



7. Since the lines are parallel  $m\angle ABC + m\angle DCB = 180^\circ$ . Bisecting the angles gives  $m\angle EBC + m\angle ECB = 90^\circ$ , so the remaining angle in the triangle is  $90^\circ$ .
8. The midpoint of the segment is  $(2,3)$ , and the slope of the segment is 2. So the line connecting  $(4,k)$  and  $(2,3)$  must have slope  $-1/2$ . So  $\frac{k-3}{4-2} = -\frac{1}{2}$  and thus  $k = 2$ .
9. Let  $QW = x$  and then  $WT = 12 - x$ . Since  $\triangle PQW \sim \triangle RTW$ ,  $\frac{10}{15} = \frac{x}{12-x}$ . So  $x = 4.8$ .
10. If Cain is guilty, then Abel and Cain both told the truth. If Baker were guilty, then Abel and Cain both told the truth. If Abel is guilty, only Cain told the truth. So Abel is guilty.
11. In the five exterior triangles, the total of the angles is  $5(180) = 900$ . The total of all the exterior angles of the pentagon is 720, so the five angles in question add up to 180.  
*Alternate solution:* In the diagram note that  $m\angle BPC = m\angle A + m\angle D$  and that  $m\angle DQC = m\angle E + m\angle B$  since an exterior angle of a triangle equals the sum of the remote interior angles. But we know that  $m\angle BPC + m\angle DQC + m\angle C = 180$ , so by substitution,  $m\angle A + m\angle B + m\angle C + m\angle D + m\angle E = 180$ . Note as well that neither solution required an equiangular polygon.
12. The total in math or science or both is  $560 + 435 - 220 = 775$ . So 75 students take neither. Thus the desired probability is  $\frac{75}{850}$ , or  $\frac{3}{34}$ .

