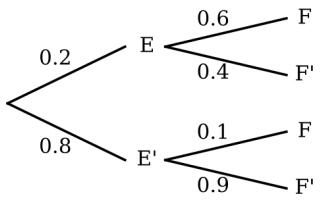
Day 266	A Level Maths: B Tier 10-a-day
1 A lorry of mass 1000 kg moves along a straight horizontal road. The engine produces a driving force of 2000 N and the resistance to motion is 400 N. Find the acceleration of the lorry.	
2 Given that $y = e^{4x - 12}$, find $\frac{dy}{dx}$, and the gradient of the curve when $x = 3$.	
3 A box of mass 12 kg rests on a rough horizontal floor, with coefficient of friction 0.4. A horizontal force of 56 N is applied to the box. Take $g = 9.8$ m s^{-2}. Determine whether the box moves. Find the friction force, or the acceleration if it moves.	
4 A curve has parametric equations $x = -t$, $y = -t^2 + t + 3$. The line $y = -2x + 3$ meets the curve at two points. Find the coordinates of these points.	
5 A has position vector $\begin{pmatrix} 0 \\ -3 \\ -3 \end{pmatrix}$ and B has position vector $\begin{pmatrix} 9 \\ -12 \\ -12 \end{pmatrix}$. The point P lies on AB with AP : PB = 1 : 2. Find the position vector of P.	

Day 266 **A Level Maths: B Tier 10-a-day**

6 The tree diagram shows probabilities for event E, followed by event F.
Find the probability that exactly one of E and F occurs.



7 A sequence is defined by $u_{n+1} = \frac{1}{1 - u_n}$, $u_1 = -2$.
(a) Show that the sequence is periodic, stating the period.
(b) Find u_{20} and $\sum_{r=1}^{20} u_r$.

8 Line l_1: $\mathbf{r} = \begin{pmatrix} 4 \\ 4 \\ 6 \end{pmatrix} + \lambda \begin{pmatrix} 0 \\ -2 \\ -1 \end{pmatrix}$.
Line l_2: $\mathbf{r} = \begin{pmatrix} -2 \\ -9 \\ 10 \end{pmatrix} + \mu \begin{pmatrix} 2 \\ 3 \\ -2 \end{pmatrix}$.
Show that l_1 and l_2 intersect and find the point.

9 The masses (kg) of parcels are normally distributed.
$P(X < 10) = 0.0228$ and $P(X > 40) = 0.1587$.
Find the mean and standard deviation (3 s.f.).

10 The curve C has equation $y = x^2 + x - 3$.
C is stretched by scale factor 3 parallel to the y-axis.
Find its new equation.