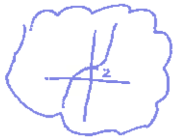
2.1 $\boxed{\#34}$

$f(x) = x^3 + 2$ ∘∘∘ 

line parallel

$3x - y - 4 = 0$

$-y = -3x + 4$

$* \; y = 3x - 4$

$m = 3$

The derivative is the slope of the tangent line.

$$\lim_{h \to 0} \frac{f(x+h) - [f(x)]}{h}$$

$$= \lim_{h \to 0} \frac{(x+h)^3 + 2 - [x^3 + 2]}{h}$$ ∘∘∘

Pascals Δ makes easy to cube
1
1 1
1 2 1
1 3 3 1

$$= \lim_{h \to 0} \frac{\cancel{x^3} + 3x^2h + 3xh^2 + h^3 \cancel{+2} \cancel{-x^3} \cancel{-2}}{h}$$

$$= \lim_{h \to 0} \frac{3x^2h + 3xh^2 + h^3}{h}$$

$$= \lim_{h \to 0} \frac{3x^2 + 3xh + h^2}{}$$

now I can direct subt because no ÷ 0 ☺

$= 3x^2$ ⟵ This is the slope of the tangent line

but we know it must be parallel to "$y = 3x - 4$"

so the slope must be 3

∴ $3x^2 = 3$

$x^2 = 1$ ∘∘ two solutions to Quad. functions

$x = \pm 1$

since $f(x) = x^3 + 2$

If $x = 1$ then $y = 3$ or the point → $(1, 3)$

If $x = -1$ then $y = 1$ $(-1, 1)$

so there are two lines tangent to $f(x) = x^3 + 2$ and parallel to $3x - y - 4 = 0$

(use point slope form $y - y_1 = m(x - x_1)$)

$*$ $m = 3$ points $(1, 3)$, $(-1, 1)$

$$\boxed{\begin{aligned} y - 3 &= 3(x - 1) \\ y - 1 &= 3(x + 1) \end{aligned}}$$

or $y - 3 = 3x - 3$, $y = 3x$

or $y - 1 = 3x + 3$, $y = 3x + 4$

2.1

#34 Graphicly