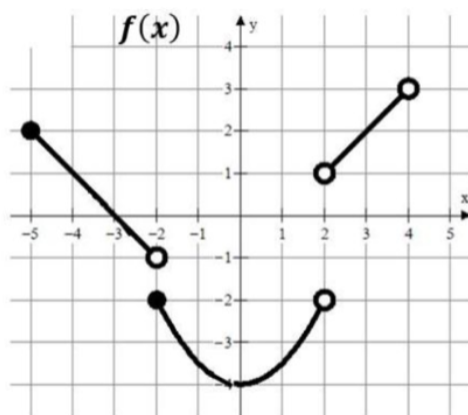
AP Calculus AB

Date: _____

Summer Assignment 2026

Instructions: Complete the following problems, showing all your work. You should not use a calculator for any of these problems. This assignment will be due during the first week of school.

Problem 1. Use the graph of $f(x)$ to find the following values.



$f(0) =$ _____

$f(-1) =$ _____

$f(2) =$ _____

$f(4) =$ _____

$f(-2) =$ _____

$f(3) =$ _____

$x =$ _____ when $f(x) = 2$

$x =$ _____ when $f(x) = -3$

Problem 2.

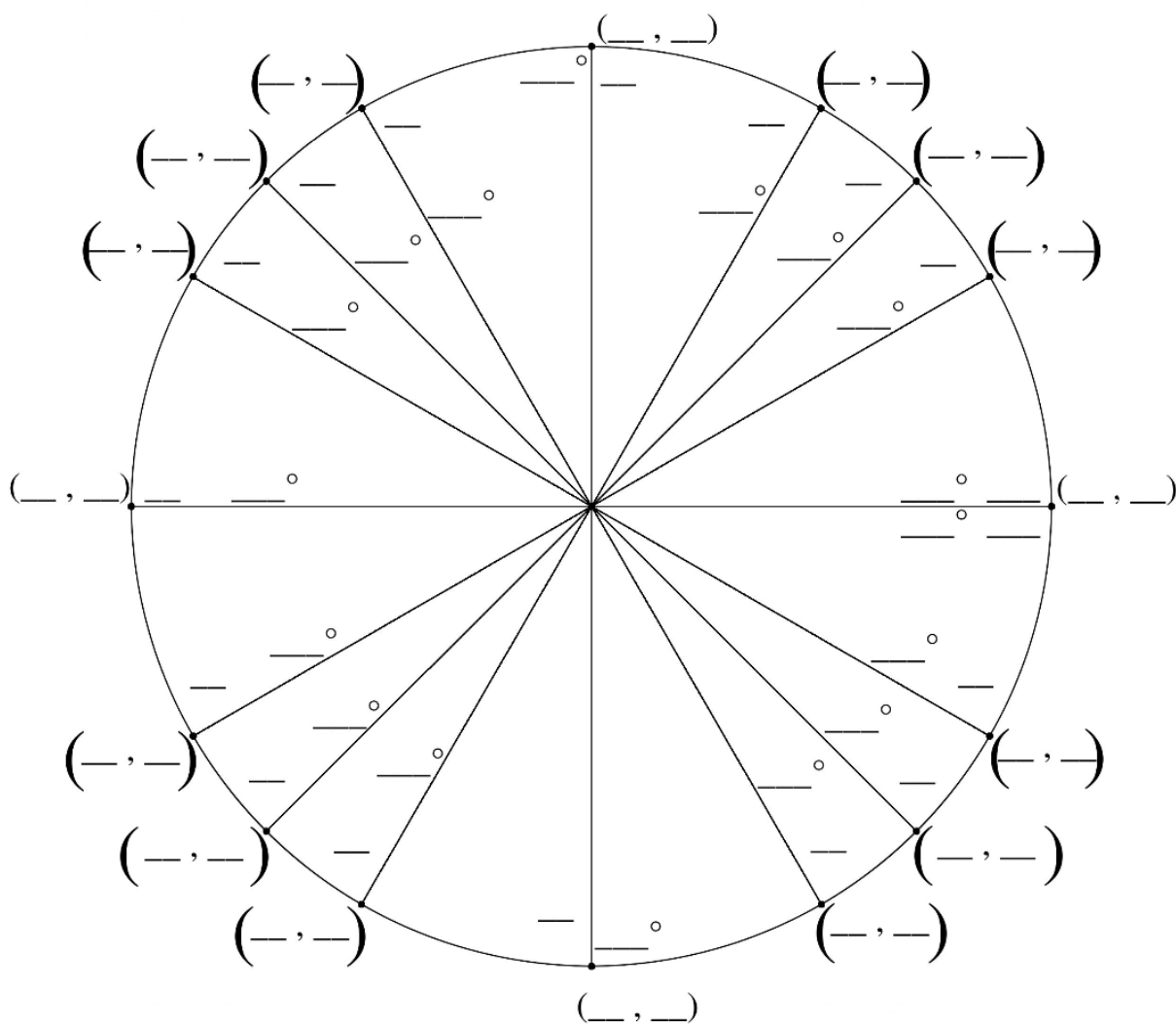
(a) Find the equation of the line through the points $(2, 8)$ and $(5, 1)$ in slope-intercept form.

