Solutions for Meet 7

Individual Questions

1. 7/11 = $\overline{.63}$ repeating. The 2015th digit is 6

2. $\left\{\frac{3}{4}\left[\left(1-\frac{1}{6}-\frac{1}{8}\right)+\frac{2}{3}\left(\frac{1}{6}\right)\right]+\frac{1}{8}\right\}x = 213$, so $x = 288$. Then $\frac{1}{4}\left[\left(1-\frac{1}{6}-\frac{1}{8}\right)+\frac{2}{3}\left(\frac{1}{6}\right)\right](288) = 59$

3. $4A = 4B + 36,\ so\ A = B + 9,\ A^2 = B^2 + 243.$ (B+9)^2=B^2 + 243 so 18B + 81 = 243. B=9 and so A=18

4. $x = \sqrt{2} + \sqrt[3]{2}$. So, $x - \sqrt{2} = \sqrt[3]{2}$. Now, cube both sides to get
$x^3 - 3x^2\sqrt{2} + 6x - 2\sqrt{2} = 2$, or $x^3 + 6x - 2 = \sqrt{2}(3x^2 + 2)$ Square both sides to get
$x^6 + 12x^4 + 36x^2 + 4 - 4x^3 - 24x = 2(9x^4 + 12x^2 + 4)$, from which we get
$x^6 - 6x^4 - 4x^3 + 12x^2 - 24x - 4 = 0$ (Equation or polynomial should be accepted)

5. Let x = the number of adults. Then , $(15)(.2x) + 3(7{,}695{,}429 - x) = (3)(7{,}695{,}429)$. Our answer is 23,086,287

6. Draw and label a picture. Let x = segment AD, y = segment DB. Using ratios from right triangles 16 = x(x + y) and 81 = y(x + y). Now divide x/y = 16/81. (accept 16:81 as well)