

MONEY

2002A 11. (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.

- 2003B 12. (C) Denote the original portions for Al, Betty, and Clare as a , b , and c , respectively. Then

$$a + b + c = 1000 \quad \text{and} \quad a - 100 + 2(b + c) = 1500.$$

Substituting $b + c = 1000 - a$ in the second equation, we have

$$a - 100 + 2(1000 - a) = 1500.$$

This yields $a = 400$, which is Al's original portion.

Note that although we know that $b + c = 600$, we have no way of determining either b or c .

- 2015A 13. **Answer (C):** If Claudia only has 10-cent coins, then she can make 12 different values. Otherwise, suppose that the number of 10-cent coins is d and thus the number of 5-cent coins is $12 - d$. Then she can make any value that is a multiple of 5 from 5 to $10d + 5(12 - d) = 5(d + 12)$. Therefore $d + 12 = 17$, and $d = 5$.

- 2004A 14. (A) If n is the number of coins in Paula's purse, then their total value is $20n$ cents. If she had one more quarter, she would have $n + 1$ coins whose total value in cents could be expressed both as $20n + 25$ and as $21(n + 1)$. Therefore

$$20n + 25 = 21(n + 1), \quad \text{so} \quad n = 4.$$

Since Paula has four coins with a total value of 80 cents, she must have three quarters and one nickel, so the number of dimes is 0.

- 2004B 15. (A) Because the value of Patty's money would increase if the dimes and nickels were interchanged, she must have more nickels than dimes. Interchanging one nickel for a dime increases the amount by 5 cents, so she has $70/5 = 14$ more nickels than dimes. Therefore she has

$$\frac{1}{2}(20 - 14) = 3 \quad \text{dimes} \quad \text{and} \quad 20 - 3 = 17 \quad \text{nickels},$$

and her coins are worth $3 \cdot 10 + 17 \cdot 5 = 115$ cents = \$1.15.