



Math Olympiad and Problem Solving Programs

F120 - Intermediate Problem Solving

Problem Set 11.1 - Arithmetic

Name:

Date:

1. Draw a picture of a 10 story building. Now draw the stairways. How many stairways are there? ONLY NINE! A climb to the third floor takes TWO stairways: one to get from Floor 1 to Floor 2, one to get from Floor 2 to Floor 3. A climb to the seventh floor takes SIX stairways (check this for yourself). Thus, the fraction of the climb to the 3rd floor to the 7th floor is $\frac{2}{6} = \boxed{\frac{1}{3}}$
2. $\boxed{87}$
3. Let's count the double-perfect squares:
 $1^2 = 1$. $1^2 = 1$.
 $2^2 = 4$. $4^2 = 16$.
 $3^2 = 9$. $9^2 = 81$.
Now find their sum: $1 + 16 + 81 = \boxed{98}$
4. $\boxed{15}$
5. $\boxed{1}$
6. The first 25 even counting numbers are these: 2, 4, ...50. Let's consider the first five: 2, 4, 6, 8, 10. It took 6 digits to write them. The next 20 numbers are all 2 digit numbers, so it will take $20 \times 2 = 40$ digits to write them. So we need $6 + 40 = \boxed{46}$ digits.
7. Use ratios: if 3 Doggy steps = 4 Catty steps, then () Doggy steps = 12 Catty steps. Since $4 \times 3 = 12$, we find that $3 \times 3 = 9$, so (9) Doggy steps = 12 Catty steps. 1 Doggy step = 1 foot, so 9 Doggy steps = $\boxed{9 \text{ feet}}$
8. $\boxed{374}$
9. $\boxed{11}$
10. First let's figure out how many marbles there are: $15 + 2 + 3 + 7 + 8 = 35$, so split evenly among 5 people, each person would get $35 \div 5 = 7$ marbles. Dan already has 7 marbles, so we can ignore him. Alex has 8 too many marbles, so we should take his 8 (so now Alex has 7) and give 5 to Bing (so now Bing has 7) and 3 to Cara (so now Cara has 6). Now we will take Earl's extra marble (now Earl has 7) and give it to Cara (now Cara has 7). So in all, we moved $8 + 1 = \boxed{9}$