Day 311	A Level Maths: B Tier 10-a-day
1 Find the x-coordinate(s) of the stationary point(s) of the curve $y = \frac{e^x}{x}$.	
2 The line segment AB is a diameter of a circle, where A is $(5, -4)$ and B is $(-3, -12)$. Find an equation of the circle in the form $(x - a)^2 + (y - b)^2 = k$.	
3 A sector of a circle has radius 5 cm and area $\frac{25\pi}{4}$ cm^2. Find the angle of the sector in degrees.	
4 For 13 pairs of values, $\bar{x} = 8$, $\bar{y} = 20$, $S_{xx} = 50$ and $S_{xy} = 125$. (a) Find the regression line of y on x in the form $y = a + bx$. (b) Estimate y when $x = 12$.	
5 $\mathbf{a} = \begin{pmatrix} 5 \\ -2 \\ 4 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} -1 \\ 2 \\ -2 \end{pmatrix}$. Find the angle between a and b, to 1 d.p.	

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6 Solve $\|2x + 1\| = \|4x + 1\|$.	
7 The mass, X g, of a loaf is normally distributed with mean 60 and s.d. 5. A random sample of 25 is taken. Find the probability that the mean mass is more than 61.5 (3 s.f.).	
8 A particle moves so that at time t s its velocity is $\mathbf{v} = (3t^2 + 4)\mathbf{i} + (4t - 16)\mathbf{j}$ m s^{-1}. Find the time when the particle is moving in the direction of $\mathbf{i}$, and its speed then.	
9 $f(x) = -x$ for $1 < x \leq 5$. Find the range of f.	
10 A ball is thrown horizontally at 28 m s^{-1} from the top of a building 44.1 m above level ground. Take g = 9.8 m s^{-2}. Find the time of flight and the horizontal distance from the base where it lands.	