Algorithms and sorting

Answers

Further Maths topic practice

This topic online

Q	Answer	Marks
1	Passes: 18 34 27 41 9 30 52; 18 27 34 9 30 41 52; 18 27 9 30 34 41 52; 18 9 27 30 34 41 52; 9 18 27 30 34 41 52; 9 18 27 30 34 41 52. Sorted: 9 18 27 30 34 41 52	4
2	**a)** 20 seconds **b)** 76.8 seconds	4
3	221	3
4	Pivots by pass: 21; 9, 60; 56, 74; 33; 38. Sorted: 9 12 21 33 38 47 56 60 74 85	4
5	Pivots by pass: Erin; Beth, Tomasz; Hannah; Mohammed. Sorted: Beth, Callum, Erin, Hannah, Kofi, Mohammed, Priya, Tomasz, Zara	4
6	**a)** 6 **b)** 9 **c)** the integer part of $\sqrt{N}$	6
7	**a)** 42 33 27 19 15 8 **b)** 14 comparisons, 8 swaps **c)** $\frac{n(n-1)}{2}$	7
8	**a)** 3.75 seconds **b)** 212	5
9	**a)** 101101 **b)** writes N in binary **c)** 10	6
10	**a)** $x > 24$ (24 and x not swapped) and $x < 31$ (x did not pass 31) **b)** 29 or 30 **c)** 17 12 24 28 29 31; 12 17 24 28 29 31; 12 17 24 28 29 31	6
11	**a)** 92 71 63 54 45 36 27 18 **b)** 16 **c)** 5 passes, 25 comparisons; quick sort quicker	8
12	**a)** 14 **b)** $\frac{1}{6}n(n+1)(2n+1)$ **c)** quadratic, order n^2 **d)** 0.144 s	9

Full worked solutions, written out by hand, are on the solutions sheet for this topic.

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