(10) $f'(x) = 2\cos 2x = 0$

$\cos 2x = 0$

$2x = \frac{\pi}{2}$

$x = \frac{\pi}{4}$

(14) $f(x) = (x-3)(x+1)^2, \ [-1, 3]$

$(x-3)(x^2+2x+1)$

$x^3 + 2x^2 + x - 3x^2 - 6x - 3$

$x^3 - x^2 - 5x - 3$

$f(-1) = (-4)(0)^2 = 0$

$f(3) = (0)(4)^2 = 0$

$f'(x) = 3x^2 - 2x - 5 = 0$

$x = \frac{2 \pm \sqrt{4 - 4(3)(-5)}}{2(3)} = \frac{2 \pm 8}{6} = -1, \frac{5}{3}$

(24) $f(x) = \sec x, \ [-\frac{\pi}{4}, \frac{\pi}{4}]$

$f'(x) = \sec x \tan x = 0$

$f(-\frac{\pi}{4}) = \sec(-\frac{\pi}{4}) = \sqrt{2}$

$f(\frac{\pi}{4}) = \sec(\frac{\pi}{4}) = \sqrt{2}$

$x = 0$

(42) $f(x) = \frac{x+1}{x}, \ [\frac{1}{2}, 2]$

$f'(c) = \frac{f(2) - f(\frac{1}{2})}{2 - \frac{1}{2}} = \frac{\frac{3}{2} - 3}{\frac{3}{2}} = \frac{-\frac{3}{2}}{\frac{3}{2}} = -1$

$f'(x) = \frac{(x)(1) - (x+1)(1)}{x^2} = \frac{x - x - 1}{x^2} = \frac{-1}{x^2} = -1$

$-1 = -x^2 \Rightarrow x^2 = 1$

$x = 1$

~~10~~
~~14~~
~~24~~
~~42~~
46
74
76

46 $f(x) = 2\sin x + \sin 2x, \quad [0, \pi]$

$$f'(c) = \frac{f(\pi) - f(0)}{\pi - 0} = \frac{0 - 0}{\pi} = 0$$

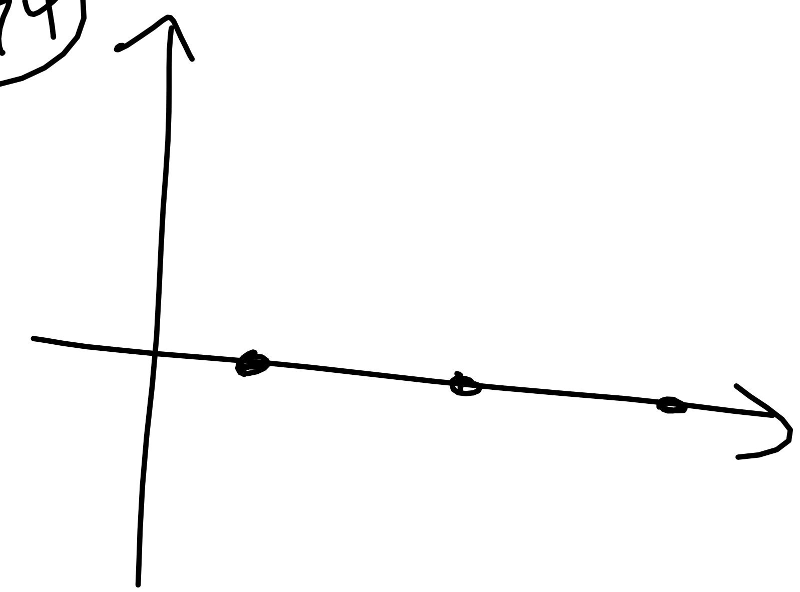
$$f'(x) = 2\cos x + 2\cos 2x = 0$$

$$2\cos x = -2\cos 2x$$

$$\cos x = -\cos 2x$$

$$x = \frac{\pi}{3}, \pi$$

74



- $f(x)$ is increasing if for $x_2 > x_1$, $f(x_2) > f(x_1)$, + is decreasing if for $x_2 > x_1$, $f(x_2) < f(x_1)$

NOTE: Since we are essentially using the change in $f(x)$ vs. the change in x to determine if $f(x)$ is increasing or decreasing, we are using the slope to make the determination.

- Derivative @ a pt. indicates inc/dec/constant
  - $\rightarrow f'(x) > 0 \rightarrow$ inc
  - $\rightarrow f'(x) < 0 \rightarrow$ dec
  - $\rightarrow f'(x) = 0 \rightarrow$ constant
- To determine where $f(x)$ is inc/dec
  1) Find critical #s
  2) Draw "sign" chart
  3) Determine "sign" for a value in each interval

HW: p. 186 → 3-45 mult. 3

HW: add on 22-27