

FTC / WS 1

1) $\frac{x-3}{x}$

2) $2x \tan(3x^2) + \frac{1}{x^2} \tan\left(\frac{3}{x}\right)$

3) $-5^{8x^3}(2)$

4) $\ln x^2$

5) 0

6) 0

7) a) $F'(x) = \frac{x-3}{x^2+7} = 0$

$$x-3=0$$

$$x=3$$

0	3	5
-		+

$\therefore F(x)$ has a min. @ $x=3$

b) $F(x)$ is increasing on $[3, +\infty)$ and decreasing on $(-\infty, 3]$

b/c $F'(x)$ is pos on $[3, +\infty)$ and neg on $(-\infty, 3]$

c) $F''(x) = \frac{1(x^2+7) - (2x)(x-3)}{(x^2+7)^2} = \frac{x^2+7-2x^2+6x}{(x^2+7)^2}$

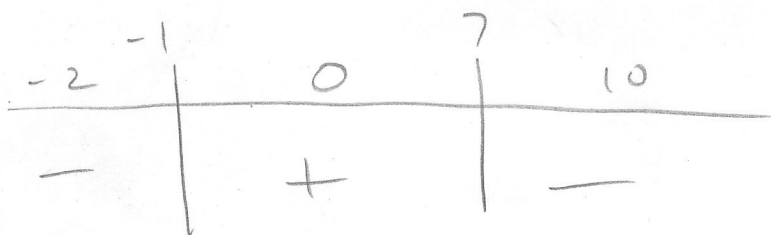
$$\frac{-x^2 + 6x + 7}{(x^2 + 7)^2} = 0$$

$$-x^2 + 6x + 7 = 0$$

$$x^2 - 6x - 7 = 0$$

$$(x-7)(x+1) = 0$$

$$x=7 \text{ or } x=-1$$



Concave up on $(-1, 7)$

Concave down on $(-\infty, -1), (7, +\infty)$