

### Westminster Challenge 2014 Paper 3 Solutions

1)  $4\frac{5}{6}in$

2) 16

3) i) 370 ii) 217 iii) 919

4) £12

5) a)  $32cm^2$  b)  $72cm^2$

6)  $a=5/3$ ,  $b=8/3$

7) a)  $30n-29$ ,  $30n-24$ ,  $30n-17$ ,  $30n-12$ , for  $n=1,2,3,\dots$

b) None. The top pattern has red at some even positions but the bottom has reds at some odd positions. So they never align.

8) Square side length = 7cm, triangle height = 9cm

9) a)  $DCB = 119$  degrees (opposite angles in parallelogram)  
 $DHC = 106$  degrees (co-interior angles with DEF)  
 $HCD = 42$  degrees (angles in triangle DHC add to 180 degrees)  
 $BCH = DCB - HCD = 119-42 = 77$  degrees

b)  $SWR = 180-x$   
Let  $PSR = a$   
 $WSR = a-z$   
 $SRQ = 180-a$  (co-interior angles with PSR)  
 $WRS = 180-a-y$   
Angles in triangle WSR = 180 so  $(180-x)+(a-z)+(180-a-y)=180$  i.e.  $x+y+z=180$

10) 5km/h

11) a) 68

b)  $x=5$ ,  $y=16$

c) i)  $2a+3b+4c$

ii)  $a=1$ ,  $b=4$ ,  $c=7$

12) a) 20%

b) 35%

13) a)  $144cm^2$

b)  $120cm^2$

14) 11cm.