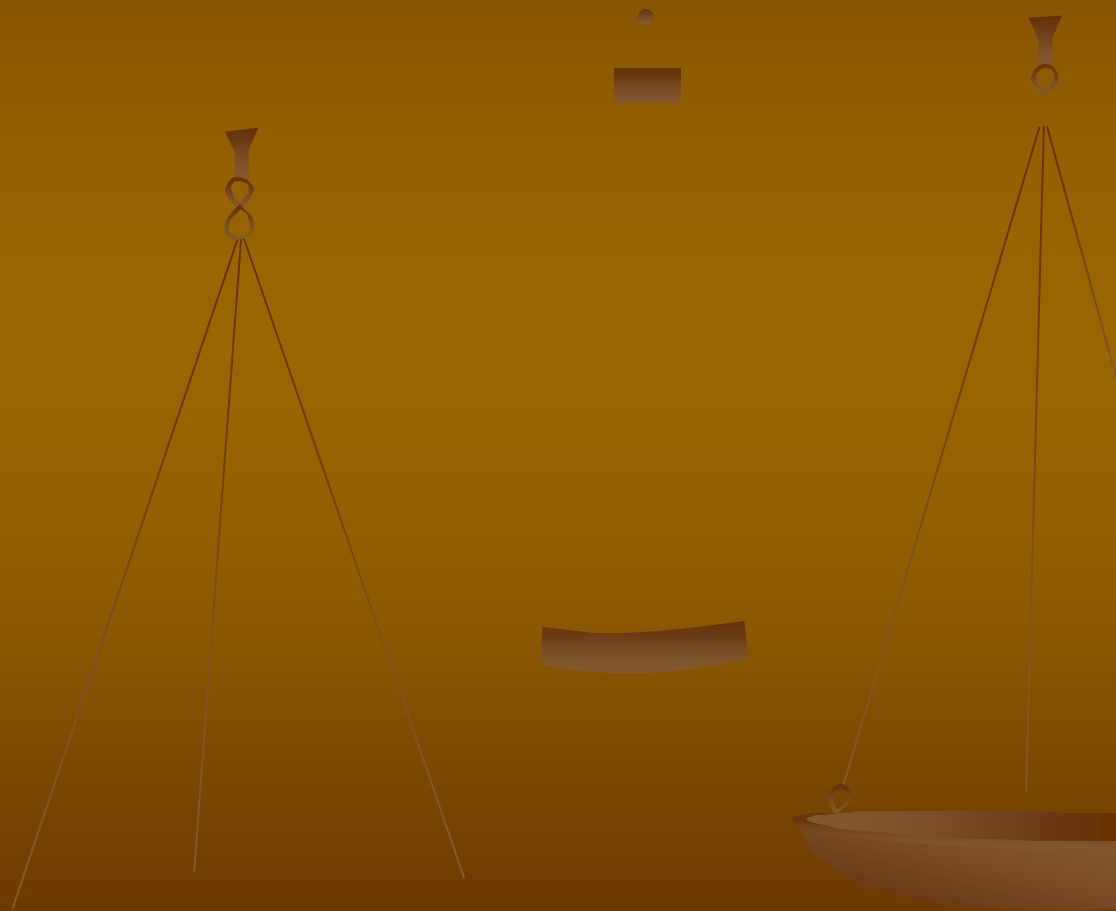




Bab 6

Metode Secant

Oleh :
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■ Rumus I:

