

Activity 1.5 – Rectilinear Motion

1. Position $s(t) = 35 - t$ feet
 Velocity $v(t) = -1$ ft/s
 Speed $|v(t)| = 1$ ft/s
 Acceleration $a(t) = 0$ ft/s²

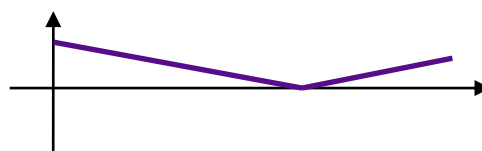
- Position $s(5) = 30$ ft
 Velocity $v(5) = -1$ ft/s
 Speed $|v(5)| = 1$ ft/s
 Acceleration $a(5) = 0$ ft/s²

1. (a) $s(t) = -20t + 100$ m

(b) Setting $-20t + 100 = 0$ yields $t = 5$ s.

(c) $\int_{9.5}^{12.5} -20dt = (-20t)|_{9.5}^{12.5} = (-20(12.5)) - (-20(9.5)) = -60$ m

(d) $\int_{9.5}^{12.5} 20dt = (20t)|_{9.5}^{12.5} = 20(12.5) - 20(9.5) = 60$ m



(b) Setting $10 - 4t = 0$ yields $t = 10/4 = 2.5$ s.

(c) $\int_0^4 (10 - 4t)dt = \frac{1}{2}(2.5)(10) - \frac{1}{2}(1.5)(6) = 8$ m

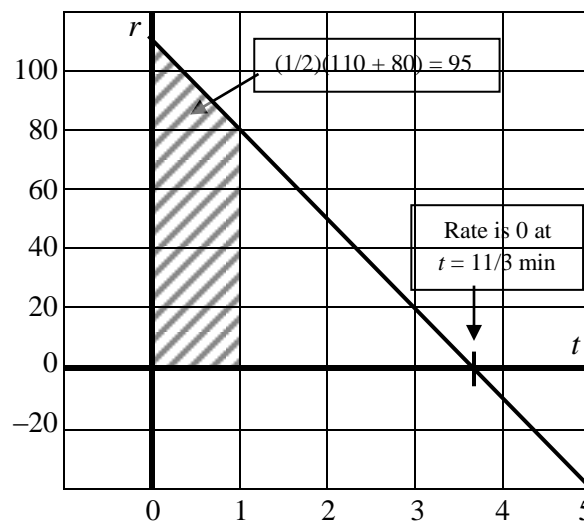
(d) $\int_0^4 |10 - 4t| dt = \frac{1}{2}(2.5)(10) + \frac{1}{2}(1.5)(6) = 17$ m

4. (a) Linear because for each unit change in t , there is a constant change of -30 in r . The slope is -30 and the initial value (y-int.) is 110 . Therefore, $r(t) = -30t + 110$ gal/min.

(b) Setting $-30t + 110 = 0$ yields $t = 11/3$ min.

(c)

t (min)	$r(t)$ (gal/min)	$V(t)$ (gal)
0	110	500
1	80	595
2	50	660
3	20	695
4	-10	700
5	-40	675



(e) Quadratic

(f) $V(t) = -15t^2 + 110t + 500$ gallons, where t is minutes after the malfunction