

Lesson Plans

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PUZZLES & PROBLEMS

1. If 3 cats eat 3 mice in 3 minutes, how long will it take 50 cats to eat 50 mice?
2. I have many coins in my pocket, but I can't make change for a nickel, a dime, a quarter, a fifty-cent piece, or a dollar. What is the largest sum of money I can have?
3. How may 100 be expressed using only 4 like numerals? For example, $100 = 99 + \frac{9}{9}$ (using four 9s). There are more than 20 ways to do this. Can you find 10 ways?
4. Find numerals for as many numbers as you can from 1 to 100 using four 4s.
For example,

$$12 = \frac{4 + 4}{0.4 \sqrt{4}}$$

$$35 = \frac{44}{4} + 4!$$

5. What is the largest number that can be formed using three 2s? Using three 4s?
6. Alice, Betty, and Carol set off simultaneously from the same point on a circular track 3 km in circumference. Alice cycles at 14 km/h, Betty runs at 8 km/h, and Carol walks at 5 km/h, all in the same direction. How long will it be before they all come together again at some point on the track?
7. The boys in Grade 5 rate 2 spears as worth 3 fishhooks and a knife, and will give 25¢ for 3 spears, 2 knives, and a fishhook together. How much will they pay for each article separately?
8. A hungry hunter came upon two shepherds, one of whom had 3 small loaves of bread, and the other 5, all of the same size. The loaves were equally divided among the three, and the hunter paid 80¢ for his share. How should the shepherds divide the money?
9. The following is a problem in addition. Each letter is a placeholder for a digit, and each time a letter appears, it represents the same digit. Can you determine what each letter represents?

$$\begin{array}{r} \text{S E N D} \\ \text{M O R E} \\ \hline \text{M O N E Y} \end{array}$$

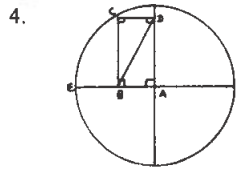
10. A man drove his car 1 km to the top of a mountain at 30 km/h. How fast must he drive 1 km down the other side in order to average 60 km/h for the 2 km trip?
11. A clock gains 12 min/h. It is correct at 17 00 h. What is the correct time when it reads midnight?
12. In a large department store a father and son mounted a moving escalator to toytown. Both walked up, but the son in his excitement took two steps to each one taken by his father. Father noted that his son took 28 steps while he took 21 steps to reach the top. How many steps were in sight at one time on the escalator?
13. Three men, let us call them A, B, and C, went out to dinner in Montreal. One was English, one Scottish, and one Welsh. The waiter was asked to guess their nationalities. He said that A was English, B was not English, and C was not Welsh. Only one of his answers was correct. What were the nationalities of A, B, and C?
14. If a bag contained twelve balls, four red, four white, and four blue, what is the smallest number you would have to withdraw to ensure that you had:
 - i. two balls of the same color?
 - ii. one ball of each color?
 - iii. three red balls?
15. Frankie and Johnny went for a long cycle ride. Johnny maintained a speed of 15 km/h but Frankie could only manage a steady 10 km/h. After riding for 5 h, Johnny turned back. How far from their starting point would the two meet?
16. Three glasses sit on a counter -- two inverted, and one upright.
 - a. Invert two glasses simultaneously so that all the glasses are upright.
 - b. Can you get all the glasses upright in exactly two moves, inverting two glasses each time?
 - c. Can you do it in three moves? Four moves?
 - d. Can you find a general strategy for any number of moves?

I GOTCHA!

contributed by Jay Caturay, Prince Rupert Secondary School

I wonder how many of our readers can give the answers to the following problems within 10 seconds for each question?

