Q1

$$f(x_{i+1}) \cong f(x_i) + \frac{f'(x_i)}{1!}.h + \frac{f''(x_i)}{2!}.h^2 \quad \Big\} \; x_i \Rightarrow 1 \;,\; h \Rightarrow 1$$

$f(x) = 2x^5 - 8x^3 + 3x^2 + 4x + 6 \Longrightarrow f(1) = 7$

$f'(x) = 10x^4 - 24x^2 + 6x + 4 \Longrightarrow f'(1) = -4$

$f''(x) = 40x^3 - 48x + 6 \Longrightarrow f''(1) = -2$

$$f(x_{i+1}) \cong f(1) + \frac{f'(1).1}{1!} + \frac{f''(1).1}{2!}$$

$\cong 7 - 4 - 1 = 2$

Answer $\Rightarrow f(2) \cong 2$

Q2

$a = 1$, $b = 4$ } initial Solution $\Rightarrow \frac{1}{2}(a+b) \Rightarrow 2,5$

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

$f'(x) = 2x - 2$

$x_1 = 2,5$

$$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)} \Rightarrow x_2 = 2,5 - \frac{(-4,75)}{3} \Rightarrow x_2 = 4,08333$$

$$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)} \Rightarrow x_3 = 4,08333 - \frac{2,50694}{6,16666} \Rightarrow x_3 = 3,67679$$

Answer $\Rightarrow$ 3,67

Q3

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

$f(-4) = 14$

$f(-3) = 6$

$f(-2) = 0$

$f(-1) = -4$

$x_{lower} = -3$, $x_{upper} = -1$ } $x_r = \frac{-3-1}{2} = -2$

$x_r = -2$

$f(x_r) \Rightarrow f(-2) = 0$ $\quad f(x_{lower}).f(x_r) = 0$ then root is -2

Answer $\Rightarrow -2$