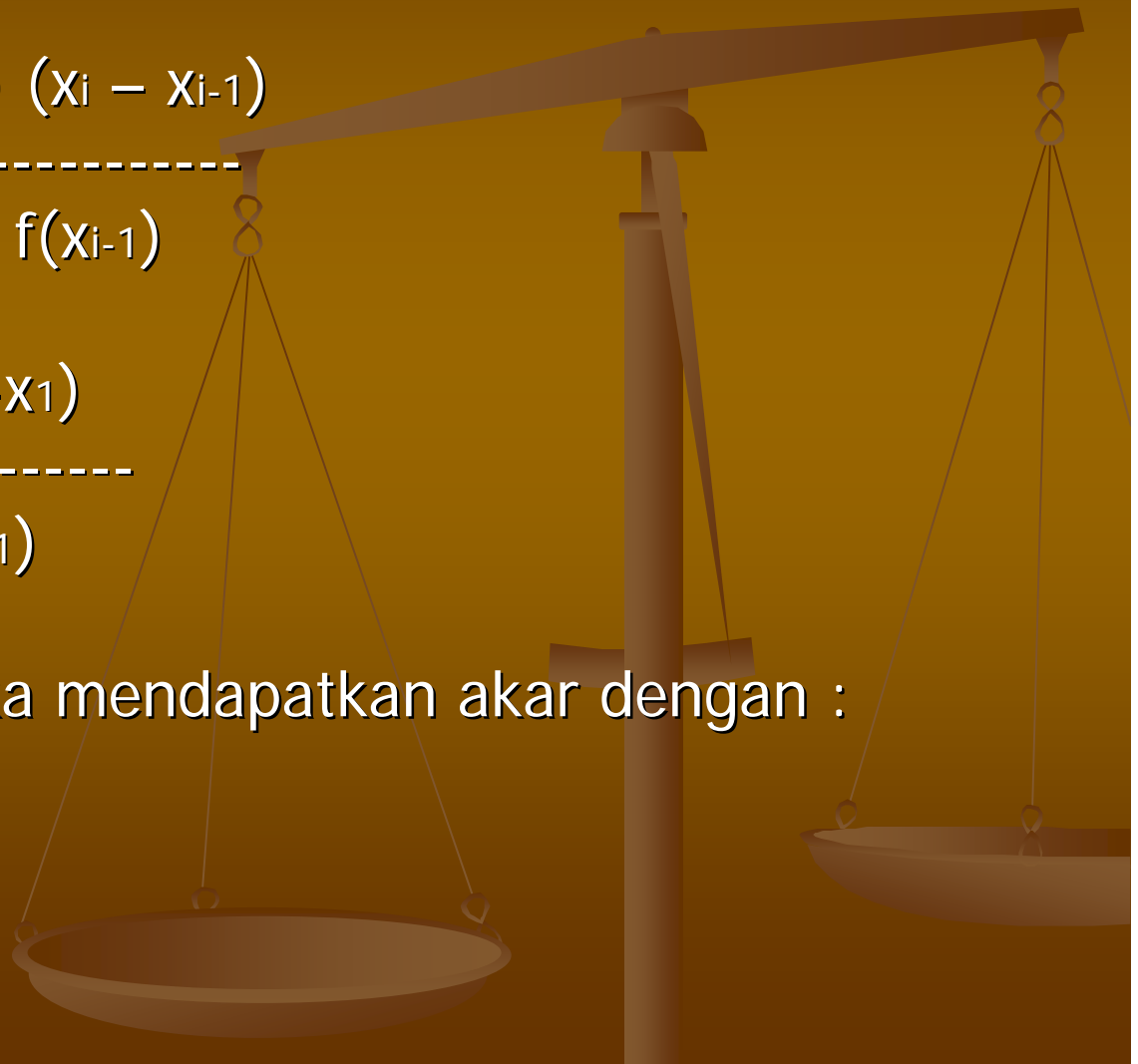
$$x_{i+1} = x_i - \frac{f(x_i) (x_i - x_{i-1})}{f(x_i) - f(x_{i-1})}$$

atau :

$$x_3 = x_2 - \frac{f(x_2) (x_2 - x_1)}{f(x_2) - f(x_1)}$$

Iterasi akan berhenti jika mendapatkan akar dengan :

- $f(x_{i+1}) = 0$
- $\text{error} = 0$



Contoh 1

$$f(x_{i+1}) = 0$$

- Cari salah satu akar dari persamaan :

$$f(x) = x^3 + x^2 - 3x - 3, \quad x_1 = 1 \text{ dan } x_2 = 2 ?$$

Jawab :

