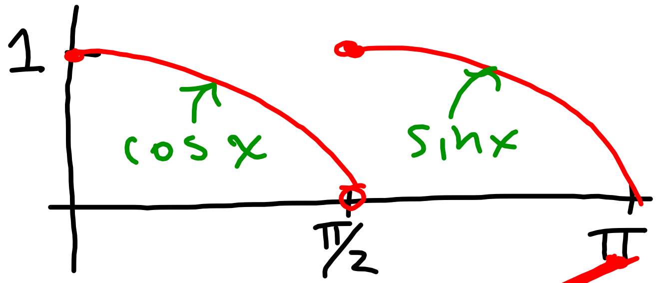
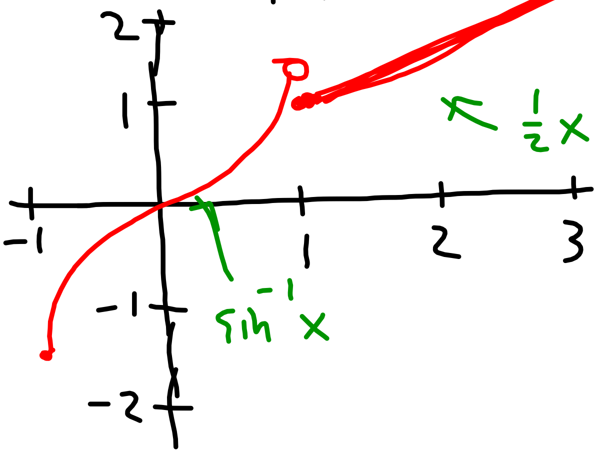
p. 202

#7



#8



#2 $c = \frac{8}{27}$

#6 $\frac{1}{c-1} = \frac{\ln 3 - \ln 1}{4-2}$

$c \approx 2.820$

#10 (a) $y = \frac{1}{\sqrt{2}}x - \frac{1}{\sqrt{2}}$

(b) $y = \frac{1}{\sqrt{2}}x - \frac{1}{2\sqrt{2}}$

#10 $f(x)=\sqrt{x-1}$ $[1,3]$

(a) secant line

$$m=\frac{f(3)-f(1)}{3-1}$$

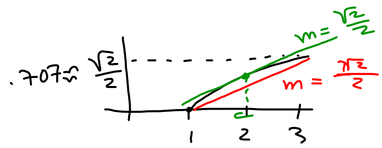
$$=\frac{\sqrt{2}-0}{2}=\frac{\sqrt{2}}{2}$$

$$y=\sqrt{2}+\frac{\sqrt{2}}{2}(x-1)$$

$$=\sqrt{2}+\frac{\sqrt{2}}{2}x-\frac{\sqrt{2}}{2}$$

$$=\frac{\sqrt{2}}{2}+\frac{\sqrt{2}}{2}x$$

$$=\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{2}}x$$



(b) $f(x)=(x-1)^{1/2}$

$$f'(x)=\frac{1}{2}(x-1)^{-1/2}$$

$$=\frac{1}{2\sqrt{x-1}}$$

MVT: @ $x=c$, $f'(c)=\frac{\sqrt{2}}{2}$)
slope of secant line
(avg. rate of change)

$$\frac{1}{2\sqrt{c-1}}=\frac{\sqrt{2}}{2}$$

$$\cancel{2}\sqrt{2}\sqrt{c-1}=\cancel{2}$$

$$c=\frac{3}{2}=x_1$$

$$f\left(\frac{3}{2}\right)=\sqrt{\frac{3}{2}-1}$$

$$=\sqrt{\frac{1}{2}}=\frac{1}{\sqrt{2}}=y_1$$

tan line: $y=\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{2}}\left(x-\frac{3}{2}\right)$

$$y=\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{2}}x-\frac{3}{2\sqrt{2}}$$

