Day 149	A Level Maths: A Tier 10-a-day
1 $f(x) = \frac{-5x + 1}{2x + 2}$, $x \in \mathbb{R}$, $x \neq -1$. Find $f^{-1}(x)$ and state its domain.	
2 Find the coordinates of the stationary points of $y = \frac{x^2}{x - 5}$.	
3 X, the length (mm), is normally distributed with mean 77 and standard deviation 2. Find (a) P(X > 81.8) (b) P(81.8 < X < 82.8), each to 3 s.f.	
4 A ball is thrown vertically upwards at 19.6 m s^{-1} from a point h m above horizontal ground, and hits the ground 6 s later. Find (a) h, (b) the greatest height above the ground. Take g = 9.8.	
5 Find the exact value of $\sin(\arcsin \frac{3}{5} + \arcsin \frac{3}{5})$.	

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6 The line l has equation $3x - y = 2$. (a) Find the coordinates of the foot of the perpendicular from P$(-1, -3)$ to l. (b) Hence find the shortest distance from P to l, in exact form.	
7 The points A, B and C have coordinates $(4, 1, -2)$, $(5, -2, -1)$ and $(-1, 2, 4)$. Find angle ABC, in degrees to 1 d.p.	
8 A data set has mean 71 and standard deviation 4. A value is treated as an outlier if it is more than 3 standard deviations from the mean. Which of 56, 62, 70, 92 are outliers?	
9 A circle passes through A$(-4, -11)$ and B$(2, 7)$. Its centre lies on the line $y = -3$. Find the equation of the circle.	
10 A uniform ladder AB (5 m, 20 kg) rests with A on rough ground, $\mu = 0.2$, and B against a smooth wall, B being 3 m above the ground. A man of mass 70 kg climbs the ladder. How far along the ladder from A can he climb before it slips?	