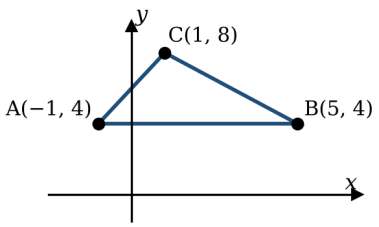
Day 164	A Level Maths: A Tier 10-a-day

1 X, the height (cm), is N(181, 7^2). The highest 5% of values exceed k.
Find k to 3 significant figures.

2 Solve $\cos 2x + 2\sin x = 1$
for $-180° \leq x \leq 180°$.

3 A cyclist passes P with speed 7 m s^{-1} and accelerates uniformly. She travels 127.2 m in the next 12 s, reaching Q. Find (a) her acceleration, (b) her speed at Q, (c) her speed at the midpoint of PQ. Give answers to 3 s.f. if not exact.

4 The diagram shows triangle ABC.
(a) Find the equation of the line through C perpendicular to AB.
(b) Hence find the coordinates of D, the foot of the perpendicular from C to AB, and the area of triangle ABC.



5 $f(x) = 4\arcsin(5x)$.
State the domain and range of f, and find $f^{-1}(x)$.

Day 164 **A Level Maths: A Tier 10-a-day**

6 The equation $3x^2 + (2k - 6)x + (2k - 6) = 0$ has real roots.
Find the set of possible values of k.

7 $g(x) = \frac{1}{30 + 21 \sin x + 20 \cos x}$
(a) Write $21 \sin x + 20 \cos x$ in the form $R \sin(x + \alpha)$, with α acute.
(b) Find the greatest and least values of g(x) and the smallest positive x at which the greatest value occurs (1 d.p.).

8 Parts are defective with probability 0.15, independently. A box of 10 parts is rejected if it has at least 3 defective.
From 6 such boxes, find the probability that exactly 3 are rejected (3 s.f.).

9 Solve $|x - 8| < |2x - 8|$.

10 The system is released from rest and A moves up the rough plane. Find (a) the acceleration, (b) the tension in the light string. Take g = 9.8. Give answers to 3 s.f. if not exact.

