

### Problem Solving Steps and Strategies

1. Brett built a tower using four different colored milk cartons. The red carton was below the green carton. The blue carton was above the yellow carton which was above the green carton. Which carton is On top?



Which of the following problem-solving strategies would be most appropriate to use to solve this problem?

A Find a pattern   B Draw a diagram   C Set up an equation   D Working backwards

2. Nicole wanted to solve a math problem: “If there are 52 weeks in a year and today makes 23 weeks, how many weeks until the end of the year?”

What should be her last problem solving step?

- A Devise a plan to solve the problem
- B Understand what the problem is asking
- C Carry out the plan
- D Look back to check her answer is correct

### Number and Operations

3. Use the student work below to answer the question that follows.

- Step 1:  $4.8 \cdot 0.5 =$
- Step 2:  $(4 + 0.8) \times 0.5 =$
- Step 3:  $4 \cdot 0.5 + 0.8 \cdot 0.5 =$
- Step 4:  $2 + 0.4 = 2.4$

Step 3 of this work indicates an understanding of which concept?

- A. associative property
- B. commutative property
- C. distributive property
- D. multiplicative inverse property

4. Which decimal number is equivalent to  $7.3/100$ ?

- A 0.073                      B 0.73                      C 7.3                      D 73

5. Which expression has a value that is greater than 42.537?

- A  $(4 \times 10) + (2 \times 1) + \left(5 \times \frac{1}{10}\right) + \left(9 \times \frac{1}{100}\right) + \left(3 \times \frac{1}{1,000}\right)$   
 B  $(4 \times 10) + (1 \times 1) + \left(6 \times \frac{1}{10}\right) + \left(2 \times \frac{1}{100}\right) + \left(5 \times \frac{1}{1,000}\right)$   
 C  $(4 \times 10) + (2 \times 1) + \left(5 \times \frac{1}{10}\right) + \left(3 \times \frac{1}{100}\right) + \left(7 \times \frac{1}{1,000}\right)$   
 D  $(4 \times 10) + (2 \times 1) + \left(5 \times \frac{1}{10}\right) + \left(1 \times \frac{1}{100}\right) + \left(9 \times \frac{1}{1,000}\right)$

6. Which expression is equivalent to  $65 \times 0.15$ ?

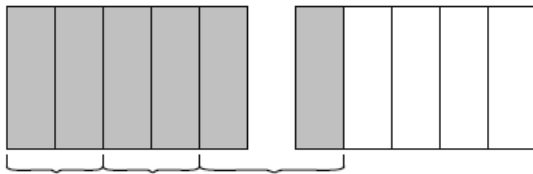
- A  $65 \times 0.1 + 0.05$   
 B  $65 \times 0.05 + 0.1$   
 C  $(65 \times 0.1) + (65 \times 0.5)$   
 D  $(65 \times 0.1) + (65 \times 0.05)$

7. What is the missing value in the equation shown below?

$$\frac{4}{10} + \frac{?}{100} = \frac{7}{10}$$

- A 1      B 3      C 10      D 30

8. The model below is shaded to represent an expression.



Which expression represents the model?

- A  $1/3 \times 2/5$     B  $1/3 \times 5/2$     C  $3 \times 2/5$     D  $3 \times 5/2$

9. Which situation could the expression  $1/4 \div 3$  represent?

- A  $1/4$  of a package of pencils shared equally among three friends  
 B 3 orders of  $1/4$ -cup servings of popcorn  
 C  $1/3$  of a stadium split into four equal sections  
 D a four-foot-long rope cut into 3 equal pieces

10. A school librarian ordered new books for the library. Of the new books ordered,  $1/3$  are science,  $2/5$  are biography, and the rest of the books are fiction. What fraction of the books ordered are fiction?

- A  $3/5$       B  $3/8$       C  $4/15$       D  $11/15$

11. Andrew wrote the number 96, 245 on the board. In which number is the value of the digit 4 exactly 100 times the value of 4 in the number Andrew wrote?

- A 681,452    B 462,017    C 246,912    D 124,655

12. Please find the value for each letter; each letter represents a distinct value:

$$\begin{array}{r} \text{TWO} \\ + \text{TWO} \\ \hline \text{FOUR} \end{array}$$

To solve this problem, which of the following statements is the most useful?

- A. Knowing that O cannot be 0
- B. Knowing that T cannot be smaller than 4
- C. Knowing that W can be any number
- D. Knowing that F is 1

13. What is *six hundred eighty and fourteen thousandths* written in standard form?

- A 608.014      B 608.14      C 680.014      D 680.14

14. The common factor of any two prime numbers is \_\_\_\_\_.

- A 3      B 0      C 1      D 2

15. What is the value of  $p$  when  $47p05$  is divisible by 3?

- A 3    B 4    C 2    D 1

16. The greatest common factor of 10, 100 and 1000 is

- A 1000      B 100      C 10      D None of these

17. The integers between -3 and 2 includes?

- A 0, -2, -1, 1    B -2, -1, 0, 1    C -1, -2, 0, 1    D 0, 1, -1, -2

18. Using an area model for  $(10+a) \times (20+b)$  as shown in below, what is the value for the unknown (with the “?” mark) area?

