5) $f(x) = \frac{1}{x^3}$ at the point $(1,1)$

$$m_{TL} = \lim_{x\to 1} \frac{\frac{1}{x^3} - 1}{x-1}$$

$$= \lim_{x\to 1} \frac{\frac{1-x^3}{x^3}}{x-1}$$

$$= \lim_{x\to 1} \frac{1-x^3}{x^3(x-1)}$$

$$= \lim_{x\to 1} \frac{-1(x-1)(1+x+x^2)}{x^3(x-1)}$$

$$= \lim_{x\to 1} \frac{-x^2+x+1}{x^3}$$

$$= \frac{-(1)^2+1+1}{(1)^3}$$

$m_{TL} = -3$, $(1,1)$

$y - y_1 = m(x - x_1)$

$y - 1 = -3(x-1)$

$y - 1 = -3x + 3$

$\boxed{y = -3x + 4}$

6) $f(x) = 2x^2 - 4x + 5$ at the point $(-1,11)$

$$m_{TL} = \lim_{x\to -1} \frac{2x^2 - 4x + 5 - 11}{x+1}$$

$$= \lim_{x\to -1} \frac{2x^2 - 4x - 6}{x+1}$$

$$= \lim_{x\to -1} \frac{2(x^2 + x - 3x - 3)}{x+1}$$

$$= \lim_{x\to -1} \frac{2[x(x+1) - 3(x+1)]}{x+1}$$

$$= \lim_{x\to -1} \frac{2(x+1)(x-3)}{x+1}$$

$$= \lim_{x\to -1} = 2x - 6$$

$m_{TL} = 2x - 6$

$= 2(-1) - 6$

$= -2 - 6$

$m_{TL} = -8$, $(-1,11)$

$y - y_1 = m(x - x_1)$

$y - 11 = -8(x+1)$

$y - 11 = -8x - 8$

$\boxed{y = -8x + 3}$

7) $f(x) = \sqrt{x+9}$ at the point where $x = 0$

$f(0) = \sqrt{0+9}$

$= \sqrt{9}$

$f(0) = 3$

$(0,3)$

$$m_{TL} = \lim_{x\to 0} \frac{\sqrt{x+9} - 3}{x - 0}$$

$$= \lim_{x\to 0} \frac{(\sqrt{x+9} - 3)(\sqrt{x+9} + 3)}{x(\sqrt{x+9} + 3)}$$

$$= \lim_{x\to 0} \frac{x + 9 - 9}{x(\sqrt{x+9} + 3)}$$

$$= \lim_{x\to 0} \frac{x}{x(\sqrt{x+9} + 3)}$$

$$= \lim_{x\to 0} \frac{1}{\sqrt{x+9} + 3}$$

$$m_{TL} = \frac{1}{\sqrt{0+9} + 3}$$

$$= \frac{1}{3+3}$$

$m_{TL} = \frac{1}{6}$, $(0,3)$

$y - y_1 = m(x - x_1)$

$y - 3 = \frac{1}{6}(x - 0)$

$\boxed{y = \frac{1}{6}x + 3}$

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Page 2 of 3