14

SYSTEM OF EQUATIONS

2011A

12. **Answer (A):** Let x, y, and z be the number of successful three-point shots, two-point shots, and free throws, respectively. Then the given conditions imply

$$3x + 2y + z = 61,$$
$$2y = 3x, \text{ and}$$
$$y + 1 = z.$$

Solving results in $x = 8$, $y = 12$, and $z = 13$. Hence the team made 13 free throws.

2001

14. **(A)** Let n be the number of full-price tickets and p be the price of each in dollars. Then

$$np + (140 - n) \cdot \frac{p}{2} = 2001, \text{ so } p(n + 140) = 4002.$$

Thus $n + 140$ must be a factor of $4002 = 2 \cdot 3 \cdot 23 \cdot 29$. Since $0 \leq n \leq 140$, we have $140 \leq n + 140 \leq 280$, and the only factor of 4002 that is in the required range for $n + 140$ is $174 = 2 \cdot 3 \cdot 29$. Therefore, $n + 140 = 174$, so $n = 34$ and $p = 23$. The money raised by the full-price tickets is $34 \cdot 23 = 782$ dollars.

2007B 15. **Answer (D):** Let x be the degree measure of $\angle A$. Then the degree measures of angles B, C, and D are $x/2$, $x/3$, and $x/4$, respectively. The degree measures of the four angles have a sum of 360, so

$$360 = x + \frac{x}{2} + \frac{x}{3} + \frac{x}{4} = \frac{25x}{12}.$$

Thus $x = (12 \cdot 360)/25 = 172.8 \approx 173$.