

**2006**

# **ISAT**

## **Sample Book**



**GRADE**  
**7**

**Sample Items for Reading, Mathematics, and Science**

**ILLINOIS STATE BOARD OF EDUCATION**

999-8334-48-9



**1**

Seven students bought enough pencils to share equally among themselves.

Which could be the number of pencils they bought?

- 27      38      56      64  
**A**      **B**      **C**      **D**

**2**

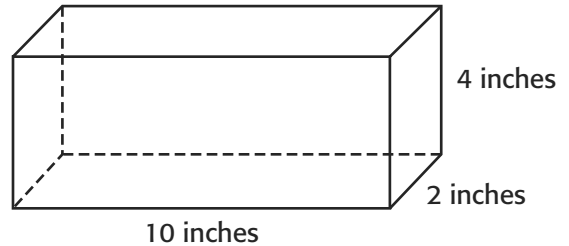
The ratio of the number of girls to the number of boys in a class is 3 to 2. There are 18 girls in the class.

How many boys are in the class?

- 23      12      3      2  
**A**      **B**      **C**      **D**

**3**

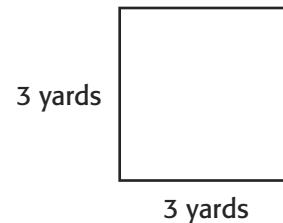
What is the surface area of this rectangular prism?



- A** 136 square inches  
**B** 120 square inches  
**C** 80 square inches  
**D** 16 square inches

**4**

The area of the square below is 9 square yards.






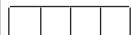
What is the area of the square in square feet?

- A** 12 square feet  
**B** 27 square feet  
**C** 54 square feet  
**D** 81 square feet



5

The table below shows Jan's pattern between the number of squares made and the number of toothpicks used.

Number of Squares	Number of Toothpicks	Picture
1	4	
2	7	
3	10	
4	13	
$n$	?	

Which expression can Jan use to determine the number of toothpicks used to make  $n$  squares?

**A**  $4n$

**B**  $4n - 1$

**C**  $3n + 1$

**D**  $3n - 1$

6

Which of the following expressions is equivalent to  $3x + 5 + x + 10 + 2y$ ?

**A**  $6x + 15$

**B**  $3x + 2y + 15$

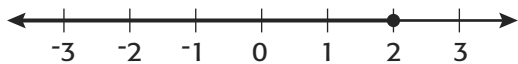
**C**  $4x + 2y + 15$

**D**  $9x + 12y$



7

Which inequality best represents the graph below?



- A**  $x \leq 2$
- B**  $x > 2$
- C**  $x < 2$
- D**  $x \geq 2$

8

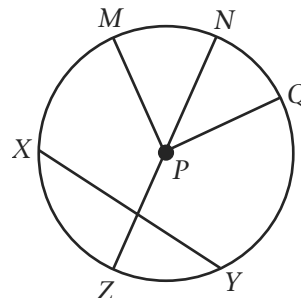
What values of  $x$  satisfy this inequality?

$$3x - 4 > 38$$

- A**  $x > 14$
- B**  $x < 14$
- C**  $x > 11$
- D**  $x < 11$

9

Points  $M, N, Q, Y, Z,$  and  $X$  all lie on circle  $P$ .



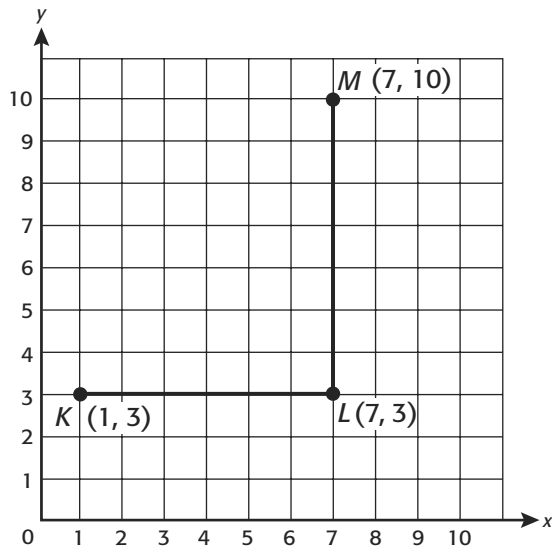
Which represents the diameter of circle  $P$ ?

