LSN 14
6.5
2, 16, 18

2) $f(x) = \sin(4x)$ $[-\pi, \pi]$ $f_{ave} = \frac{1}{\pi - -\pi}\int_{-\pi}^{\pi} \sin(4x)\,dx$

$= \frac{1}{2\pi}\left(-\frac{1}{4}\cos(4x)\right)\Big|_{-\pi}^{\pi}$

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

even function $\cos(-4\pi) = \cos(4\pi)$

$= \frac{-1}{8\pi}(0) = 0$

$\boxed{f_{ave} = 0}$

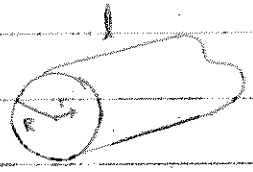
6) $f(2) = 20$ $M_3 = 20(4) + 50(4) + 63(4)$

$f(6) = 50$ $= 532$

$f(10) = 63$ $\boxed{AVG = 44.3}$ $f(5) \approx 44.3$ mph

for more accuracy, use $f(1), f(3), f(5), f(7), f(9), f(11)$

ff) $v(r) = \frac{P}{4\eta l}(R^2 - r^2)$



$V_{Ave} = \left[\int_0^R \frac{P}{4\eta l}(R^2 - r^2)\,dr\right]\left(\frac{1}{R-0}\right)$

$V_{Ave} = \left(\frac{P}{R}\right)\left(\frac{1}{4\eta l}\right)\int_0^R (R^2 - r^2)\,dr$

$\left(R^2 r - \frac{r^3}{3}\right)\Big|_0^R = R^3 - \frac{R^3}{3} = \frac{2R^3}{3}$

$V_{Ave} = \left(\frac{P}{R}\right)\left(\frac{1}{4\eta l}\right)\left(\frac{2R^3}{3}\right) = \frac{PR^2}{6\eta l}$

$\boxed{\begin{aligned} V_{Ave} &= \frac{PR^2}{6\eta l} \\ V_0 &= \frac{PR^2}{4\eta l} \\ V_R &= 0 \end{aligned}}$