(b) Find the equation of the line through the point $(10, 2)$ that is parallel to the line $y = 3x + 4$ in point-slope form.

(c) Find the equation of the line through the point $(10, 2)$ that is perpendicular to the line $y = 3x + 4$ in point-slope form.

(d) Find an equation of the line perpendicular to the y -axis that goes through the point $(3, 9)$.

Problem 3. Fill in all the information in the unit circle, and then use the unit circle to determine the values of the trigonometric functions below.



$$\sin 0 = \underline{\hspace{2cm}}$$

$$\sin \frac{3\pi}{4} = \underline{\hspace{2cm}}$$

$$\cos \frac{\pi}{3} = \underline{\hspace{2cm}}$$

$$\tan \frac{3\pi}{4} = \underline{\hspace{2cm}}$$

$$\csc \frac{3\pi}{2} = \underline{\hspace{2cm}}$$

$$\sec \frac{7\pi}{6} = \underline{\hspace{2cm}}$$

Problem 4. Sketch a graph of each of the following functions. Mark any important points, such as intercepts, vertices, maxima, minima, etc. Include at least two specific points on each graph (though some graphs should have more than two points marked). For periodic functions, sketch only one period.

(a) $f(x) = x$ (b) $f(x) = x^2$ (c) $f(x) = x^3$ (d) $f(x) = |x|$ (e) $f(x) = \frac{1}{x}$ (f) $f(x) = e^x$
(g) $f(x) = \ln x$ (h) $f(x) = \sqrt{x}$ (i) $f(x) = \sin x$ (j) $f(x) = \cos x$ (k) $f(x) = \tan x$

Problem 5. Solve the following equations for x .

(a) $x^2 - 7x = -12$

(b) $\frac{3x^2 + 3}{x} = x + 7$

(c) $3x^2 + 2x - 7 = 0$

Problem 6. Solve the following inequalities. Write your answers in interval notation and in set notation.

(a) $x^3 - x > 4x^2 - 4$

(b) $\frac{x^2 - 5x + 6}{x^2 - 9} \leq 0$

Problem 7. Rewrite the following expressions using rational exponents. [Example: $\frac{1}{\sqrt{x^5}} = x^{-\frac{5}{2}}$.]

(a) $\sqrt[3]{y^6} = \underline{\hspace{2cm}}$

(b) $\sqrt{(x+1)^3} = \underline{\hspace{2cm}}$

(c) $(\sqrt[3]{3a})^4 = \underline{\hspace{2cm}}$

(d) $(\sqrt[4]{m})^3 = \underline{\hspace{2cm}}$

(e) $\frac{1}{(\sqrt{3k})^5} = \underline{\hspace{2cm}}$

(f) $\frac{1}{\sqrt{x+1}} = \underline{\hspace{2cm}}$

Problem 8. Use the laws of exponents to simplify each expression. Give your answer using only positive exponents. You can assume that all the variables are nonzero.

(a) $\frac{x^0 y^{-3}}{2^{-5} z^{-12}} = \underline{\hspace{2cm}}$

(b) $\frac{z^4 \cdot z^9}{z^{11}} = \underline{\hspace{2cm}}$

(c) $\left(\frac{y^2}{x^9}\right)^4 = \underline{\hspace{2cm}}$

(d) $(2x^3 y z^4)^6 = \underline{\hspace{2cm}}$

(e) $(a^{1/3} a^{1/4})^{12} = \underline{\hspace{2cm}}$

(f) $\left(\frac{m^{-1/4}}{n^{-1/2}}\right)^{-4} = \underline{\hspace{2cm}}$

Problem 9. Write each of the following expressions in radical form and with positive exponents.

(a) $x^{-\frac{1}{2}} - x^{-\frac{3}{2}} =$ _____

(b) $2x^{-2} + \frac{3}{2}x^{-1} =$ _____

(c) $x^{-2} + x^{\frac{1}{2}} =$ _____

Problem 10. Solve each of the following equations.

(a) $e^x + 1 = 2$

(b) $e^{3x} + 4 = 9$

(c) $\ln(3x) = 0$

(d) $\ln(6x + 1) = 4$

Problem 11. Using the following graph, determine the domain, range, vertical asymptotes, and horizontal asymptotes of the function.

