

- 1) $f(x)$ is inc on $(-2, 1) \cup (1, 3)$ b/c $f'(x) > 0$.
- 2) $f(x)$ has a rel. max @ $x = 3$ b/c $f'(x)$ Δ s signs from $+$ to $-$.
- 3) $f(x)$ is concave down on $(-1, 1) \cup (2, 4)$ b/c $f''(x) < 0$ or $f'(x)$ is decreasing.
- 4) $f(x)$ has a P.o.I @ $x = -1, 1, 2, 4$ b/c $f''(x)$ Δ s signs.

$$\begin{aligned}
 5) \int_{-4}^{-1} f'(x) dx &= f(x) + C \Big|_{-4}^{-1} \\
 &= f(-1) - f(-4) \\
 &= -1.5 - 0.75 \\
 &= -2.25
 \end{aligned}$$

- 6) The particle is moving to the right on $(0, 4) \cup (6, 7)$
b/c $v(t) > 0$.

$$\begin{aligned}
 7) x(6) &= 2 + \int_0^6 v(t) dt \\
 &= 2 + \frac{1}{2}(4)(4) - 1 \\
 &= 9
 \end{aligned}$$

$$\begin{aligned}
 8) v(3) &= 2 > 0 \\
 a(3) &= -2 < 0
 \end{aligned}
 \left. \vphantom{\begin{aligned} v(3) &= 2 > 0 \\ a(3) &= -2 < 0 \end{aligned}} \right\} \begin{array}{l} \text{Since } v(3) \neq a(3) \\ \text{are opposite signs} \\ \text{the particle is slowing} \\ \text{down} \end{array}$$

$$9) \int_0^7 |v(t)| dt = 9.5$$

$$11) a) \int_8^{21} (95 + 0.1t^2 - t) dt = 1338.133$$

1338 bicycles

$$b) R(10) = 95 \text{ bicycles/day}$$

$$\begin{aligned}
 10) x(4) &= 1 + \int_0^4 (t^2 + 3t + 2) dt \\
 &= 1 + \left(\frac{1}{3}t^3 + \frac{3}{2}t^2 + 2t \right) \Big|_0^4 \\
 &= 1 + \frac{64}{3} + 24 + 8 \\
 &= \frac{163}{3}
 \end{aligned}$$