

AP Calculus BC

Name: _____ Score: _____

1. A tap runs at 3 L/min for 4 min. The area under the rate graph (accumulated volume) is...

2. For $f(x) = x^2$ on $[0, 2]$ with 2 right rectangles (width 1): heights $f(1) = 1$, $f(2) = 4$. Find the right Riemann sum.

3. For n equal strips on $[a, b]$, the width Δx is...
- ☐ $\frac{b-a}{n}$
- ☐ $b-a$
- ☐ $\frac{n}{b-a}$
- ☐ $n(b-a)$
4. By FTC Part 1, $\frac{d}{dx} \int_a^x f(t) dt =$
- ☐ $F(x) - F(a)$
- ☐ $f(x)$
- ☐ $f'(x)$
- ☐ $f(a)$
5. For $g(x) = \int_a^x f(t) dt$, g is increasing exactly where...
- ☐ $f(x) > 0$
- ☐ $f(x) < 0$
- ☐ $f'(x) > 0$
- ☐ $g(x) > 0$
6. Given $\int_0^4 f dx = 10$ and $\int_0^4 g dx = 3$, find $\int_0^4 (2f - g) dx$.

7. FTC Part 2 says $\int_a^b f dx =$
- ☐ $f'(b) - f'(a)$
- ☐ $F(b) - F(a)$ where $F' = f$
- ☐ $F(a) - F(b)$
- ☐ $f(b) - f(a)$

8. What is $\int x^3 dx$?

☐ $3x^2 + C$

☐ $\frac{x^4}{4} + C$

☐ $x^4 + C$

☐ $\frac{x^2}{2} + C$

9. An integral is improper when...

☐ a limit of integration is infinite

☐ the integrand is unbounded on the interval

☐ the integrand is a polynomial

☐ the interval is finite and the function bounded

Tick every correct option.

10. Where a rate graph dips below the axis, that area subtracts from the net accumulated change.

☐ True ☐ False

AP Calculus BC1. **12**Rectangle area = $3 \times 4 = 12$ L.2. **5** $1 \cdot 1 + 4 \cdot 1 = 5$.3. $\frac{b-a}{n}$

The interval width divided by the number of strips.

4. $f(x)$ The derivative of the accumulation function is the integrand $f(x)$.5. $f(x) > 0$ $g' = f$, so g increases where $f > 0$.6. **17** $2(10) - 3 = 17$.7. $F(b) - F(a)$ **where** $F' = f$

Evaluate an antiderivative at upper minus lower limit.

8. $\frac{x^4}{4} + C$ Add one to the exponent, divide by it: $\frac{x^4}{4} + C$.9. **a limit of integration is infinite; the integrand is unbounded on the interval**Infinite limit or unbounded integrand $\rightarrow$ improper.10. **True**

Below-axis area is negative (signed area).