- A**  $\overline{PM}$
- B**  $\overline{ZN}$
- C**  $\overline{XY}$
- D**  $\overline{PQ}$



10

Points  $K$ ,  $L$ , and  $M$  are three of the vertices of rectangle  $KLMN$ .

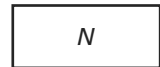
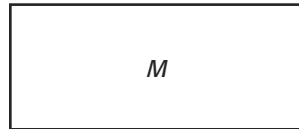


What are the coordinates of vertex  $N$  to create rectangle  $KLMN$ ?

- A** (7, 7)
- B** (1, 10)
- C** (10, 3)
- D** (10, 1)

11

The dimensions of rectangle  $N$  are half the dimensions of rectangle  $M$ .



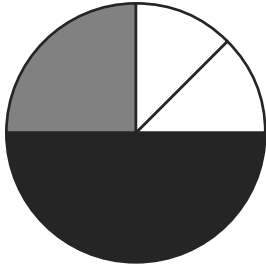
Which of the following must be true about the two rectangles?

- A** The area of rectangle  $N$  is half the area of rectangle  $M$ .
- B** The perimeter of rectangle  $N$  is equal to the perimeter of rectangle  $M$ .
- C** The area of rectangle  $N$  is equal to the area of rectangle  $M$ .
- D** The perimeter of rectangle  $N$  is half the perimeter of rectangle  $M$ .

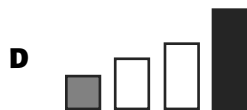
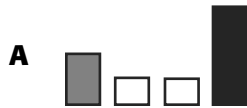


12

Look at the circle graph shown below.



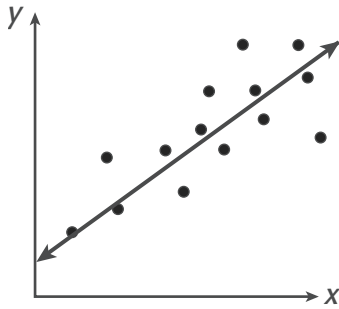
Which set of bars could be used to create a bar graph that best represents the data in the circle graph?



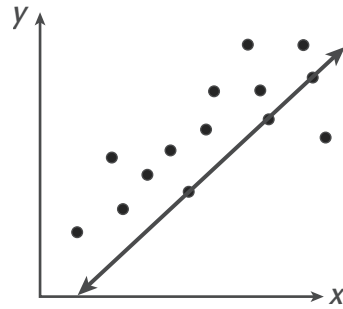


13

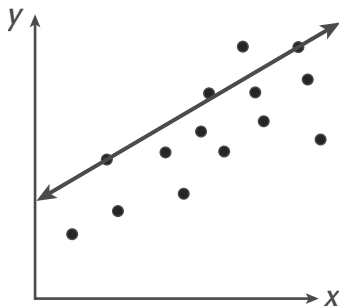
Which graph shows the line that best fits the data points given?



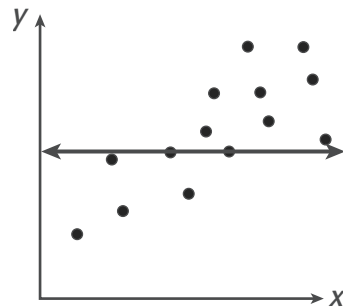
**A**



**C**



**B**



**D**

14

Mike has only 2 red apples and 3 green apples in a bowl. Without looking he chooses an apple and gives it to his sister. Then he chooses an apple for himself.

What is the probability that he and his sister will each get a red apple?

- 10%
- 30%
- 40%
- 60%

**A**      **B**      **C**      **D**

**15**

A hamburger restaurant offers 5 different combinations of hamburgers. There are french fries, tater tots, onion rings, and fried mushrooms that can be ordered as sides.

