

#3

$$(a) \frac{P(10) - P(0)}{10 - 0} =$$

inner function

$$(b) \frac{dP}{dt} = 100 e^{0.25t} (0.25)$$

$$(c) \left. \frac{dP}{dt} \right|_{t=10} = 100 e^{2.5} (0.25) = \frac{\text{lbs dens}}{\text{day}}$$

#4

$$(a) \frac{C(105) - C(100)}{105 - 100} = \$20.25$$

$$\frac{C(101) - C(100)}{101 - 100} = \$20.05$$

$$(b) \frac{dC}{dn} = 0.1n + 10$$

$$(c) \left. \frac{dC}{dn} \right|_{n=100} = 0.1(100) + 10 = \$20$$

70 #2

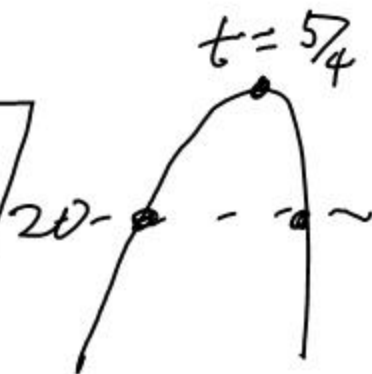
$$(c) -16t^2 + 40t + 4 = 20$$

$$\frac{-16t^2 + 40t - 16}{-8} = \frac{0}{-8}$$

$$2t^2 - 5t + 2 = 0$$

$$(2t - 1)(t - 2) = 0$$

$$t = \frac{1}{2} \text{ or } t = 2$$



$$(d) \frac{ds}{dt} = v(t) = -32t + 40$$

$$v(0) = 40 \text{ ft/sec}$$

$$-32t + 40 = 0$$

$$t = \frac{40}{32} = \frac{5}{4} \text{ sec}$$

$$\text{max height} = s\left(\frac{5}{4}\right) =$$

7P #1 $s(t) = 2t^4 - 6t^2, t \geq 0$

(a) $v(t) = \frac{ds}{dt} = 8t^3 - 12t$

$a(t) = \frac{dv}{dt} = 24t^2 - 12$

Memorize: $v(t) = \frac{ds}{dt}$
 $a(t) = \frac{dv}{dt}$

(b) $a(2) = 24(2)^2 - 12 = 84 \text{ cm/s}^2$

(c) $v(t) = 8t^3 - 12t = 0$

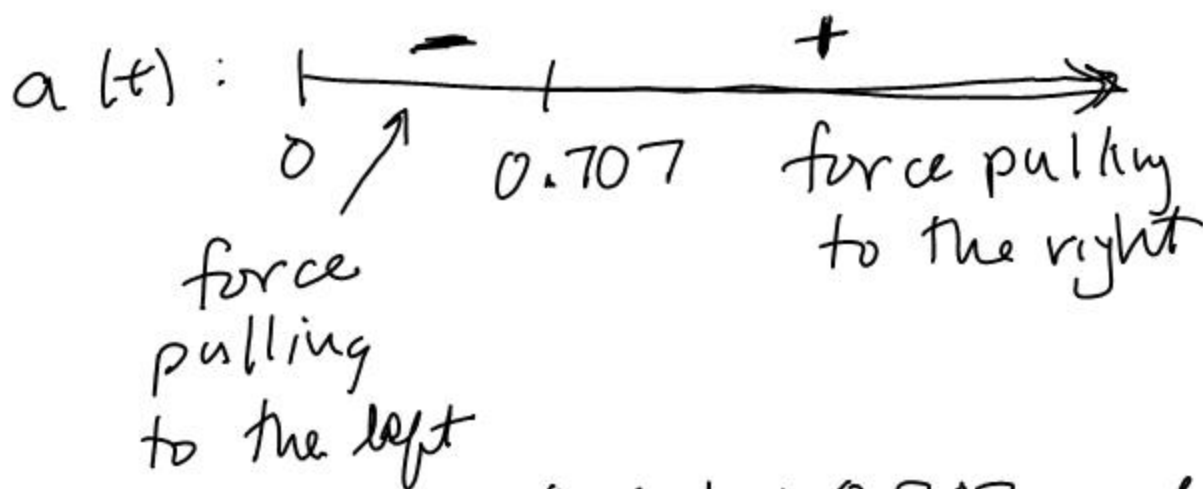
$4t(2t^2 - 3) = 0$

$t = 0$ or $t = \sqrt{\frac{3}{2}} \approx 1.22 \text{ s}$

$a(t) = 24t^2 - 12 = 0$

$t = \sqrt{\frac{1}{2}} \approx 0.707$

$v(t)$: 

$a(t)$: 

speeding up: $0 \leq t < 0.707$ and $t > 1.22$

slowing down: $0.707 < t < 1.22$

Memorize: A particle is speeding up when $v(t)$ and $a(t)$ have the same sign

7R you sleeping?

#4 $f(x) = x^4 - 2x^2$



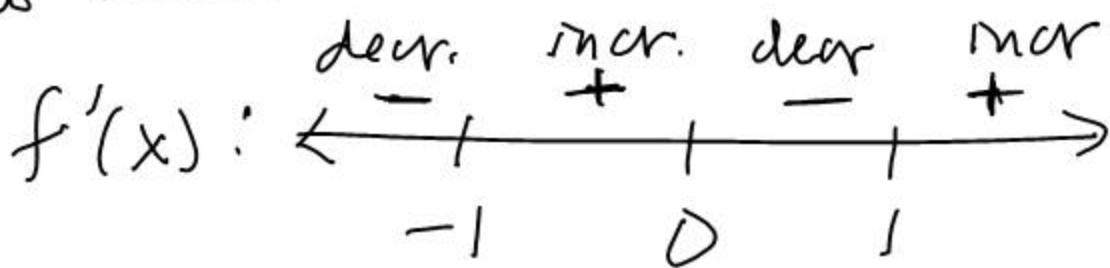
$$f'(x) = 4x^3 - 4x = 0$$

$$4x(x^2 - 1) = 0$$

$$\rightarrow 4x(x-1)(x+1) = 0$$

Critical values

$$x = 0 \text{ or } x = 1 \text{ or } x = -1$$



minimum at $x = -1$ and $x = 1$

max at $x = 0$

HW 7P # 2-4

7R # 1, 3, 6