- A  $10b$                       B  $20a$                       C  $ab$                       D  $200ab$

	20	b
10	200	$10b$
a	$20a$	?

19. Jack puts  $\frac{1}{3}$  pound of birdseed into his bird feeder every time he fills it. How many times can Jack fill his bird feeder with 5 pounds of birdseed?

- A  $1\frac{2}{3}$  (one and two thirds)      B  $2\frac{2}{3}$  (two and two thirds)      C 8      D 15

### Operations and Algebra

20. Jake takes guitar lessons that cost \$120 per month. Which equation can be used to determine the total number of dollars,  $d$ , that Jake pays for lessons for any number of months,  $m$ ?

- A  $d = 120 \times m$     B  $m = 120 \times d$     C  $d = 120 + m$     D.  $m = 120 + d$

21. A bakery made 9 cakes using 3 bags of flour. The bakery uses the same relationship between cakes made and the amount of flour to make all of their cakes. Which table of values shows the relationship between the numbers of cakes the bakery makes to the number of bags of flour the bakery uses?

Cakes	1	2	3	4	5
Bags of Flour	3	6	9	12	15

A

Cakes	7	8	9	10	11
Bags of Flour	1	2	3	4	5

C

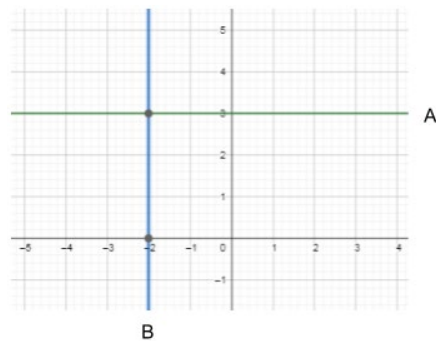
Cakes	3	6	9	12	15
Bags of Flour	1	2	3	4	5

B

Cakes	1	2	3	4	5
Bags of Flour	7	8	9	10	11

D

22. Which graph, A or B, is not a function and why?



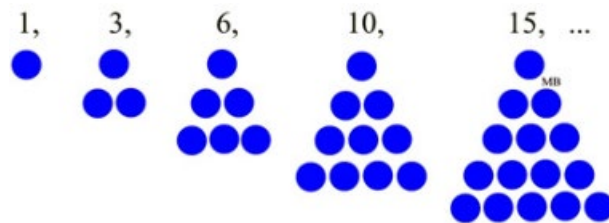
- A. B is not a function because every input does not correspond to one unique output  
 B. A is not a function because every input does not correspond to one unique output  
 C. B is not a function because every output does not correspond to one unique input  
 D. A is not a function because output does not correspond to one unique input

23. The table shows how OUT values are related to IN numbers. Which rule tells how to find the OUT number for any IN number, X?

IN	2	3	10	8	20	...	X
OUT	3	5	19	15	39	...	

- A  $X + 1$     B  $X + 3$     C  $2(X - 1)$     D  $2X - 1$

24. Please observe the patterns below. The number of circles comprising the triangles is 1, 3, 6, 10, 15, where the number of circles in the new row is added each time: 2, 3, 4, 5,... added. What is the number of circles comprising the triangle that has 7 rows?



- A. 20      B 21      C 26      D 28

25. Which expression is equivalent to  $-3(2x - 8) + 4x$

- A  $-2x - 8$     B  $-2x + 24$     C  $-10x - 8$     D  $-10x + 24$

26

What are the values of  $\square$  and  $\triangle$  in Figures 10 and 11 below?

a.

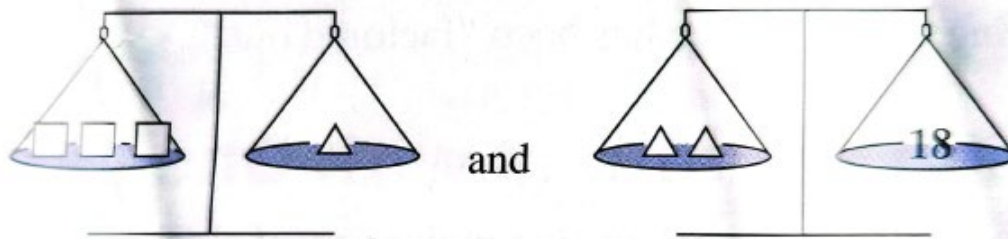


Figure 10

What is the value of the square  $\square$  ?

- A 3    B 6    C 9    D 18

### Ratios and Proportion Relations

27. Ms. Wilson is buying packages of pencils. Each package costs \$11.52 and contains 96 pencils. What is the unit price of a pencil?

- A \$0.12      B \$0.96      C \$1.20      D \$1.92

28. A zoo has 15 toucans and 75 parrots. What is the ratio of the number of toucans to the number of parrots at the zoo?

- A 4:1      B 5:1      C 1:5      D 5:4

29. Kate has a coin collection. She keeps 6 of the coins in a box, which is only 5% of her entire collection. What is the total number of coins in Kate's coin collection?