How many different combinations of one hamburger and one side are possible?

- 2            5            9            20  
**A**            **B**            **C**            **D**



## Answer Key with Assessment Objectives Identified

Item Number	Correct Answer	Assessment Objective
1	C	<b>6.7.07</b> Solve problems involving descriptions of numbers, including characteristics and relationships (e.g., square numbers, prime/composite, prime factorization, greatest common factor, least common multiple).
2	B	<b>6.7.15</b> Use proportional reasoning to model and solve problems.
3	A	<b>7.7.04</b> Determine the volume and surface area of a right rectangular prism using an appropriate formula or strategy.
4	D	<b>7.7.05</b> Solve problems involving unit conversions within the same measurement system for length, weight/mass, capacity, and square units (e.g., $1 \text{ ft}^2 = 144 \text{ in}^2$ ).
5	C	<b>8.7.01</b> Determine a missing term in a sequence, extend a sequence, and construct and identify a rule that can generate the terms of an arithmetic or geometric sequence.
6	C	<b>8.7.03</b> Simplify algebraic expressions by identifying and combining like terms.
7	A	<b>8.7.09</b> Identify, graph, and interpret inequalities on a number line.
8	A	<b>8.7.11</b> Solve linear equations in one variable (e.g., $2x + 3 = 13$ ) and inequalities involving $<$ or $>$ (e.g., $2x < 6$ , $x + 7 > 10$ ).
9	B	<b>9.7.04</b> Identify, describe, and determine the radius and diameter of a circle.
10	B	<b>9.7.06</b> Represent and identify geometric figures using coordinate geometry.
11	D	<b>9.7.12</b> Recognize which attributes (such as shape, perimeter, and area) change or don't change when plane figures are composed, decomposed, or rearranged.
12	A	<b>10.7.02</b> Compare different representations of the same data.
13	A	<b>10.7.04</b> Identify a reasonable approximation of the line of best fit from a set of data or a scatter plot.
14	A	<b>10.7.06</b> Solve problems involving the probability of a simple or compound event, including representing the probability as a fraction, decimal, or percent.
15	D	<b>10.7.08</b> Solve simple problems involving the number of ways objects can be arranged (permutations and combinations).

To view all the mathematics assessment objectives, download the *Illinois Mathematics Assessment Framework* for Grades 3–8 online at [www.isbe.net/assessment/IAFindex.htm](http://www.isbe.net/assessment/IAFindex.htm).

## Mathematics Short-Response Sample Item

Below is a short-response sample item, followed by the short-response scoring rubric and 3 samples of student responses.

This short-response sample item is classified to assessment objective 6.7.08, “Solve problems and number sentences involving addition, subtraction, multiplication, and division using integers, fractions, and decimals.”

**16**

A submarine is 294 feet below sea level. A helicopter is flying directly over the submarine 1,277 feet above sea level.

What is the distance, in feet, from the helicopter to the submarine?

Show your work.

## Mathematics Extended-Response Sample Item

Below is an extended-response sample item, followed by the extended-response scoring rubric and 3 student samples.

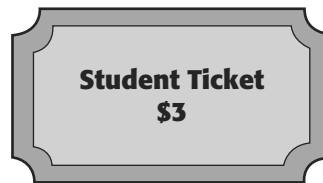
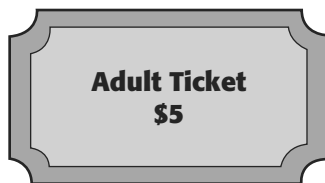
This extended-response sample item is classified to assessment objective 8.7.12, “Solve word problems involving unknown quantities.”

**17**

Ben sold some adult tickets and some student tickets for a basketball game.

- Each adult ticket cost \$5.
- Each student ticket cost \$3.

Ben collected \$180 for the 50 tickets he sold.



1. How many adult tickets did he sell?
2. How many student tickets did he sell?

Show all your work. Explain in words how you found your answer. Tell why you took the steps you did to solve the problem.