UNIT 8 EXERCISES 6-10

MONEY

2006B 6. **(B)** Francesca's 600 grams of lemonade contains $25 + 386 = 411$ calories, so 200 grams of her lemonade contains $411/3 = 137$ calories.

2018B 6. **Answer (B):** The cost of 1 can is $\frac{Q}{S}$ quarters, which is $\frac{Q}{4S}$ dollars. Hence the number of cans that can be purchased with D dollars is

$$\frac{D}{\left(\frac{Q}{4S}\right)} = \frac{4DS}{Q}.$$

2003B 7. (D) Let n represent the number of nickels in the bank, d the number of dimes, and q the number of quarters. Then $n+d+q=100$ and $5n+10d+25q=835$. Further, n, d, and q must all be nonnegative integers. Dividing the second equation by 5 yields $n+2d+5q=167$. Subtracting the first equation from this gives $d+4q=67$. Since q cannot be negative, d is at most 67, and we check that 67 dimes and 33 nickels indeed produces \$8.35. On the other hand, d cannot be 0, 1, or 2 because then q would not be an integer. Thus the smallest d can be is 3, leaving $q=16$. We check that 16 quarters, 3 dimes, and 81 nickels also produces \$8.35. Thus the largest d can be is 67, the smallest is 3, and the difference is 64.

2002A 9. **(B)** First note that the amount of memory needed to store the 30 files is

$$3(0.8) + 12(0.7) + 15(0.4) = 16.8 \text{ mb},$$

so the number of disks is at least

$$\frac{16.8}{1.44} = 11 + \frac{2}{3}.$$

However, a disk that contains a 0.8-mb file can, in addition, hold only one 0.4-mb file, so on each of these disks at least 0.24 mb must remain unused. Hence, there is at least $3(0.24) = 0.72$ mb of unused memory, which is equivalent to half a disk. Since

$$\left(11 + \frac{2}{3}\right) + \frac{1}{2} > 12,$$

at least 13 disks are needed.
To see that 13 disks suffice, note that:
Six disks could be used to store the 12 files containing 0.7 mb;
Three disks could be used to store the three 0.8-mb files together with three of the 0.4-mb files;
Four disks could be used to store the remaining twelve 0.4-mb files.