

AP Calculus BC

Name: _____ Score: _____

1. The average value of f on $[a, b]$ is...

- ☐ $\int_a^b f \, dx$
- ☐ $(b - a) \int_a^b f \, dx$
- ☐ $\frac{1}{b - a} \int_a^b f \, dx$
- ☐ $f(b) - f(a)$

2. To recover position from velocity you...

- ☐ differentiate velocity
- ☐ square velocity
- ☐ take the reciprocal
- ☐ integrate velocity

3. The applied accumulation relationship is: final value =...

- ☐ initial value $+ \int_a^b R \, dt$
- ☐ initial value $\times \int_a^b R \, dt$
- ☐ $R(b) - R(a)$
- ☐ $\int_a^b R \, dt$

4. With horizontal slices, the area is $\int_c^d (\quad) \, dy$ where...

- ☐ top minus bottom
- ☐ leftmost minus rightmost
- ☐ the product of the curves
- ☐ rightmost minus leftmost

5. Where do $y = x^3$ and $y = x$ cross?

- ☐ $x = 0$
- ☐ $x = -1$
- ☐ $x = 1$
- ☐ $x = 2$

*Tick every correct option.*6. The volume of a solid with cross-sectional area $A(x)$ is...

☐ $\int_a^b A(x) \, dx$

☐ $\pi \int_a^b A(x) \, dx$

☐ $A(b) - A(a)$

☐ $\int_a^b \sqrt{A(x)} \, dx$

7. In the disc method, the radius R is the _____ from the curve to the axis of revolution.

8. When revolving about $y = -1$, you can still use radius $R = f(x)$.

☐ True ☐ False

9. The washer integrand $R^2 - r^2$ is the same as $(R - r)^2$.

☐ True ☐ False

10. Evaluate $\int_0^3 \sqrt{1+x} \, dx$ (a decimal).

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1. $\frac{1}{b-a} \int_a^b f \, dx$

Total divided by width.

2. **integrate velocity**

Position = initial + $\int v \, dt$.

3. **initial value** + $\int_a^b R \, dt$

Final = initial + accumulated change.

4. **rightmost minus leftmost**

Horizontal strips: right curve minus left curve.

5. $x = 0$; $x = -1$; $x = 1$

$$x^3 = x \Rightarrow x(x-1)(x+1) = 0.$$

6. $\int_a^b A(x) \, dx$

Add up slabs $A(x) \, dx$.

7. **distance**

Radius = distance to the axis.

8. **False**

You must shift: $R = f(x) + 1$.

9. **False**

Square each radius first; $(R-r)^2$ is wrong.

10. **4.667**

$$\frac{2}{3}(8-1) = \frac{14}{3} \approx 4.667.$$