

Solutions

2.1 $dy/dx=3x^2-3$. At $x=2$ it is $12-3=9$.

2.2 Substitute into the original curve: $y(1)=1-3=-2$.

2.3 The derivative is $12x^2$; at 2 it is $12 \times 4=48$.

2.4 False. A zero derivative does not always mean a maximum or minimum: $y=x^3$ is stationary at 0 but continues increasing. An endpoint can also produce an extreme value on a restricted domain.

2.5 A The instantaneous rate of change, also the gradient of a tangent.

3.1 Derivative $3x^2-3=0$ at ± 1 . Values $y(-2)=-2$, $y(-1)=2$, $y(1)=-2$, $y(2)=2$. Maximum 2 at $-1, 2$; minimum -2 at $-2, 1$. Checking only stationary points misses endpoint ties.