Name: _____ Precalc Review 2025 No Calculator

1. The following function has vertical asymptotes at which points?

$$f(x) = \frac{(x-3)(x^2-1)(x-2)(x+2)(x+5)}{(x+1)(x-1)(x^2-9)(x^2-4)(x+2)}$$

a) -3 and -2 b) -2 c) -3 d) -5, -3, and -2

2. Given $g(x)$ and a graph of $f(x)$, find $g(0) - g'(0)$. Assume $A = 4$ and $B = 8$.

$$g(x) = \int_{12}^{3x} f(x)dx$$

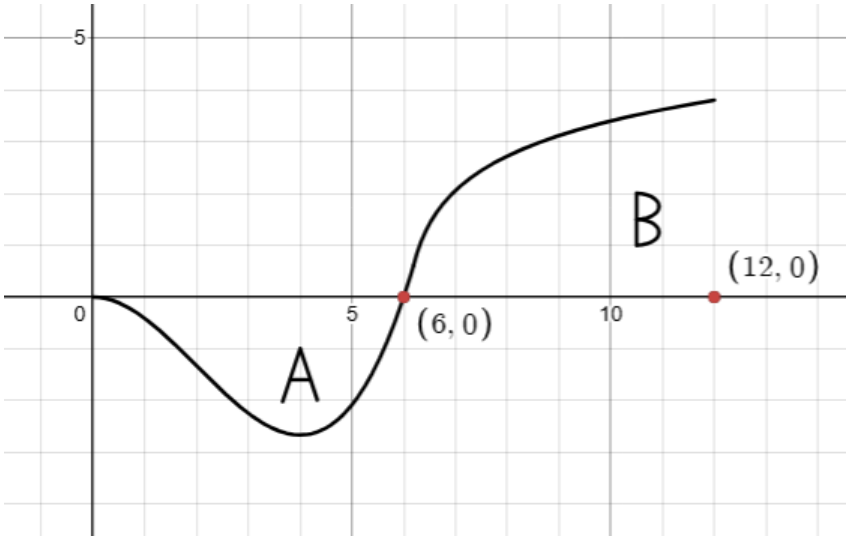

Figure 1: $f(x)$

3. Find $\frac{d}{dx}(2x(sin^2(\sqrt{x}))) =$

4. Find

$$\frac{5x^2-2}{3x+1}\frac{d}{dx} =$$

a) $\frac{-30x^2+10x+6}{(3x+1)^2}$ b) $\frac{10x}{3}$ c) $\frac{30x^2-10x-6}{(3x+1)^2}$ d) $\frac{4x^2-5x+6}{(3x+1)^2}$

5. $\int_2^5 3xe^{x^2}dx =$

6. Find the area between $f(x)$ and $g(x)$, given $\int f(x)dx = \frac{2(\sqrt{x^3})}{3}$ and $g(x) = x^3$.

7. Divide:
$$\frac{3x^5 + x^2 + 4x^3 - 1}{x + 1} =$$

8. Find the relative minimum and maximum of $3x^3 - 2x^2$ on the interval [0,2/3].

9. The velocity of a particle is given by $v(t) = 2t^2 + 3t + 4$.
   a) Find the position of the particle at $t = 2$, assuming that the position at time 0 $p(0) = 2$.
   b) Is the particle speeding up or slowing down at time $t = 2$?

10. A bird is perched on a 40 foot flag pole. A camera filming the bird moves at a rate of $15m/s$ away from the base of the flag pole. How fast is the camera moving away from the bird?

Calculator

1. If $\frac{dy}{dt} = 5e^{-0.09(t^2-3)^3}$, assuming on initial y-value at $t = 1$ is -3, calculate the value of y at $t = 6$.

2. For the function $f(x) = x^5 - x^2 + 1 + e^{2x^2} + ln(2x + 2)$, for how many values on the interval $[0, 2.039]$ is the instantaneous rate of change of f equal to the average rate of change on the closed interval?

3. Let g e a function with a first derivative $g' = \sqrt{x^4 + x^2 + x}$for $x > 0$, if $g(3.59) = -2$, what is the value of $g(3.6)$?

4. Find $\frac{dy}{dx}$ at point (2, 8) if $x^2 + y^{1/3} + y^2 = 2y^{1/3} - 4x$.

5. Using the graph, do a trapezoid approximation.

x	0	1	3	7	10
$f(x)$	7	17.5	14.5	52.5	102