AP Calculus AB **Ch. P Test Review Session**

1. For each of the following, find $f(-x)$ and use it to determine if the function is odd, even, or neither:

a. $y = \cos x \sin x$ | b. $y = x + x^3$ | c. $y = x + x^2$

2. Find the equation of the line that passes through the x-intercept of $3x + y^2 = 36$ and is perpendicular to the line $2x + 8y = 7$.

3. Graph and find domain/range of piecewise function: $\begin{cases} y = 4 - x^2, & x < 1 \\ \left(\frac{3}{2}\right)x + \frac{3}{2}, & 1 \le x \le 3 \\ x + 3, & x > 3 \end{cases}$

4. Write piecewise function for absolute value function $y = -|2x - 3| + 1$

Solve the following:

5. $\cos x = \cos 2x \quad 0 \le x < 2\pi$

6. $3\log_b 2 = \log_b x + \log_b (x - 7)$

7. Solve $\frac{x-1}{x+5} \le 5$

AP Calculus AB **Ch. P Test Review**

Solution Key

1. For each of the following, find $f(-x)$ and use it to determine if the function is odd, even, or neither:

a. $y = \cos x \sin x$

$f(-x) = \cos(-x)\sin(-x)$

$= \cos x \cdot -\sin x = -\cos x \sin x$

$-f(x) = -\cos x \sin x$

Since $f(-x) = -f(x)$, this is an odd function.

b. $y = x + x^3$

$f(-x) = (-x) + (-x)^3$

$= -x - x^3$

$-f(x) = -(x + x^3) = -x - x^3$

Since $f(-x) = -f(x)$, odd function

c. $y = x + x^2$

$f(-x) = (-x) + (-x)^2 = -x + x^2$

$-f(x) = -(x + x^2) = -x - x^2$

Since $f(-x) \neq f(x)$ nor $f(-x) \neq -f(x)$, this is neither odd nor even function.

2. Find the equation of the line that passes through the x-intercept of $3x + y^2 = 36$ and is perpendicular to the line $2x + 8y = 7$.

$3x + y^2 = 36$

*x-int: set $y = 0$

$3x + 0 = 36$

$x = \frac{36}{3} = 12$

$(12, 0)$

$2x + 8y = 7$

$8y = -2x + 7$

$y = -\frac{2}{8}x + \frac{7}{8}$

$m_1 = -\frac{1}{4}$

$m_2 = 4$ (perpendicular)

point: $(12, 0)$

slope: $m = 4$

$y - y_1 = m(x - x_1)$

$y - 0 = 4(x - 12)$

$\boxed{y = 4(x - 12)}$

3. Graph and find domain/range of piecewise function:

$$\begin{cases} y = 4 - x^2, & x < 1 \\ \left(\frac{3}{2}\right)x + \frac{3}{2}, & 1 \leq x \leq 3 \\ x + 3, & x > 3 \end{cases}$$

$y = 4 - x^2$

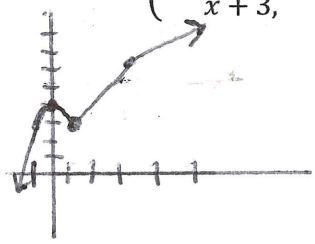
x	y
1	3
0	4
-1	3

$y = \frac{3}{2}x + \frac{3}{2}$

x	y
1	3
2	4.5
3	6

$y = x + 3$

x	y
3	6
4	7
5	8



$\boxed{\text{Domain: } (-\infty, \infty)}$

$\boxed{\text{Range: } (-\infty, \infty)}$

4. Write piecewise function for absolute value function $y = -|2x - 3| + 1$

$$y = \begin{cases} -(2x-3)+1, & x \geq 3/2 \\ 2x - 3 + 1, & x < 3/2 \end{cases}$$

$$\boxed{y = \begin{cases} -2x + 4, & x \geq 3/2 \\ 2x - 2, & x < 3/2 \end{cases}}$$

Solve the following:

$0 \leq x < 2\pi$

5. $\cos x = \cos 2x$

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

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

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

$(2\cos x + 1)(\cos x - 1) = 0$

$\cos x = -\frac{1}{2}, \quad \cos x = 1$

$\boxed{x = \frac{2\pi}{3}, \frac{4\pi}{3}, 0}$

6. $3\log_b 2 = \log_b x + \log_b (x - 7)$

$\log_b 2^3 = \log_b x(x-7)$

$2^3 = x^2 - 7x$

$x^2 - 7x - 8 = 0$

$(x - 8)(x + 1) = 0$

$x = 8, \cancel{x = -1}$

$\boxed{x = 8}$

7. Solve $\frac{x-1}{x+5} \leq 5$

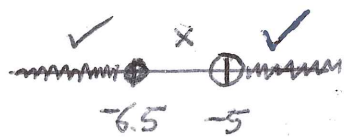
$\frac{x-1}{x+5} = 5$

$x - 1 = 5(x + 5)$

$x - 1 = 5x + 25$

$-26 = 4x$

$-6.5 = x$



$\boxed{(-\infty, -6.5] \cup (-5, \infty)}$