Day 274	A Level Maths: S Tier 10-a-day
1 The curve $y = 3^x - 4x$ has one stationary point. Find its coordinates to 3 s.f. and show that it is a minimum.	
2 The masses of apples, in grams are normally distributed. 35% are less than 70 and 20% are greater than 82. Find the mean and standard deviation, each correct to 3 significant figures.	
3 Solve $2 \ln x = \ln(x + 20) + \ln 1$, stating clearly why one root is rejected.	
4 A ball is projected horizontally at 29.4 m s^{-1} from the top of a vertical cliff of height 44.1 m, and lands on horizontal ground. Find (a) the time of flight and the distance from the cliff, (b) the speed and direction on landing. Take $g = 9.8$ m s^{-2}.	
5 The tangent to $y = x\sqrt{2x + 3}$ at the point where $x = 3$ meets the axes at A and B. Find the exact area of triangle OAB, where O is the origin.	

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6 A particle P moves on a straight line. At time t seconds, where $t \geq 0$, its velocity is v m s^{-1}, where

$v = 30\sqrt{t} - 5t$.

Find (a) the greatest speed of P, (b) the greatest displacement of P from its starting point.

7 Express $\frac{21x^2 - 2x - 26}{(x + 3)(3x - 4)^2}$ in the form

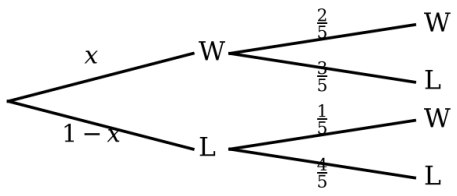
$\frac{A}{(x + 3)} + \frac{B}{(3x - 4)} + \frac{C}{(3x - 4)^2}$.

8 Solve $|4x - 5| < |-x - 5|$.

9 The tree diagram shows two games played in turn.

Given the second is a W, P(first was a W) = $\frac{4}{5}$.

Find x.



10 The circle with equation $(x + 0)^2 + (y + 2)^2 = 169$ passes through P(−12, −7). The tangent at P meets the axes at A and B. Find the area of triangle OAB.