Nassau County Interscholastic Mathematics League

Solutions **2001-2002**
Contest # 3

13. There are ${}_{12}C_3 = 220\, roads$.

14. They are different when (1) p, q, r all true; (2) p, q true, r false;(3) p, r true, q false; and (4) p false, q, r true.

15. Let $x = 3$. Consequestly $3f(3) = 9,$ and then $f(3) = 3$.

16. Space diagonal = edge $\sqrt{3}$, so edge = $\frac{18}{\sqrt{3}} = 6\sqrt{3}$ So volume = $\left(6\sqrt{3}\right)^3 = 648\sqrt{3}$.

17. Radius goes from $(0,2)$ to $(3,6)$, slope $\frac{4}{3}$, so the tangent has slope $\frac{-3}{4}$ and contains $(3,6)$. So in point-slope, it's $y-6=\frac{-3}{4}(x-3)$. Convert to slope-intercept form.

18. Any set of five digits works once. So the question is how many sets of five digits are there; and ${}_8C_5 = 56$.