

**LESSON**  
**6•9**

## Pan-Balance Problems

A pan balance can be used to compare the weights of objects or to weigh objects. If the objects in one pan weigh as much as those in the other pan, the pans will balance.



The diagram at the right shows a balanced pan balance.



**Example:** In each of the diagrams below, the pans are balanced. Your job is to figure out how many marbles weigh as much as an orange. When moving the oranges and marbles, follow these simple rules:

- ◆ Whatever you do, the pans must always remain balanced.
- ◆ You must do the same thing to both pans.

The pan balance shows that 3 oranges weigh as much as 1 orange and 12 marbles.



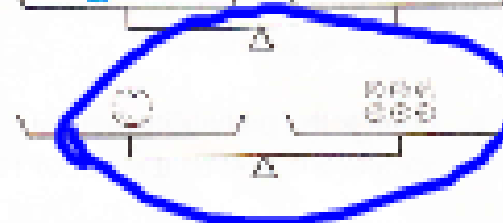
If you remove 1 orange from each pan, the pans remain balanced.



If you then remove half of the objects from each pan, the pans will still be balanced.



Success! One orange weighs as much as 6 marbles.



Solve the pan-balance problems with a partner. Be ready to share your strategies with the class.

1. One pencil weighs as much as 10 paper clips.
2. One pencil weighs as much as 2 erasers (paper clips).



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Pan-Balance Problems *continued*

Solve these pan-balance problems. In each figure, the two pans are balanced.



3. One banana weighs as much as 6 marbles.



4. One cube weighs as much as 7 paper clips.



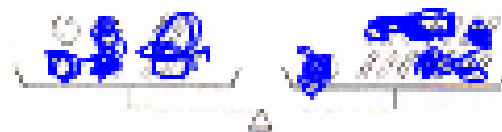
5. One cube weighs as much as 5 marbles.



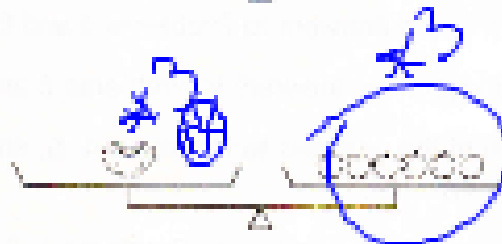
6. One triangle weighs as much as 3 squares.



7. One orange weighs as much as 3 paper clips.



8. One apple and one-half apple weigh as much as 10 apples.



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**Pan-Balance Problems** *continued*

**Reminder:**  $4\overline{1}$  or  $4 \cdot \overline{1}$  are other ways to write  $\overline{1} + \overline{1} + \overline{1} + \overline{1}$ .



9. One cube weighs as much  
as \_\_\_\_\_ coins.



10. One  $p$  weighs as much  
as \_\_\_\_\_ balls.



11. One  $b$  weighs as much  
as \_\_\_\_\_  $k$ 's.



Check your answers.

- ◆ The sum of the answers to Problems 3 and 6 is equal to the square root of 91.
- ◆ The product of the answers to Problems 6 and 8 is 38.
- ◆ The sum of the answers to Problems 4, 5, and 11 is the solution to the equation  $4n = 2^6$ .
- ◆ The product of the answers to Problems 7, 9, and 11 is 24.

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## Math Boxes



1. Use the order of operations to evaluate each expression.

a.  $\frac{1}{2} \times (-28) - 0^2 =$  \_\_\_\_\_

b.  $-3 - 14 + 7 =$  \_\_\_\_\_

c. \_\_\_\_\_  $= (-6) \div (8) - (-8)$

d.  $-5 - (-30) \div 3 =$  \_\_\_\_\_



2. Tell whether each statement is true or false.

a. If  $a < b$ , then  $a - 3 < b - 3$ . \_\_\_\_\_

b. If  $m < n$ , then  $m + 8 > n + 8$ . \_\_\_\_\_

c. If  $x > y$ , then  $x + 0 > y + 0$ . \_\_\_\_\_



3. You can use a formula to calculate about how long it will take a falling object to reach the bottom of a well.

$$\text{Formula: } t = \frac{1}{4} \times \sqrt{d}$$

(This formula does not account for air resistance.)

- ◆  $d$  is the distance in feet the object falls.
- ◆  $t$  is the time in seconds it takes the object to reach the bottom.

About how long would it take a bowling ball to hit the bottom of a well 100 ft deep?

\_\_\_\_\_ seconds



4. Lines  $a$  and  $b$  are parallel.



$m\angle 1 =$  \_\_\_\_\_

$m\angle 2 =$  \_\_\_\_\_

$m\angle 3 =$  \_\_\_\_\_



5. Solve mentally.

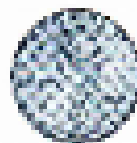
a. 10% of 82 = \_\_\_\_\_

b. 5% of 44 = \_\_\_\_\_

c. 15% of 90 = \_\_\_\_\_



6. Suppose you toss a coin 10 times and get 10 heads. What is the probability of getting heads on the 11th toss?



Probability = \_\_\_\_\_



232-233

500

and  
hand out 6.9