201 §5.3 #s 7, 8, 11, 13, 14, 19, 22, 23, 28, 32, 37, 38

#s 7-18 Use FTC I to find the derivative

(7) $g(x) = \int_1^x \frac{1}{t^3+1}\,dt \Longrightarrow$

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

(8) $g(x) = \int_1^x (2+t^4)^5\,dt \Longrightarrow$

$$\boxed{g'(x) = (2+x^4)^5}$$

(11) $F(x) = \int_x^{\pi} \sqrt{1+\sec t}\,dt = -\int_{\pi}^{x} \sqrt{1+\sec t}\,dt$

$$\Longrightarrow \boxed{F'(x) = -\sqrt{1+\sec x}}$$

(13) $h(x) = \int_2^{\frac{1}{x}} \sin^4 t\,dt \longrightarrow$ Chain Rule!

$$\boxed{h'(x) = \sin^4\left(\tfrac{1}{x}\right)\cdot\left(-\tfrac{1}{x^2}\right)}$$

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

201 §5.3 #s 19, 22, 23, 28, 32, 37, 38

#s 19–36 Evaluate the integral

(19) $\int_{-1}^{2}(x^3-2x)\,dx = \left[\frac{1}{4}x^4 - x^2\right]_{-1}^{2}$

$= \frac{1}{4}(2)^4 - (2)^2 - \left(\frac{1}{4}(-1)^4 - (-1)^2\right)$

$= \frac{16}{4} - 4 - \left(\frac{1}{4} - 1\right) = \boxed{\frac{3}{4}}$

(22) $\int_0^1 \left(1 + \frac{1}{2}u^4 - \frac{2}{5}u^9\right) du$

$= \left[u + \frac{1}{10}u^5 - \frac{1}{25}u^{10}\right]_0^1 = 1 + \frac{1}{10} - \frac{1}{25} = \frac{50+5-2}{50}$

$= \boxed{\frac{53}{50}}$

(23) $\int_0^1 x^{\frac{4}{5}}\,dx = \left[\frac{x^{\frac{9}{5}}}{\frac{9}{5}}\right]_0^1 = \left[\frac{5}{9}x^{\frac{9}{5}}\right]_0^1 = \boxed{\frac{5}{9}}$

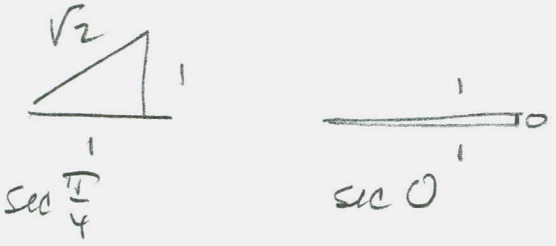
$\frac{4}{5} + \frac{5}{5} = \frac{9}{5}$

(28) $\int_0^1 \left(3 + x\sqrt{x}\right)dx = \int_0^1 \left(3 + x^{\frac{3}{2}}\right)dx = \left[3x + \frac{2}{5}x^{\frac{5}{2}}\right]_0^1$

$= 3 + \frac{2}{5} = \boxed{\frac{17}{5}}$

201 §5.3 #s 32, 37, 38

(32) $\int_0^{\frac{\pi}{4}} \sec\theta \tan\theta \, d\theta = \left[\sec\theta\right]_0^{\frac{\pi}{4}} = \boxed{\sqrt{2} - 1}$



#s 37-40 what's wrong with the equation?

(37) $\int_{-2}^{1} x^{-4} \, dx = \frac{x^{-3}}{-3}\Big]_{-2}^{1} = -\frac{3}{8}$

You can't apply FTC II to a function that is not cts on the interval over which you are integrating. $f(x) = x^{-4} = \frac{1}{x^4}$ blows up @ $x = 0 \in [-2, 1]$.

(38) $\int_{-1}^{2} \frac{4}{x^3} \, dx = -\frac{2}{x^2}\Big]_{-1}^{2} = \frac{3}{2}$ has the same issue. It has an infinite discontinuity @ $x = 0 \longrightarrow$ FTC II does not apply!