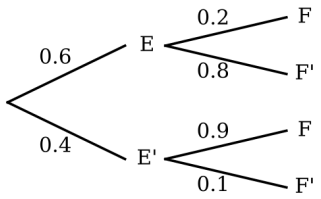
**Day 288** **A Level Maths: B Tier 10-a-day**

**1** y = f(x) has a maximum point at (6, 2).
Find the turning point on the curve:

(a) $y = f(\frac{x}{2})$ (b) y = f(x + 3)

(c) y = 3f(x)

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




**3** A drone moves with constant velocity $(-3\mathbf{i} - \mathbf{j})$ m $s^{-1}$. At time t = 0 its position vector relative to a fixed origin O is $(-5\mathbf{i} + 4\mathbf{j})$ m.
Find (a) its position vector when t = 2, (b) the value of t when it crosses the line through O in the direction of $\mathbf{i}$.

**4** Solve $5^{3x-3} = 145$, giving your answer to 3 s.f.

**5** The first term of an arithmetic series is 2 and the common difference is 7.
The sum of the first n terms is 1817. Find the value of n.

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| **6** Simplify $\frac{1 - \cos 4x}{\sin 4x}$, giving your answer as a single trigonometric term. | |
| **7** A factory says a proportion 0.4 of its parts are defective. In a sample of 40 parts, 12 are defective. Test, at the 5% significance level, whether the proportion is different from 0.4. | |
| **8** A golf ball is hit from the ground at 83.3 m $s^{-1}$ at angle $\theta$ to the horizontal, where $\sin\theta = \frac{8}{17}$. Take g = 9.8 m $s^{-2}$. Find (a) the greatest height, (b) the speed of the ball at the greatest height. | |
| **9** Express $\frac{-9x^2 - 13x}{(x - 4)(x + 3)^2}$ in partial fractions. | |
| **10** The radius of a circular oil slick increases at 2 cm per second. Find the rate at which its area is increasing when r = 10 cm, in terms of $\pi$. | |