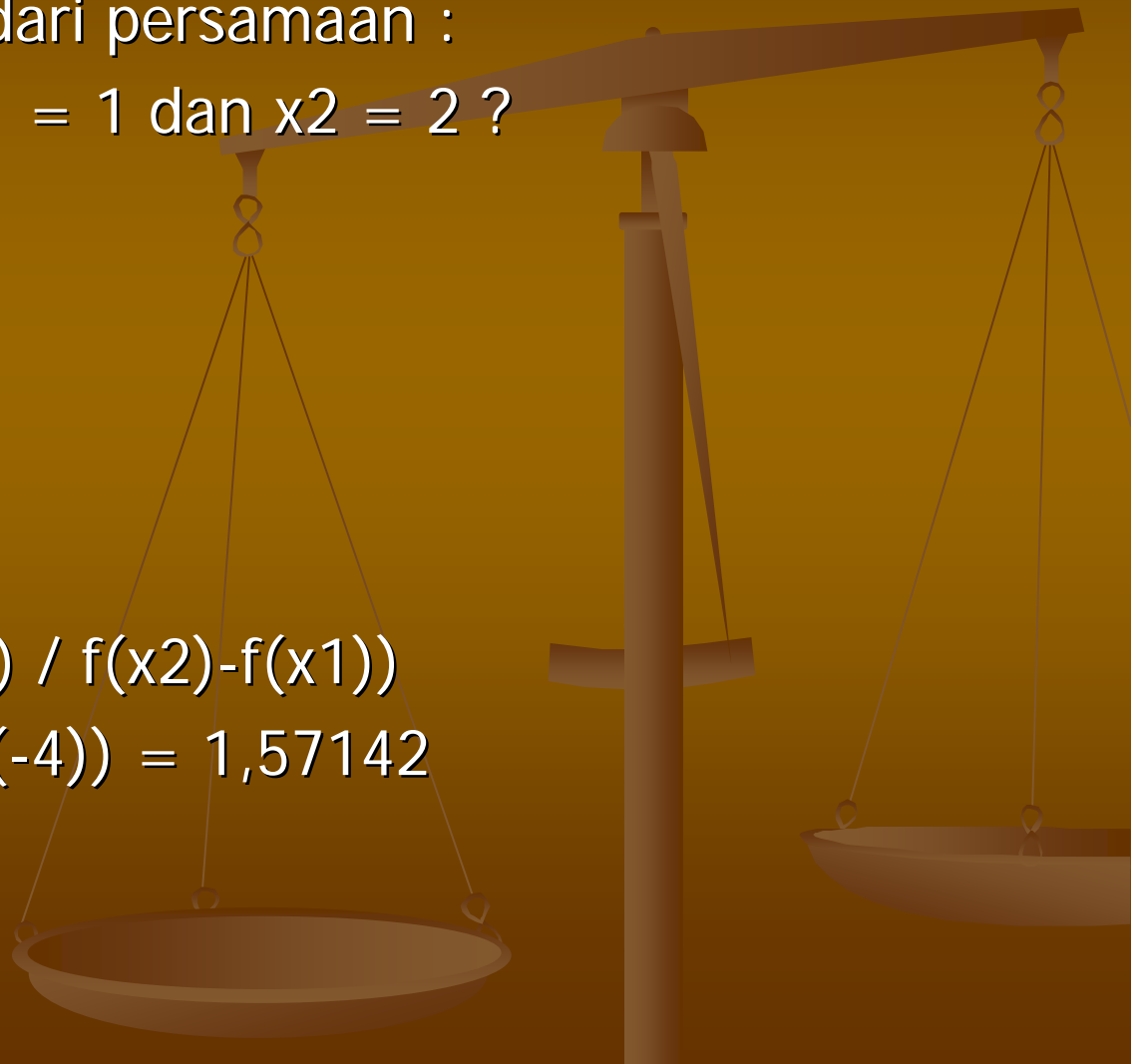
$$f(1) = -4$$

$$f(2) = 3$$

Iterasi I :

$$\begin{aligned} X_3 &= x_2 - \frac{f(x_2) (x_2 - x_1)}{f(x_2) - f(x_1)} \\ &= 2 - \frac{3 (2 - 1)}{3 - (-4)} = 1,57142 \end{aligned}$$

$$F(1.57142) = -1.36449$$



Iterasi 2:

$$\begin{aligned}x_4 &= x_3 - (f(x_3)(x_3 - x_2) / (f(x_3) - f(x_2))) \\ &= 1.57142 - (-1,36449) (1.57142 - 2)\end{aligned}$$

$$-1.36449 - 3$$

$$= 1,70540$$

$$f(1.70540) = -0.24774$$

Iterasi 3 :

$$\begin{aligned}x_5 &= x_4 - (f(x_4)(x_4 - x_3) / f(x_4) - f(x_3)) \\ &= 1.70540 - (-0.24774) (1.71 - 1.57)\end{aligned}$$

$$(-0.24774) - (-1.36449)$$

$$= 1.73514$$

$$f(1.73514) = 0.02925$$

Iterasi 4 :

$$\begin{aligned}x_6 &= x_5 - (f(x_5)(x_5 - x_4) / (f(x_5) - f(x_4))) \\ &= 1.73514 - 0.02925 (1.73514 - 1.70540)\end{aligned}$$

$$0.02925 - (-0.024774)$$

$$= 1.73200$$

$$f(1.73200) = -0.00051$$

Iterasi 5 :

$$\begin{aligned}x_7 &= x_6 - (f(x_6)(x_6 - x_5) / f(x_6) - f(x_5)) \\ &= 1.73200 - (-0.00051)(1.73200 - 1.73514)\end{aligned}$$

$$\text{-----}$$
$$- 0.00051 - 0.02925$$

$$= 1.073205$$

$$f(1.073205) = 0$$

∴ maka akarnya adalah 1.073205

Contoh 2: error = 0

1. Terapkan dengan metode secant pada persamaan :

$$\mathbf{f(x) = x^2 - x - 2}$$

dengan $x_1 = 0$ dan $x_2 = 3$ dan error = 0.05 ?

