projectmaths

The Tangent to a Curve and the Derivative of a Function

16	**11 b**	Differentiate $\frac{x+2}{3x-4}$.	**2**	Solution
15	**12 c**	Find $f'(x)$, where $f(x) = \frac{x^2+3}{x-1}$.	**2**	Solution
14	**11 c**	Differentiate $\frac{x^3}{x+1}$.	**2**	Solution
13	**11 b**	Evaluate $\lim_{x\to 2} \frac{x^3-8}{x^2-4}$.	**2**	Solution
12	**11 c**	Find the equation of the tangent to the curve $y = x^2$ at the point where $x = 3$.	**2**	Solution
11	**2c**	Find the equation of the tangent to the curve $y = (2x + 1)^4$ at the point where $x = -1$.	**3**	Solution
10	**8d**	Let $f(x) = x^3 - 3x^2 + kx + 8$, where k is a constant. Find the values of k for which $f(x)$ is an increasing function.	**2**	Solution
09	**1d**	Find the gradient of the tangent to the curve $y = x^4 - 3x$ at the point (1, -2).	**2**	Solution
09	**6c**	The diagram illustrates the design for part of a roller-coaster track. The section RO is a straight line with slope 1.2 and the section PQ is a straight line with slope -1.8. The section OP is a parabola $y = ax^2 + bx$. The horizontal distance from the y-axis to P is 30 m. In order that the ride is smooth, the straight sections must be tangent to the parabola at O and at P.		Solution
		(i) Find the values of a and b so that the ride is smooth.	**3**	
		(ii) Find the distance d, from the vertex of the parabola to the horizontal line through P, as shown on the diagram.	**2**	
09	**8a**	The diagram shows the graph of a function $y = f(x)$.		Solution
		(i) For which values of x is the derivative, $f'(x)$, negative?	**1**	
		(ii) What happens to $f'(x)$ for large values of x?	**1**	
		(iii) Sketch the graph of $y = f'(x)$.	**2**	
08	**2a**	Differentiate with respect to x: (i) $(x^2 + 3)^9$	**2**	Solution
05	**2b**	Differentiate with respect to x: (ii) $\frac{x^2}{x-1}$	**2**	Solution