What is a Derivative?

Worksheet

The derivative of f(x) is f'(x) = lim(h0) [f(x+h)f(x)]/h. For power functions, the power rule gives d/dx x = nx^(n1).

$$f'(x) = \lim_{h \to 0} \frac{f(x+h)-f(x)}{h}$$

Questions

1. Derivative of x?

A) 5x
B) x
C) 5x
D) 4x

2. Derivative of a constant like 7?

A) 7
B) 1
C) 0
D) x

3. f(x)=x, f'(2)=?

A) 6
B) 8
C) 12
D) 9

4. Derivative of 4x + 2x?

A) 8x+2
B) 4x+2
C) 8x+2x
D) 4x+2

5. Find the derivative of f(x) = x.

6. Find f'(2) for f(x) = x.

7. Find the derivative of f(x) = 5x + 3x.

8. Define: What is a derivative?

9. Define: Power rule formula?

10. Define: Derivative of a constant?

Answer Key

1. A) 5x - Power rule: bring down 5, reduce exponent by 1 5x.
2. C) 0 - Constants have zero rate of change.
3. C) 12 - f'(x)=3x, f'(2)=34=12.
4. A) 8x+2 - d/dx[4x]=8x, d/dx[2x]=2 8x+2.
5. Apply power rule: d/dx x = nx^(n1) n=4 f'(x) = 4x
6. f'(x) = 3x f'(2) = 3(2) = 34 = 12
7. Differentiate term by term. d/dx[5x] = 10x d/dx[3x] = 3 f'(x) = 10x + 3
8. The instantaneous rate of change of a function - the slope of its tangent line at a point.
9. d/dx [x] = nx^(n1)
10. 0 - constants don't change.