

D Michaelmas Differentiation II

Patrons are reminded that

$\frac{dy}{dx}$ is the gradient.

If you are looking for a point with a gradient of (say) 6, then set $\frac{dy}{dx}$ equal to 6 and solve for x .

Remember also that if $y = ax^n$ then $\frac{dy}{dx} = anx^{n-1}$.

Questions

1. Find the point on the curve $y = x^2 - 3x + 1$ with gradient 3. (3, 1)
2. Find the point on the curve $y = x^2 + 3x + 2$ with gradient 5. (1, 6)
3. Find the point on the curve $y = -2x^2 + 4x + 1$ with gradient 8. (-1, -5)
4. Find the point on the curve $y = 2x^2 + x + 3$ with gradient -3. (-1, 4)
5. Find the point on the curve $y = -4x^2 + 4x - 2$ with gradient 0. ($\frac{1}{2}$, -1)
6. Find the point on the curve $y = \frac{1}{2}x^2 - \frac{3}{2}x + \frac{1}{2}$ with gradient -1. ($\frac{1}{2}$, $-\frac{1}{8}$)
7. Find the points on the curve $y = x^3 + 3x^2 - 10x$ with gradient 14. (2, 0) or (-4, 24)
8. Find the points on the curve $y = x^3 - 6x^2 + 5x + 1$ with gradient 5. (0, 1) or (4, -11)
9. Find the points on the curve $y = x^3 - 3x^2 + 1$ with gradient 0. (0, 1) or (2, -3)
10. Find the points on the curve $y = x^3 - 12x$ with gradient -9. (1, -11) or (-1, 11)
11. Find the points on the curve $y = x^3 - 6x + 2$ with gradient 6. (-2, 6) or (2, -2)
12. Find the points on the curve $y = x^3 + 12x^2 - 1$ with gradient -36. (-2, 39) or (-6, 215)
13. Find the points on the curve $y = x^3 - 3x^2 + 1$ with gradient -3. (1, -1)
14. Find the points on the curve $y = 2x^3 - 9x^2 + 14x + 1$ with gradient 2. (1, 8) or (2, 9)
15. Find the points on the curve $y = 2x^3 + 3x^2 - 32x - 1$ with gradient 4. (2, -27) or (-3, 68)