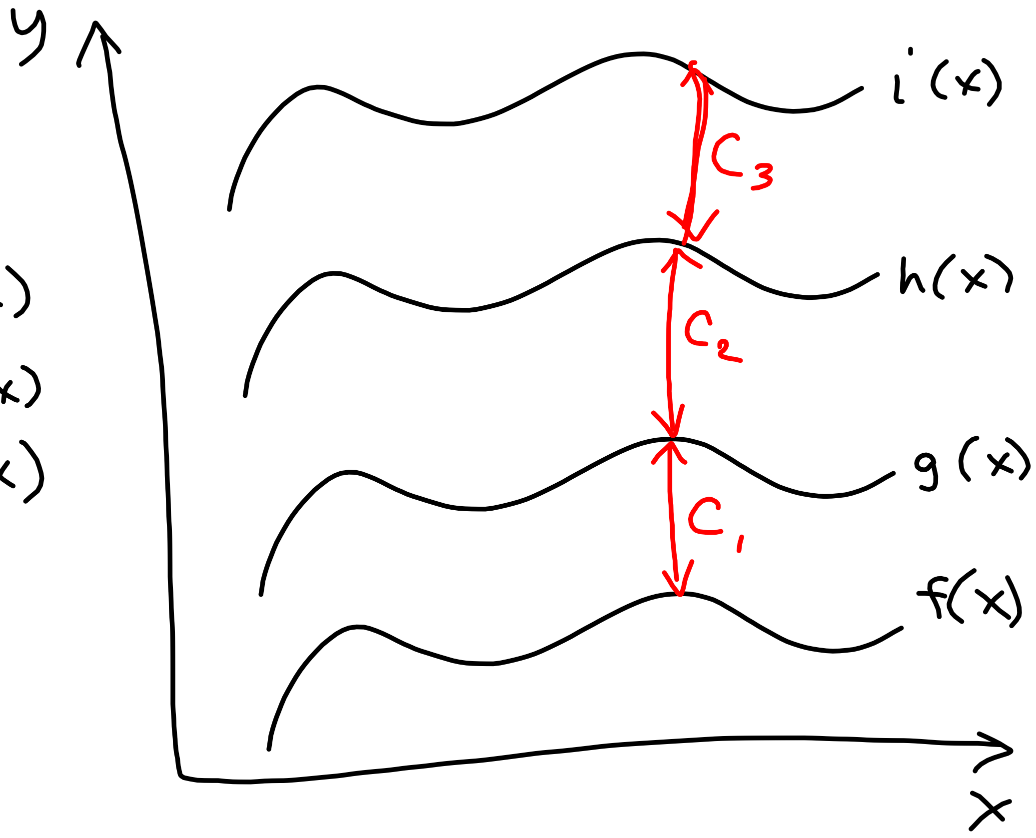
$$y=-\frac{1}{2\sqrt{2}}+\frac{1}{\sqrt{2}}x$$

If $f'(x) = 0$ on an interval, f is constant

i.e. $f(x) = C$ on the interval

If two functions have same derivative, the 2 fcns differ by a constant, C (which may be 0)

$f'(x)$
$= g'(x)$
$= h'(x)$
$= i'(x)$



Suppose: $a(t) = -9.8$

$v(t) = -9.8t + C$

to find $v(t)$, we need a $(t, v(t))$ pair

suppose: @ $t=0$, $v=-5$

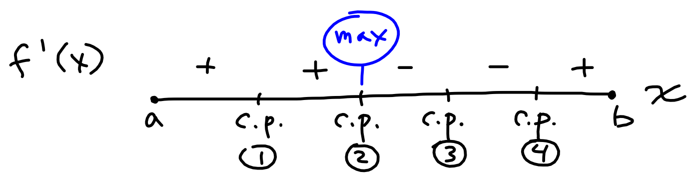
i.e. $v(0) = -5$

$v(0) = -9.8(0) + C$

$-5 = C$

$v(t) = -9.8t - 5$

sign chart



local max of f: c.p. 2

local min of f: c.p. 4

AP test -

1. can use sign chart as illustration
2. must use words to justify min/max

"f' changes from + to −"

"f changes from increasing to decreasing"