Day 11	IGCSE 10-a-day

1 $y = 4x^4 + x - \frac{2}{x^2}$

Find $\frac{dy}{dx}$.

2 $f(x) = -2x^2 + 4x - 5$ for $x \geq 1$.

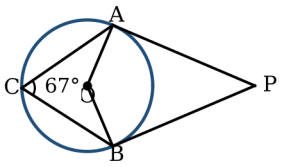
Find the range of f.

3 PA and PB are tangents to a circle, centre O. C is a point on the circle. Angle ACB = 67°.

(a) Work out the size of angle AOB.

(b) Work out the size of angle APB.

The diagram is not drawn accurately.



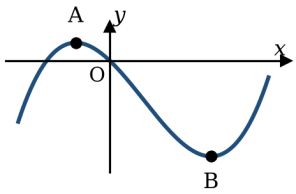
4 Rationalise the denominator of $\frac{6}{4\sqrt{5}}$

Give your answer in its simplest form.

5 The diagram shows a sketch of the curve $y = 2x^3 - 6x^2 - 18x$.

The curve has turning points at A and B.

Find the coordinates of A and B and state whether each is a maximum or a minimum.



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6 Write down the matrix that represents each transformation. (a) Stretch, scale factor 2, x-axis invariant (b) Enlargement, scale factor -1, centre the origin	
7 Prove that the difference between the cubes of any two consecutive integers is always an odd number.	
8 A curve has equation $y = x^2 + \frac{2}{x}$. (a) Show that the curve has a stationary point at $x = 1$. (b) Find the y coordinate of this point and decide whether it is a maximum or a minimum.	
9 A sector of a circle has radius 16 cm and angle 180°. The sector is made into a cone by joining the two straight edges together. (a) Work out the radius of the base of the cone. (b) Work out the exact volume of the cone. Give your answer in terms of π, as a surd if necessary.	
10 Oscar and Jamal play a match. The first to win 2 table tennis games wins the match. The probability that Oscar wins any one of the table tennis games is $\frac{1}{3}$. Work out the probability that the match needs a third one to decide it.	