Solutions for Meet 2

Individual Questions

1.We want $\frac{5}{9}(F-32)=\frac{1}{2}(F-30)$, solving $10F-320=9F-270$, so $F=50$

2. We have $(x)+(x+2)+(x+4)+\cdots(x+198)=100^{100}$.
This gives $100x+99(100)=100^{100}$, so now $x+99=100^{99}$.
Our answer then becomes $x=100^{99}-99$

3. Much of the geometric data is unimportant. We have DE = AE – AD = 6 – 4 = 2
Then EB = DB – DE = 9 – 2 = 7

4. Let the roots of $x^2+2x+2=0$ be a and b. Then ab = 2 and a + b = 2, using the theorem on sum and product of the roots of a quadratic equation. The required equation is given by
$x^2-\left(a+\frac{1}{b}+b+\frac{1}{a}\right)x+\left(a+\frac{1}{b}\right)\left(b+\frac{1}{a}\right)=0$, or we can write
$x^2-\left(\frac{(ab+1)(a+b)}{ab}\right)x+\left(ab+\frac{1}{ab}+2\right)=0$. Now using the values we have the required equation is $x^2+3x+\frac{9}{2}=0$

Solutions for Meet 2

Team Questions

1.Let L, D, and I denote the doctor's, lawyer's, and Indian Chief's homes, respectively. The equation of the perpendicular bisector of $\overline{LD}$ is: $y = -x + 13$, while the equation of the perpendicular bisector of $\overline{DI}$ is: $y = 2x + 1$. Solving , the center of the circle is at (4, 9) and arc LD is one quarter of a circle whose radius has length 5. Thus the required distance is $\frac{5\pi}{2}$.

2. Adding 1 to both sides of each equation we get: $(x+1)(y+1) = 12$, $(x+1)(z+1) = 18$, $(y+1)(z+1) = 24$. Multiplying together, $(x+1)^2(y+1)^2(z+1)^2 = 12^2 \cdot 6^2$, from which $(x+1)(y+1)(z+1) = \pm 72$. Dividing this result, in turn, by the originally derived equations, the TWO possible triples are (2, 3, 5) and (-4, -5, -7)

3. Let $y = 18°$. This gives $cos3y = sin2y$. Using the identity $cos3y = 4cos^3y - 3cosy$, we have $4cos^3y - 3cosy = 2sinycosy$. Since $cosy \neq 0$, we have $4cos^2y - 3 = 2siny$, or $4sin^2y + 2siny - 1 = 0$. Since $y = 18°$ and $siny$ is the positive root of $4x^2 + 2x - 1 = 0$, it follows that (a, b) = (2, -1)

4. Let x = #people originally, and let each original share be $y. Then the cost of the boat was $xy. The equations arising from the problem are: (x – 10)(y + 1) = xy, and (x – 25)(y + 3) = xy. When we simplify we get x = 100

5. Draw a diagram, and label with other letters, and notice (BQ)(AO) = (AB)(BO). Since AO = 5, BQ = 2, and AQ = 4. The area = 8