1. What is 32% of 25?
2. $\frac{3}{8} + \frac{2}{3} - \frac{1}{24} =$
3. Thirty divided by a half.



Given:

radius $\overline{AE} = 10$ cm

$\overline{BE} = 2$ cm

Find: \overline{BD}

Answers:

1. 8 $\frac{32}{100} \times 25 = 32 \times \frac{25}{100} = 32 \times \frac{1}{4} = 8$

2. 1 $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$

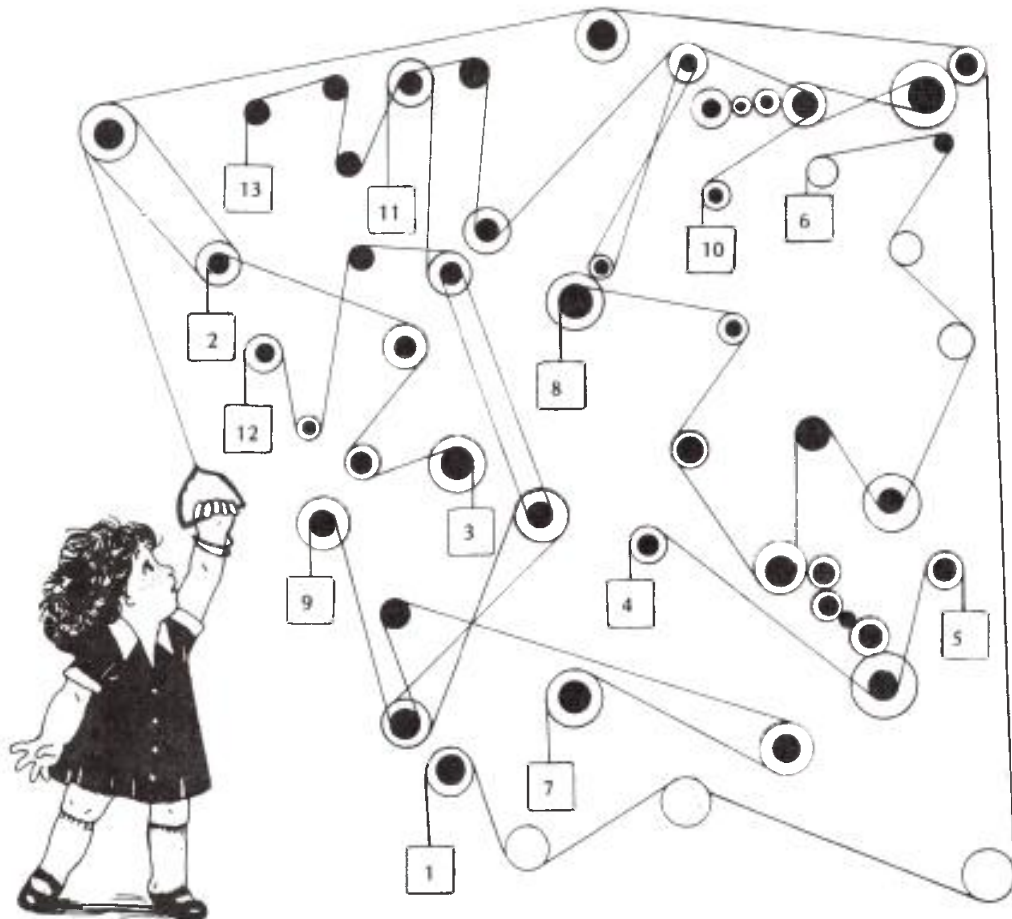
$\frac{3}{8} + \frac{2}{3} = \frac{9 + 16}{24} = \frac{25}{24}$

3. 60, not 15

$\frac{30}{\frac{1}{2}} = \frac{30 \times 2}{1} = 60$

4. $\overline{BD} = 10$ cm Draw AC $\overline{AE} = \overline{AC}$, $\overline{AC} = \overline{BD}$

Hence $\overline{AE} = \overline{BD} = 10$ cm



PULLEY PROBLEM

When Josie pulls down on the lever, the whole system of loads, belts, and pulleys will begin to move. Which loads will go up, and which loads will come down?

Remember: wheels belted to each other revolve in the same direction, unless the belt crosses itself. In that case, the wheels revolve in opposite directions. Wheels in contact with each other on their outer rims will rotate in opposite directions.