Day 308	IGCSE 10-a-day
1 $\mathbf{a} = \begin{pmatrix} k \\ 4 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 3 \\ -4 \end{pmatrix}$. $\mathbf{a}$ is parallel to $\mathbf{b}$. Find the value of k.	
2 Work out $1\frac{2}{3} \times 2\frac{2}{3} - 3\frac{1}{3}$ Give your answer as a mixed number or a fraction in its simplest form.	
3 The equation of a curve is $y = x^2 + \frac{7}{x}$. Work out the gradient of the curve at the point where x = 2.	
4 15 workers can build a wall in 10 days. After 6 days, 3 of the workers leave. The rest carry on working at the same rate. How many more days does it take to finish?	
5 Here are the first five terms of a quadratic sequence. 0, 11, 30, 57, 92 Find an expression for the nth term.	

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6 A circular arc has a chord AB of length 24 cm. The greatest distance between the chord and the arc is 6 cm. Work out the radius of the circle.	
7 A particle P moves in a straight line. After t seconds, its displacement from a fixed point O is s metres, where $s = 2t^3 - 24t^2 + 72t + 3$ $(t \geq 0)$ Find the acceleration of P at each instant when it is at rest.	
8 A point A is on level ground in line with the base of a mast. (Calculator) The angle of elevation of the top of the mast from A is 46°. B is a point on the same line, 50 m further from the mast than A. The angle of elevation of the top of the mast from B is 33°. Work out the height of the mast. Give your answer to 1 decimal place.	
9 $y = -x^3 - 3x^2 - 2$ Use the second derivative to show that the curve has a minimum at $x = -2$.	
10 θ is an acute angle and $\tan\theta = \frac{1}{8}$. Find the exact value of (a) $\sin\theta$ (b) $\cos\theta$. Give each answer as a fraction, rationalising any denominator.	