7. The number of possible arrangements is the number of permutations, ${}_{20}P_6$. The event can occur in one way for each combination, ${}_{20}C_6$. So the probability is $\frac{{}_{20}C_6}{{}_{20}P_6} = \frac{1}{720}$

8. Let AH = AE = x, then GH = 2x. In right triangle AHG, $x^2 + (2x)^2 = 5^2$, so $x^2 = 5$, the area is $4x^2 = 20$.

9. Let $a = \sqrt{\frac{2}{x} + 2}$ and substitute to get $a + a^2 = 6$. Solving, a = 2 or -3. But a can't be negative, so a = 2.

Now $\frac{2}{x} + 2 = 4$, *so* $x = 1$

10. The region is a square with vertices (3,-1), (-3,-1), (0,-4), and (0,2). so the area is 18.

11. The hour hand is halfway between the 4 and 5, so makes a 15° angle with 5 O'clock and the minute hand is on the six, so it is 30° from 5 to 6, making a total of 45°.

12. Andy (2) is true, so Andy (1) is false, so Bob, Dave are innocent. Bob (2) must be false, so Bob(1) is true, hence Andy and Bob are innocent; so Carl is guilty. To check, note that then Carl (1) is false, Carl (2) is true; and Dave (1) is false and Dave (2) is true.