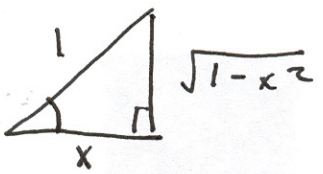
21.4

7a) if $y = \arccos x$ then $\cos y = x$

$$-\sin y \frac{dy}{dx} = 1 \Rightarrow$$

$$\frac{dy}{dx} = \frac{-1}{\sin y} = \frac{-1}{\sin(\arccos x)}$$



$$\frac{dy}{dx} = \frac{-1}{\sqrt{1-x^2}}$$ since on $[0, \pi]$, whereas the range of arccos, sin is always positive

8. $f'(x) = \frac{6x}{(1+x^2)^2} \sin\left(\frac{1}{1+x^2}\right) + \arctan\left(\frac{1}{x}\right) - \frac{x}{x^2+1}$

9. $\frac{d}{dx}\left(\frac{\sin^{-1} x}{\cos^{-1} x}\right) = \frac{\frac{1}{\sqrt{1-x^2}} \cos^{-1} x - \sin^{-1} x \frac{-1}{\sqrt{1-x^2}}}{(\cos^{-1} x)^2} \neq \frac{1}{1+x^2}$

22.2

2 a) i) $\sum_{k=3}^{300} (-1)^{k+1} k$ ii) $\sum_{k=1}^{500} 2k$ iii) $\sum_{k=1}^{500} (2k-1)$ iv) $\sum_{k=1}^{15} (-1)^{k+1} \frac{2}{3^k}$

v) $\sum_{k=1}^{40} x^k$ vi) $\sum_{k=1}^{100} k^2$ vii) $\sum_{k=0}^{n} a_k x^k$

answers may vary.

b) i) $2^2+3^2+4^2+5^2$ ii) $2^0+2^1+2^2+2^3+2^4$ iii) $a_0 + a_1 x + a_2 x^2 + a_3$

4 a) $L_4 = 0^3 \frac{1}{2} + \frac{1}{2}^3 \frac{1}{2} + \left(\frac{3}{2}\right)^3 \frac{1}{2} + \left(\frac{3}{2}\right)^3 \frac{1}{2} = \frac{9}{4}$

$R_4 = \left(\frac{1}{2}\right)^3 \frac{1}{2} + \left(\frac{2}{2}\right)^3 \frac{1}{2} + \left(\frac{3}{2}\right)^3 \frac{1}{2} + \left(\frac{4}{2}\right)^3 \frac{1}{2} = \frac{25}{4}$

b) $L_6 = {}^1/_{3^3} \cdot \frac{1}{3} + \ldots + {}^1/_{8^3} \cdot \frac{1}{3} \approx 1.218$

$R_6 = {}^1/_{4^3} \cdot \frac{1}{3} + \ldots + {}^1/_{9^3} \cdot \frac{1}{3} \approx .9956$