Jawab :

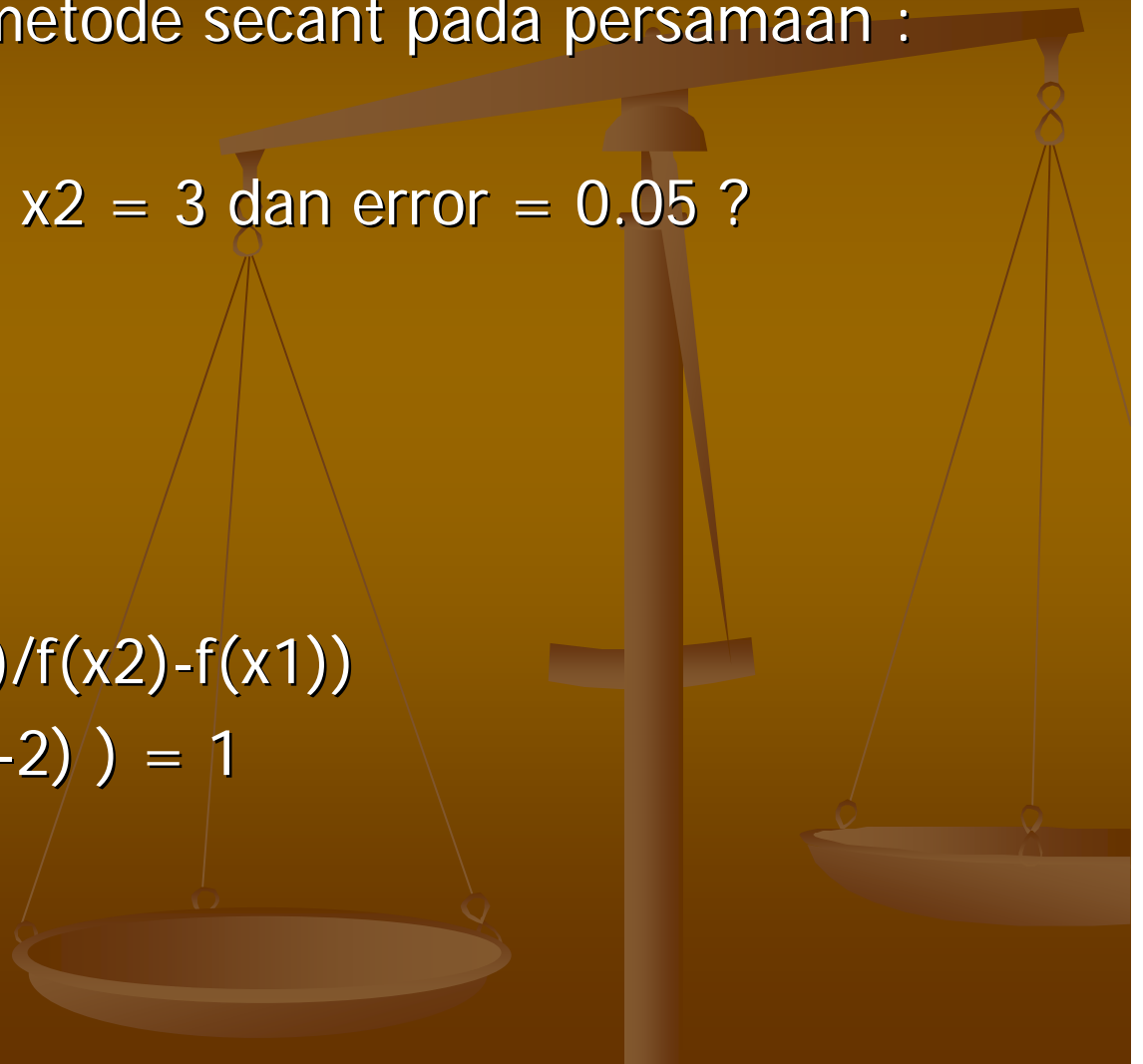
$$F(0) = -2$$

$$F(3) = 4$$

Iterasi I : [0,3]

