



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 $x = 3$. Consequently $3f(3) = 9$, and then $f(3) = 3$.
16. Space diagonal = edge $\sqrt{3}$, so edge = $\frac{18}{\sqrt{3}} = 6\sqrt{3}$. So volume = $(6\sqrt{3})^3 = 648\sqrt{3}$.
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 ${}_{8}C_5 = 56$.