

## Part II – For the Teacher

### Curriculum Areas

Problem 1 – Measurement; Number Sense and Numeration

Problem 2 – Number Sense and Numeration

Problem 3 – Number Sense and Numeration

Problem 4 – Measurement; Geometry and Spatial Sense

Problem 5 – Patterning and Algebra; Number Sense and Numeration

Problem 6 – Patterning and Algebra; Probability and Data Management

### Hints and Suggestions

#### Problem 1

Hint 1 – Remember: 60 minutes = 1 hour.

*Suggestion:* You may wish to make available some clock faces (borrow from a primary class).

#### Problem 2

Hint 1 – How can you make a chart or a table to organize the information?

(Answer: Label the columns for the day, the amount for that day, and the accumulated total.)

*Suggestion:* Ask the students to make a hypothesis first. You may wish to have play money available.

#### Problem 3

Hint 1 – Could the 12 hits be 4 small bottles and 8 large bottles for a win? What about 7 small and 5 large?

Hint 2 – What is the minimum number of points needed to win (if she hits 5 small bottles and 6 large bottles)?

#### Problem 4

*Suggestion:* You may wish to supply graph or dot paper.

#### Problem 5

Hint 1 – Who takes the shortest time to get to the rink? Who takes the longest?

Hint 2 – If you guess Indira takes 10 minutes, how long will each of the others take?

Hint 3 – Ali and Indira's combined time is less than 30 minutes.

#### Problem 6

Hint 1 – You may wish to begin with a simpler problem with only four towns to help students organize their thinking.

Hint 2 – How many choices does she have when leaving A? When leaving the second town?

*Suggestion:* Since students are working in groups for this problem, different students could organize the counting for different initial steps (i.e.,  $A \rightarrow B$ ,  $A \rightarrow C$ ,  $A \rightarrow D$ ,  $A \rightarrow E$ ) Students can use a tree to organize their counting; it is not necessary to write out all four steps, as they each give the same number of routes.

## Solutions and Notes

### Problem 1

Mackenzie should get up at 7:50 am; she usually gets up at 8:00 am.

### Problem 2

- a) Wei gets \$6.35 from the 'daily double' allowance, versus \$10.00 from the flat rate.  
b) He gets \$820.15 versus \$50.00 over the two-week period. Note that students need only do the first few days of the second week to see what will happen.

### Problem 3

Since Genevieve must hit at least 5 small bottles and 6 large bottles to win, the only combinations that need to be checked are 5 small and 7 large (which gives  $5 \times 25 + 7 \times 15 = 230$  points), and 6 small bottles and 6 large bottles (which gives  $6 \times 25 + 6 \times 15 = 240$  points). Since she only got 220 points, she did not win the rabbit. Alternatively, note that the winning combination of 5 small and 6 large bottles gives 215 points. Since Genevieve's total was 220 points, neither a small nor large bottle could be her 12th hit, so she didn't win.

### Problem 4

- a) There are five possible fields:  $1 \times 100$ ,  $2 \times 50$ ,  $4 \times 25$ ,  $5 \times 20$ , and  $10 \times 10$ . A field 1 or 2 meters wide is probably not sensible, since the cows would have difficulty turning around.  
b) The square  $10\text{m} \times 10\text{m}$  field has the smallest perimeter (40 m).

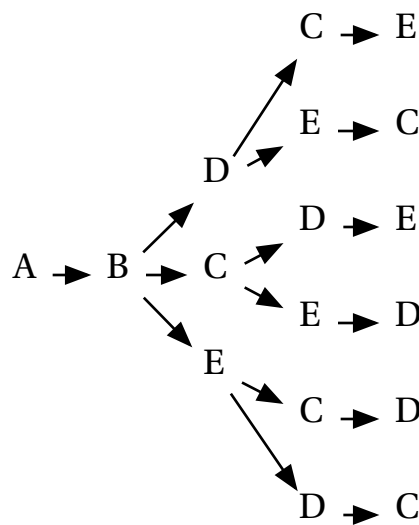
*Extension:* There are six possible fields:  $1 \times 200$ ,  $2 \times 100$ ,  $4 \times 50$ ,  $5 \times 40$ ,  $8 \times 25$ ,  $10 \times 20$ . The smallest perimeter is 60m, for the  $10 \times 20$  field, which is rectangular.

### Problem 5

Ali takes 18 minutes, Juan takes 37 minutes, and Indira takes 9 minutes.

### Problem 6

- a) Drawing the figure and joining the towns gives 10 roads.  
b) One way to organize the counting of possible routes is to use a tree. For example, if her first stop is town B, the six possible routes are:



There are four such trees, giving a total of 24 possible routes.

- c) Use the trees (or tables) constructed for b), and eliminate any routes that go from B to E or E to B; this eliminates 12 routes, leaving 12.