

Eton 2018 King's Scholarship A Solutions

- 1) a) $10\frac{1}{2}$
b) $2\frac{5}{8}$
c) $7\frac{5}{6}$
d) $12\frac{1}{4}$
- 2) a) 0.14
b) 4000
c) 0.000064
- 3) $1\frac{5}{18}$
- 4) $x > -6$
- 5) $x=13, y=3$
- 6) 0.24cm
- 7) 36%
- 8) 600
- 9) i) 65
ii) 21
- 10) $\frac{8}{9}$
- 11)a) $(5\sqrt{7})^2 = 25 \times 7 = 175$
b) $3\sqrt{3} = \sqrt{9}\sqrt{3} = \sqrt{27}$ and similarly $2\sqrt{7} = \sqrt{28}$ so $2\sqrt{7}$ is larger
c) $6\sqrt{3}$
d) $6\sqrt{2}$
- 12)a) 117 degrees
b) 109 degrees
- 13)a) $210 = 2 \times 3 \times 5 \times 7$, all prime so no smaller values possible.
1 must be the other number.
So $a + b + c + d + e = 1 + 2 + 3 + 5 + 7 = 18$

- b) Two of the numbers must be combined.
 If 1 is one of those numbers then we get:
 2, 3, 5, 7 which gives 17
 Otherwise:
 1, 2x3, 5, 7 gives 19
 1, 2x5, 3, 7 gives 21
 1, 2x7, 3, 5 gives 23
 1, 2, 3x5, 7 gives 25
 1, 2, 3x7, 5 gives 29
 1, 2, 3, 5x7 gives 41
- c) $10 = 1 \times 1 \times 2 \times 5$ or $1 \times 1 \times 1 \times 10$ with 0, 2 or 4 negative signs.
 Order of $(w-1)$, $(x-2)$, $(y-3)$, $(z-4)$ doesn't matter.

				$w+x+y+z$
1	1	2	5	19
-1	-1	2	5	15
-1	1	-2	5	13
-1	1	2	-5	7
1	1	-2	-5	5
-1	-1	-2	-5	1
1	1	1	10	23
-1	-1	1	10	19
-1	1	1	-10	1
-1	-1	-1	-10	-3

- 14)a) i) $50 \times 4 + 9 \times 202 = 2018$
 $50 \times 13 + 9 \times 152 = 2018$
 ii) (22,102), (31,52), (40,2)
 b) 3
- 15)a) OAC and OBC are isosceles as they each contain two radii.
 Let $\angle OCB = x$ degrees
 Then $\angle OBC = x$ (isosceles).
 $\angle BOC = 180 - 2x$ (180 degrees in a triangle)
 $\angle AOC = 2x$ (180 degrees on straight line)
 $\angle OCA = 90 - x$ (OAC isosceles and 180 degrees in triangle)
 $\angle ACB = \angle OCA + \angle OCB = x + (90 - x) = 90$
 b) 24cm
 c) 2.25cm