Worksheet: Limits and Derivatives

Maharashtra State Board · Class 11 · Mathematics · 10 questions · 37 marks

Name: _____ Date: _____ Score: _____ / 37

Q1. Evaluate lim(x->2) (x^2-4)/(x-2). *[2 marks]*

Q2. Evaluate lim(x->0) sin(5x)/sin(3x). *[3 marks]*

Q3. For f(x) = 3x+1 if x<2, and f(x)=x^2+3 if x>=2, determine whether lim(x->2) f(x) exists. *[3 marks]*

Q4. Find the derivative of f(x) = x^3 from first principles. *[4 marks]*

Q5. Find the derivative of f(x) = sqrt(x) from first principles (for x>0). *[4 marks]*

Q6. Evaluate lim(x->0) (e^(3x)-1)/x, using the standard exponential limit. *[3 marks]*

Q7. Differentiate y = x^2.sin(x) using the product rule, then evaluate dy/dx at x=pi/2. *[5 marks]*

Q8. Differentiate y = (x^2+1)/(x-1) using the quotient rule. *[5 marks]*

Q9. Differentiate y = sec(x) using the quotient rule on 1/cos(x). *[4 marks]*

Q10. Differentiate f(x) = (3x+2)^5 using the first-principles substitution technique (without invoking a general chain rule). *[4 marks]*