**Source**:

# 1 | cube root

## 1.1 | approximation

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

at $x = 0$ is

$$\frac{1}{3}(1 + 0)^{\cdots} = \frac{1}{3}$$

so the linear approximation is

$$y = m(x - 0) + f(0) = \frac{1}{3}x + 1$$

## 1.2 | estimations

| value | estimate |
|-------|----------|
| 0.05 | 1.016666 |
| -0.25 | 0.916666 |

These will be overestimates because the graph is concave down in this reigon.

# 2 | sin(x)

## 2.1 | approximation

$$y = \frac{d}{dx}\sin x\Big|_0 (x - 0) + \sin 0 = x$$

## 2.2 | remainder skipped temporarily

# 3 | unknown function (only some points known

## 3.1 | approximation