Sec 5.4 day 2 page 373 (2-14 even, 19, 23, 25)

(2) a) $g(0) = \int_0^0 f(t)\,dt = 0$

$g(1) = \int_0^1 f(t)\,dt = \frac{1}{2}$

$g(2) = \int_0^2 f(t)\,dt = 0$

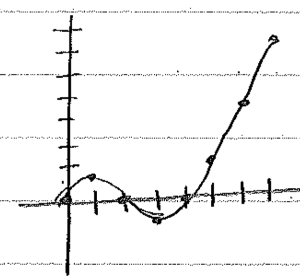
$g(3) = \int_0^3 f(t)\,dt = -\frac{1}{2}$

$g(4) = \int_0^4 f(t)\,dt = 0$

$g(5) = \int_0^5 f(t)\,dt = 1\frac{1}{2}$

$g(6) = \int_0^6 f(t)\,dt = 4$

d)



b) $g(7) = \int_0^7 f(t)\,dt \approx 6.2$

c) max $g(7)$

min $g(3)$

(4) a) $g(0) = \int_0^0 f(t)\,dt = 0$

$g(6) = \int_0^6 f(t)\,dt = 0$

b) $g(1) = \int_0^1 f(t)\,dt = 2.8$

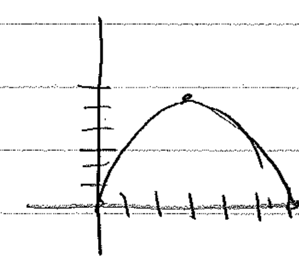
$g(2) = \int_0^2 f(t)\,dt = 4.9$

$g(3) = \int_0^3 f(t)\,dt = 5.7$

$g(4) = \int_0^4 f(t)\,dt = 4.9$

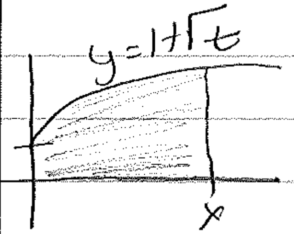
$g(5) = \int_0^5 f(t)\,dt = 2.8$

e)



c) $\uparrow (0,3)$

d) max at $x = 3$

(6) 

a) $g(x) = \int_0^x (1+\sqrt{t})\,dt$

$\boxed{g'(x) = 1+\sqrt{x}}$

b) $g(x) = \int_0^x (1+\sqrt{t})\,dt = t + \frac{2}{3}t^{3/2} \Big]_0^x = x + \frac{2}{3}x^{3/2} - 0$

$g(x) = x + \frac{2}{3}x^{3/2} \Rightarrow \boxed{g'(x) = 1 + x^{1/2}}$

(8) $g(x) = \int_3^x e^{t^2-t}\,dt \quad \boxed{g'(x) = e^{x^2-x}}$

(10) $g(x) = \int_0^r \sqrt{x^2+4}\,dx \quad \boxed{g'(x) = \sqrt{r^2+4}}$

(12) $G(x) = \int_x^1 \cos\sqrt{t}\,dt \Rightarrow G(x) = -\int_1^x \cos\sqrt{t}\,dt$

$\boxed{G'(x) = -\cos\sqrt{x}}$

(14) $h(x) = \int_0^{x^2} \sqrt{1+r^3}\,dr$

$h'(x) = \sqrt{1+(x^2)^3}\,(2x) = \boxed{2x\sqrt{1+x^6}}$

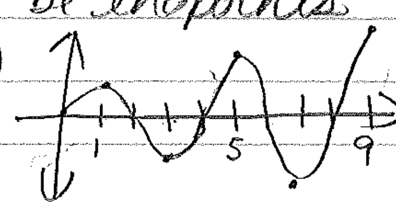
(19) a) Local min $x = 3, 7$

Local max $x = 1, 5$

b) absolute at 9 bc steepest slope and absolutes can be endpoints

c) cd $(\frac{1}{2}, 2)\ (4, 6)\ (8, 9)$

cu $(0, \frac{1}{2})\ (2, 4)\ (6, 8)$

d) 

(23) $y = \int_0^x \frac{t^2}{t^2+t+2}\,dt$ cd is when y'' -

so $y' = \frac{x^2}{x^2+x+2}$ by FTC I

quotient rule $y'' = \frac{2x(x^2+x+2) - (2x+1)x^2}{(x^2+x+2)^2} = \frac{\cancel{2x^3}+2x^2+4x-\cancel{2x^3}-x^2}{(x^2+x+2)^2}$

$= \frac{4x+x^2}{(x^2+x+2)^2}$ because the denominator is always + we only worry about the numerator.

$4x+x^2=0$ when $x(4+x)=0$

$x=0$ or $x=-4$

$(-\infty,-4)$ $(-4,0)$ $(0,\infty)$

$+$ $-$ $+$

$\boxed{\text{So on } (-4,0)}$

(25) $f(1)=12$ $\int_1^4 f'(x)\,dx = 17$ $f(4)=?$

by FTC2 $\int_1^4 f'(x)\,dx = f(x)\Big]_1^4 = f(4)-f(1) =$

$f(4)-12=17 \Rightarrow \boxed{f(4)=29}$