$$\begin{aligned}x_3 &= x_2 - (f(x_2)(x_2 - x_1) / (f(x_2) - f(x_1))) \\ &= 3 (4 (3 - 0) / 4 - (-2)) = 1\end{aligned}$$

$$\text{error} = |1 - 3| = 2$$



Iterasi 2 : [1;3]

$$f(1) = -2$$

$$f(3) = 4$$

$$x_3 = 4 - \frac{4(3-1)}{4-(-2)} = 2$$

$$\text{error} = |2-1| = 1$$

Iterasi 3 : [2;3]

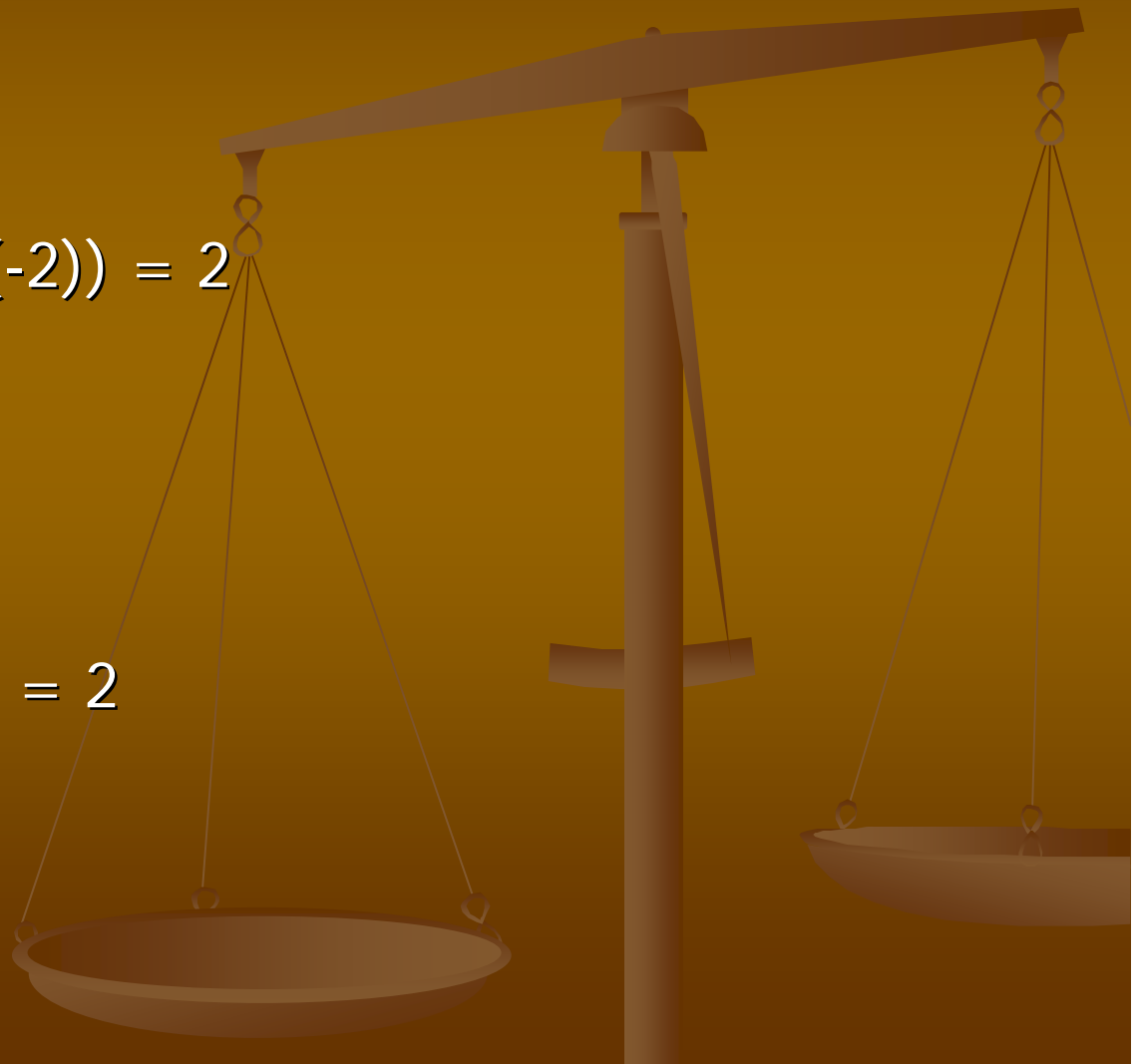
$$f(2) = 0$$

$$f(3) = 4$$

$$x_3 = 3 - \frac{4(3-2)}{4-0} = 2$$

$$\text{error} = |2-2| = 0$$

∴ maka akar : 2

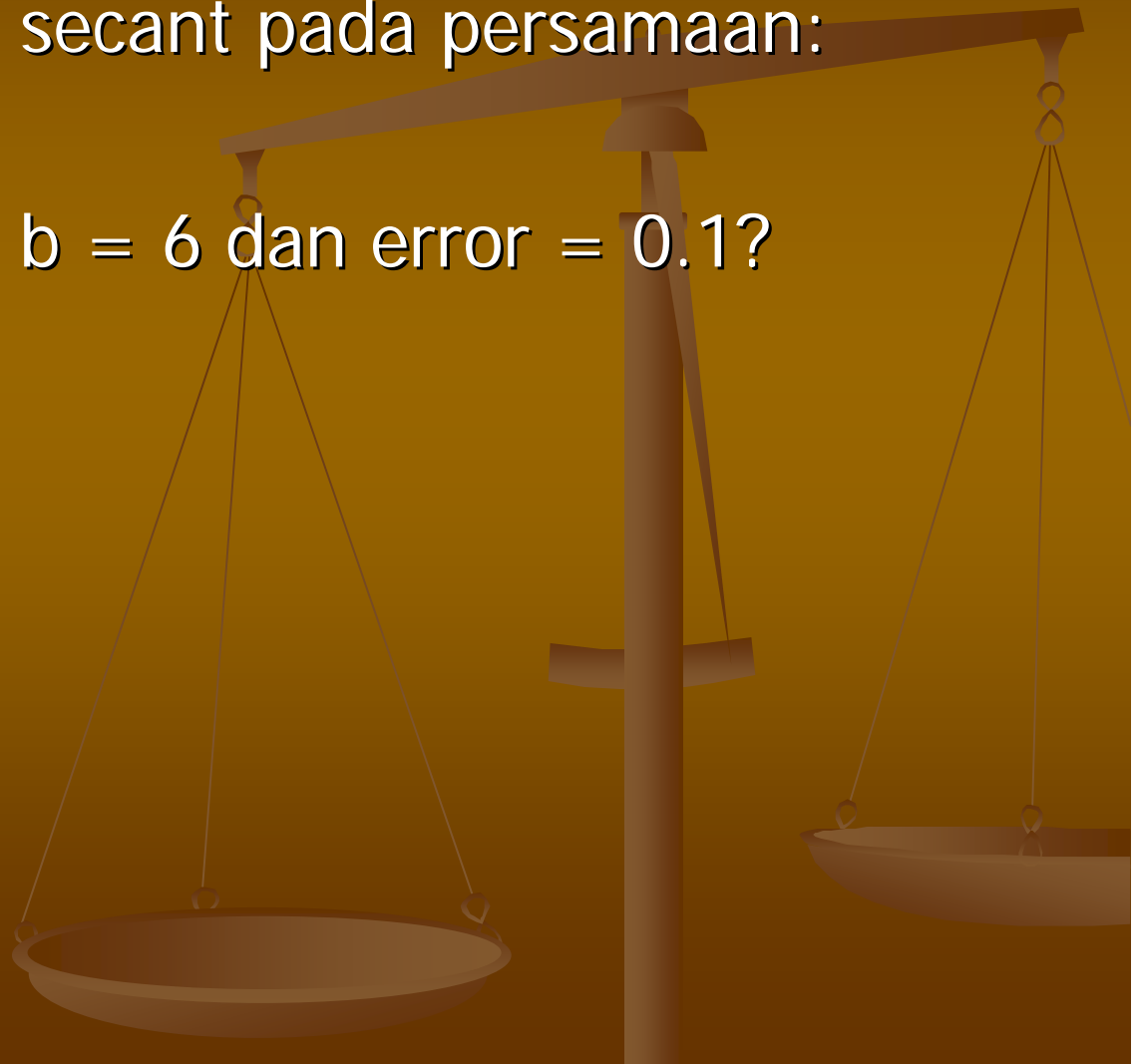


Tugas

1. Terapkan metode secant pada persamaan:

$$f(x) = x^2 - 6x + 8$$

dengan $a = 3$ dan $b = 6$ dan error = 0.1?



Terima Kasih

