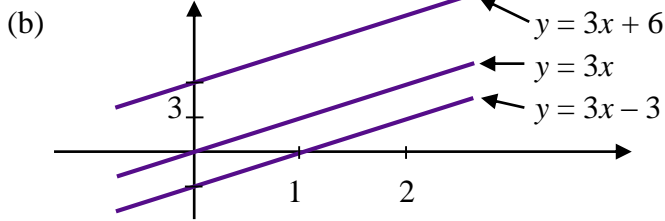


Activity 1.4 – Integrals of Constant Functions

1. (a) $\int 3 dx = 3x + C$



(c) $\int_{-1}^4 3 dx = 3x \Big|_{-1}^4 = 3(4) - 3(-1) = 15$



2. (a) $\int 1 dx = x + C$

(b) $\int 5.4 dt = 5.4t + C$

(c) $\int -62 du = -62u + C$

(d) $\int_2^5 -1 dx = (-x) \Big|_2^5 = (-5) - (-2) = -3$

(e) $\int_0^3 4.32 dx = (4.32x) \Big|_0^3 = 4.32(3) - 4.32(0) = 12.96$

(f) $\int_{-3}^2 -0.02 dv = (-0.02v) \Big|_{-3}^2 = (-0.02(2)) - (-0.02(-3)) = -0.1$

3. (a) $\int v(t) dt = \int -45 dt = -45t + C$ miles from Bill's at t hours

(b) $\int_0^2 v(t) dt = \int_0^2 -45 dt = (-45t) \Big|_0^2 = (-45(2)) - (-45(0)) = -90$

Over the first 2 hours, Bill and Sally traveled a net distance of 90 miles westward.

(c) No, we need to know the distance from Bill's at the start of the trip.

(d) Since $s(t) = -45t + C$ and $s(0) = 200$, $s(0) = C = 200$. Therefore, the distance function is $s(t) = -45t + 200$ and $s(2) = -45 \cdot 2 + 200 = 110$ miles east of Bill's house.

(e) Part (b) is the net distance traveled, but Part (d) is the distance from Bill's.

4. $\int_{-1}^0 2 dx = (2x) \Big|_{-1}^0 = 2(0) - 2(-1) = 2$

5. $\int_{-1}^1 (2x - 8) dx = -[\text{area of trapezoid, or area of rectangle and triangle}] = -16$

6. If $f'(x) = 2$, then $f(x) = 2x + C$ and $f(1) = 2 + C = 7$. Hence, $C = 5$ and