Day 279	A Level Maths: B Tier 10-a-day
1 Items numbered 1 to 91; systematic sample of size 13. (a) Find the sampling interval. (b) The first item is number 7. Find the 6-th item.	
2 $f(x) = e^x - 6x$. Use the Newton-Raphson method with $x_0 = 0.2$ to find x_1 and x_2, to 4 d.p.	
3 The line segment AB is a diameter of a circle, where A is (5, 3) and B is (3, −3). Find an equation of the circle in the form $(x - a)^2 + (y - b)^2 = k$.	
4 A crate of mass 6 kg is pulled along rough horizontal ground by a horizontal force of 17.7 N. It accelerates at 0.5 m s^{-2}. Take g = 9.8 m s^{-2}. Find the coefficient of friction between the crate and the ground.	
5 Solve $\lvert -x + 2 \rvert \geq 8$.	

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6 A chord AB subtends an angle of 0.8 radians at the centre O of a circle of radius 12 cm.
Find the perimeter of the minor segment, to 3 s.f.

7 A trunk of mass 15 kg is dragged at constant speed along rough horizontal ground by a rope inclined at angle α above the horizontal, where $\cos\alpha = \frac{3}{5}$.
The coefficient of friction is 0.5. Take g = 9.8 m s^{-2}. Find the tension in the rope.

8 $\mathbf{a} = \begin{pmatrix} 1 \\ 4 \\ 0 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 1 \\ -2 \\ -1 \end{pmatrix}$.
Find the angle between a and b, to 1 d.p.

9 The masses (kg) of parcels are normally distributed.
P(X < 48) = 0.1587 and P(X > 84) = 0.0228.
Find the mean and standard deviation (3 s.f.).

10 The diagram shows the curve y = f(x), a quadratic.
(a) Find the coordinates of the local maximum point of y = |f(x)|.
(b) How many solutions has |f(x)| = 19?

