Day 270 **IGCSE 10-a-day**

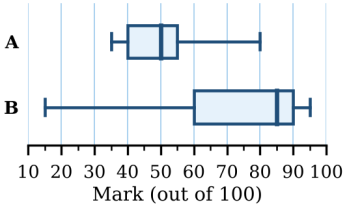
1 Here are six numbers.
$\sqrt{8} \times \sqrt{2}$, $\sqrt{49}$, $\sqrt{3} \times \sqrt{5}$, $\sqrt{2} \times \sqrt{6}$, $0.\dot{4}$, $(\sqrt{6} + 2)(\sqrt{6} - 2)$
Write down the irrational numbers.

2 In a bag, the ratio of the number of red counters to the number of blue counters is 6 : 7.
Then 2 red counters are removed and 11 blue counters are removed.
The ratio is now 7 : 6.
How many red counters were there at the start?

3 A curve has equation $y = (x + 1)(x - 3)(x + 3)$.
Work out the gradient of the curve at each point where it crosses the x-axis.

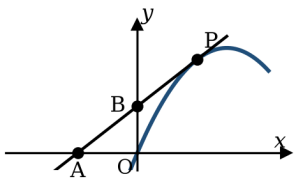
4 Solve $3 \sin x + 1 = 0$ for $0° \leq x \leq 360°$.
(Calculator)
Give your answers correct to 1 decimal place.

5 The box plots show the test marks of the students in two classes, A and B.
(a) Work out the interquartile range for each.
(b) Compare the distributions of A and B.

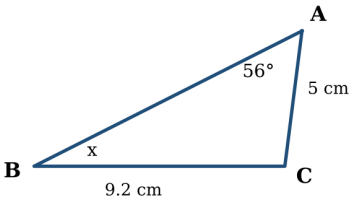


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6 The diagram shows the curve $y = -2x^2 + 6x$ and the tangent at P(1, 4), meeting the axes at A and B.
(a) Find an equation of the tangent at P.
(b) Work out the area of triangle OAB.



7 Angle B is acute.
Work out the size of angle ABC.
Give your answer correct to 1 decimal place.
(Calculator)



8 An open tray has a square base of side x cm and height h cm. The total outside surface area is 432 cm^2.
(a) Show that the volume of the box is $V = \frac{1}{4}(432x - x^3)$ cm^3.
(b) Find the maximum volume of the box, proving that it is a maximum.

9 (a) Show that the equation $x^3 + 3x - 15 = 0$ has a solution between x = 2 and x = 3.
(b) Show that the equation can be rearranged to give $x = \sqrt[3]{15 - 3x}$

10 P is directly proportional to r and inversely proportional to the square of t.
When r = 8 and t = 5, P = 3.84.
Find P when r = 10 and t = 4.