

Eton King's Scholarship 2005 B Solutions

- 1) a)  $2n+1$   
b) 2005
- 2) a)  $2^5 - 1$   
b)  $x^{100} - 1$   
c) By (b)  $2^{100} - 1 = (2^{50} - 1)(2^{50} + 1)$ , so not prime.
- 3) a)  $\frac{1}{10}$   
b)  $1 - x^4$  and  $1 - x^5$   
c)  $1 - \frac{1}{30}$
- 4) a) 180m  
b) 20m
- 5) a) 15cm  
b) 48cm  
c)  $1230\text{cm}^2$
- 6) a)  $\sqrt{3}$   
b)  $GAX = 30^\circ$ ,  $AXG = 60^\circ$   
c) They have the same angles  
d)  $\frac{1}{\sqrt{3}}$   
e)  $\frac{\pi}{3}$
- 7) a) 120 degrees  
b)  $\frac{311}{484}$   
c) 23cm
- 8) a) 100  
b)  $x=2, y=3, z=5$
- 9) a)  $\sqrt{2}$   
b) BX and BY are  $\sqrt{2} - 1, \sqrt{2} + 1$  respectively.  
c)  $1 : \sqrt{2} + 1$   
d)  $3 - 2\sqrt{2}$
- 10) a) 2  
b) 9  
c) 32