Day 245	A Level Maths: A Tier 10-a-day

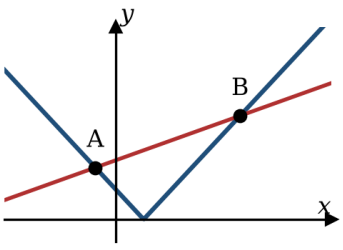
1 Solve $x(\sqrt{5} - 1) = -1 - \sqrt{5}$, writing x in the form $p + q\sqrt{5}$.

2 By writing 195° as 150° + 45°, find the exact value of

sin 195°, in the form $\frac{\sqrt{a} \pm \sqrt{b}}{c}$.

3 Ball A is dropped from rest 24.5 m above the ground. At the same instant ball B is projected upwards at 24.5 m s^{-1} from the ground directly below A. Find (a) the time when they collide, (b) the height of the collision. Take g = 9.8.

4 The diagram shows the graphs of $y = |3x - 2|$ and $y = x + 4$.
The graphs meet at A and B.
Find the coordinates of A and B.



5 θ is small and measured in radians. Use small angle approximations to show that
$\sin 3\theta + 4\cos 3\theta = 0.5$
can be written as $a\theta^2 + b\theta + c = 0$ with integers a, b, c. Hence find the approximate solution with $0 < \theta < 0.8$, to 3 s.f.

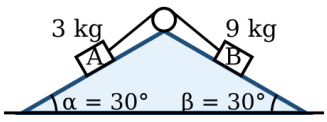
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6 3% of people have a disease. The screening test is positive for 96% of those who have it and for 2% of those who do not.
(a) Find the probability that a person tests positive.
(b) Given a positive test, find the probability that the person has the disease (3 s.f.).

7 Solve $2\text{cosec}^2 x - 2\cot x - 6 = 0$
for $0° < x < 180°$. Give answers to 1 d.p.

8 A circle touches both coordinate axes and passes through the point $(-9, -8)$. Its centre lies in the third quadrant.
Find the equations of the two possible circles.

9 The system is released from rest. Find (a) the magnitude of the acceleration and which particle moves down, (b) the tension. Take g = 9.8.



10 The Venn diagram shows the numbers of 53 students in sets A and B.
(a) Find the value of x.
(b) A student in B is chosen at random. Find P(A).

