

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) $36cm^2$ 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.