

AP Calculus BC

Integral as Net Change

1) B

2) C

3) E

4) D

5) G

6) A

7) F

1) a) $\int_0^8 w(t) dt$

b) $\int_2^4 [w(t) - s(t)] dt$

c) $55 + \int_0^8 [w(t) - s(t)] dt$

d) $\int_4^8 s(t) dt$

2) $Q(t) = 200(3-t)^2$

a) $Q'(t) = 400(3-t)$

$Q'(10) = 400(-7) = -2800 \text{ gal/min}$

b) $\frac{Q(10) - Q(0)}{10 - 0} = \frac{200(-7)^2 - 200(3-0)^2}{10}$

3) $R(t) = 9 \sin(\sqrt{t+1})$

a) $R(4) = 7.081 \text{ gal/min}$

b) $W(t) = 81.637 - \int_0^t R(x) dx$

c) $W(6) = 36.605 \text{ gal}$

4) $R(t) = 2\sqrt{t+5}t^3$

a) $W(t) = \int_0^t R(x) dx$

b) $W(10) = 568.109 \text{ gal}$

5) $\int_0^6 R(t) dt = 31.815$

6) a) $E(3) = 135 \text{ gal/hour}$

b) $\int_0^4 E(t) dt = 3981.022 \text{ gal}$

c) $\int_0^3 [E(t) - 645] dt = 1417.193 \text{ gal}$