- A 30      B 100      C 120      D 300

30. Gail received a 7% raise last year. If her salary is now \$27,285, what was her salary last year?

- A \$29,195    B \$25,375    C 25,500    D 25,255

31. Terry leaves his house riding a bike at 20 km/h. Sally leaves 6 h later on a scooter to catch up with him travelling at 80 km/h. How long will it take her to catch up with him?

- A. 1    B 2    C 4    D 6

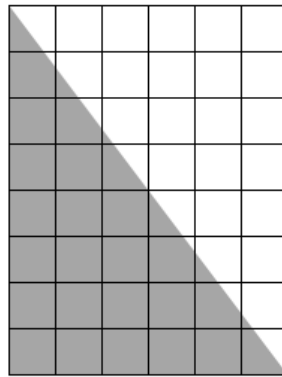
**Measurements and Geometry**

32. Which statement about parallelogram and trapezoid is always true?

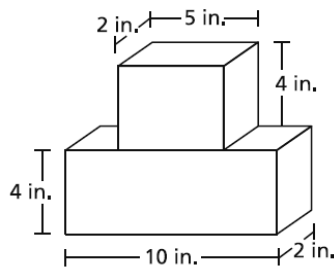
- A Both figures are three dimensional shapes  
 B Both figures are quadrilaterals  
 C Both figures have no right angles  
 D Both figures have four congruent sides

33. The grid shown below is in the shape of a rectangle. What is the area, in square units, of the **unshaded** part of the rectangle?

- A 14    B 24    C 28    D 48



34. Lana used the two blocks pictured in the diagram to build a tower.



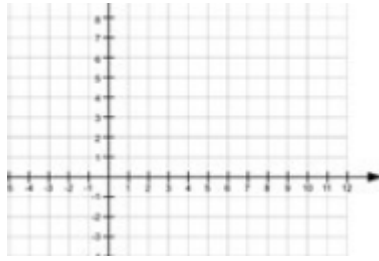
**LANA'S TOWER**

What is the total volume, in cubic inches, of the tower Lana built?

- A 27    B 80    C 116    D 120

35. The coordinates of the points below represent the vertices of a rectangle.

P: (2, 2); Q: (7, 2); R: (7, 5); S: (2, 5)



What is the perimeter, in units, of rectangle PQRS?

- A 8    B 12    C 14    D 16

(Hint: Find *P*, *Q*, *R*, *S* on the coordinate plane)

36. Ursula drew a polygon in which all the angles were obtuse. What kind of polygon could she have drawn?

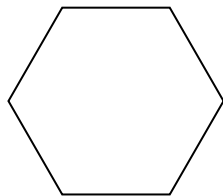
- A trapezoid    B parallelogram    C triangle    D pentagon

37. How many edges does a rectangular prism have?



- A 12    B 6    C 8    D 11

38. How many lines of symmetry does a hexagon have (all sides are congruent)?



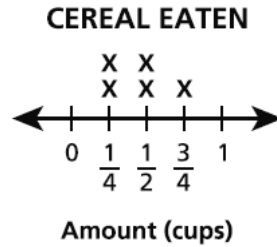
- A. 9    B. 12    C. 6    D. 10

### Data and Statistics

39. Jim has four test scores of 85, 87, 91, and 95. There is one more test during the semester. He wants to make an A in the class, which means he needs his average to be a 90. All five tests count the same in determining the class grade. What grade does Jim need to make on the fifth test to make an A in the class?

- A 90    B 92    C 93    D 88

40. The line plot below shows the amount of cereal Shyanne ate in days.



What is the total number of cups of cereal that Shyanne ate in the 5 days?

- A  $1\frac{1}{2}$     B  $1\frac{3}{4}$     C  $1\frac{4}{6}$     D  $2\frac{1}{4}$

41. Which of the following might provide a random sample for a statistical study of cafeteria good choices in a school?

- A. A collection of students on the playground who do not eat lunch in the cafeteria
- B. A collection of students at a single table in the cafeteria
- C. Every fourth student entering the cafeteria on a given day
- D. Every fourth student entering the cafeteria on a random day

### Math Pedagogy

42. Use the diagram below to answer the question that follows



A teacher places a row of apples on a table and asks a child how many apples there are. The child points to each apple while saying the numbers in the proper sequence from one through five. When asked again how many apples there are, the child responds by counting the apples again.

Given this evidence, which question could the teacher ask to help the child connect counting to cardinality?

- A How many apples are there?
- B What is the last number name you said when counting the apples?
- C How many different colors of apples are there?
- D How is the first apple counted similar to the last apple counted?



1B	2D	3 C
4A	5B	6D
7D	8C	9A
10C	11D	12D
13C	14C	15C
16C	17B	18C
19D	20A	21B
22A	23D	24D
25B	26A	27A
28C	29C	30C
31B	32B	33B
34D	35D	36D
37A	38C	39B
40B	41D	42B