3-0235 — 50 SHEETS — 5 SQUARES
3-0236 — 100 SHEETS — 5 SQUARES
3-0237 — 200 SHEETS — 5 SQUARES
3-0137 — 200 SHEETS — FILLER
COMET

21) $y = \sec x$ $(\pi/3, 2)$ Find eqn of tangent line @ given point

$y' = \sec x \tan x$

$y'(\pi/3) = \sec \pi/3 \cdot \tan \pi/3$

$= 2\sqrt{3}$ = slope

$y - y' = m(x - x_1)$

$y - 2 = 2\sqrt{3}(x - \pi/3)$

$y = 2\sqrt{3}x - (2\sqrt{3})\frac{\pi}{3} + 2$

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

25) $y = 2x \sin x$, find tangent line at $(\pi/2, \pi)$

$y' = 2\sin x + 2x\cos x$

$y'(\pi/2) = 2$

Tangent line: $y - y_1 = m(x - x_1)$

$y - \pi = 2(x - \pi/2)$

$y = 2x - \pi + \pi$

$\boxed{y = 2x}$

33) $f(x) = x + 2\sin x$.

$f'(x) = 1 + 2\cos x$

Horizontal Tangents at $f'(x) = 0$

$1 + 2\cos x = 0$

$\cos x = -1/2$

$\therefore x = \frac{2\pi}{3}, \frac{4\pi}{3} + 2\pi n$

or $(2n+1)\pi + \pi/3$

$(2n+1)\pi - \pi/3$

$\pi, 3\pi, 5\pi, 7\pi$

$(2n+1)\pi$ $n = 0, 1, 2, 3$

$(2n+1)\pi \pm \pi/3$

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35) $x(t) = 8 \sin t$

a. $v(t) = 8 \cos t$

$a(t) = -8 \sin t$

b. $x(2\pi/3) = 4\sqrt{3}$

$v(2\pi/3) = -4$

$a(2\pi/3) = -4\sqrt{3}$

velocity is < 0, so moving left.

39) $\lim_{x \to 0} \frac{\sin 3x}{x} = \lim_{x \to 0} 3 \frac{\sin 3x}{3x}$

let $\theta = 3x$

$= \lim_{\theta \to 0} 3 \frac{\sin \theta}{\theta}$

$= 3$

40) $\lim_{x \to 0} \frac{\sin 4x}{\sin 6x} = \lim_{x \to 0} \frac{\sin 4x}{x} \cdot \frac{x}{\sin 6x}$

$= \lim_{x \to 0} \frac{\sin 4x}{x} \lim_{x \to 0} \frac{x}{\sin 6x}$

$= \lim_{x \to 0} \frac{4 \sin 4x}{4x} \underbrace{\lim_{x \to 0} \frac{6x}{6 \sin 6x}}$

$= \frac{1}{6} \lim_{x \to 0} \left(\frac{1}{\frac{\sin 6x}{6x}} \right)$

$= \frac{1}{6} \frac{\lim_{x \to 0} 1}{\lim_{x \to 0} \frac{\sin 6x}{6x}}$

$= \frac{1}{6} \cdot \left(\frac{1}{1} \right)$

$= \boxed{\frac{1}{6}}$

$= 4 \cdot \frac{1}{6}$

$\boxed{\lim_{x \to 0} \frac{\sin 4x}{\sin 6x} = 2/3}$