Department of Education

Student Name: _____

Ohio's Achievement Tests

Mathematics

March 2005

This test was originally administered to students in March 2005. This publicly released material is appropriate for use by Ohio teachers in instructional settings. This test is aligned with Ohio's Academic Content Standards for Mathematics.

7/05

Directions:

Today you will be taking the Ohio Grade 7 Mathematics Achievement Test. Three different kinds of questions appear on this test: multiple choice, short answer and extended response.

There are several important things to remember:

- Read each question carefully. Think about what is being asked. Look carefully at graphs or diagrams because they will help you understand the question.
- You may use the blank areas of your test booklet to solve problems.
- For short-answer and extended-response questions, write your answers neatly and clearly in the space provided in the answer document. Any answers you write in the test booklet will not be scored.
- Short-answer questions are worth two points. Extended-response questions are worth four points. Point values are printed near each question in your test booklet. The amount of space provided for your answer is the same for two- and four-point questions.
- For multiple-choice questions, shade in the circle next to your choice in the answer document for the test question. Mark only one choice for each question. Darken completely the circles on the answer document. If you change an answer, make sure that you erase your old answer completely.
- Do not spend too much time on one question. Go on to the next question and return to the question skipped after answering the remaining questions.
- Check over your work when you are finished.

1. There are 2^9 bacteria in a sample.

   How many bacteria is this?

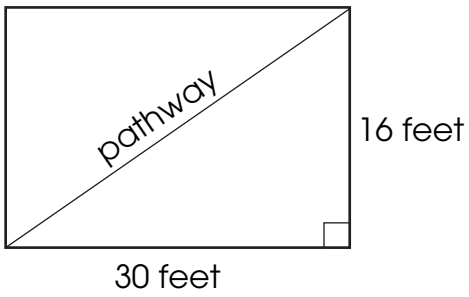
   A. 18

   B. 256

   C. 512

   D. 1,024

2. A rectangular garden has the dimensions shown.



   A pathway cuts diagonally through the garden.

   What is the length of the pathway?

   A. 25 feet

   B. 34 feet

   C. 46 feet

   D. 92 feet

3. This table shows the cost of renting a certain number of videos.

Number of Videos (n)	Cost (c)
2	\$5.50
3	\$8.00
5	\$13.00

Which rule describes the relationship between the cost (c), in dollars, and the number of videos (n) rented?

A. $c = 2n + 3$

B. $c = 2.5n + 0.5$

C. $c = 2.25n + 1$

D. $c = 2n + 2$

4. Robyn rolled a number cube 60 times in an experiment. Her results are shown in this table.

Number Rolled	1	2	3	4	5	6
Number of Times	8	5	9	12	11	15

What was the experimental probability of rolling a 6?

A. $\frac{1}{4}$

B. $\frac{1}{6}$

C. $\frac{1}{10}$

D. $\frac{1}{15}$

5. Simplify the expression: $20 - 6(12 - 8)$

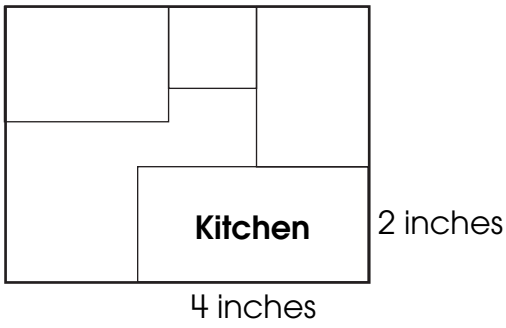
   A. –60

   B. –4

   C. 44

   D. 56

6. A drawing for a house uses the scale of $\frac{1}{4}$ inch = 1 foot.



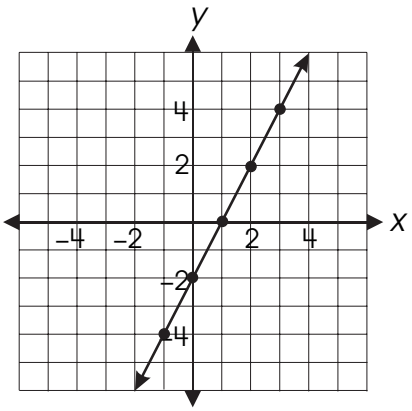
   The dimensions of a kitchen on the drawing are 2 inches by 4 inches.

   In your **Answer Document**, determine the actual dimensions of the kitchen. Show or describe how you found the length and width. Label your answer with appropriate units.

For question 6, respond completely in your **Answer Document**. (2 points)

7. Which graph represents $y = 2x + 1$?

A.



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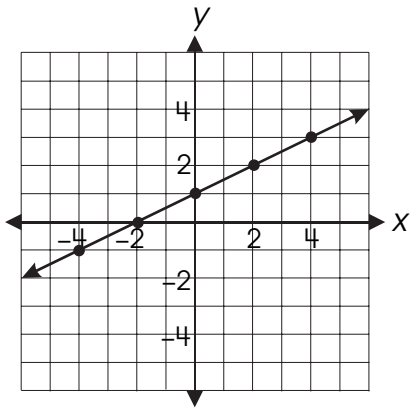

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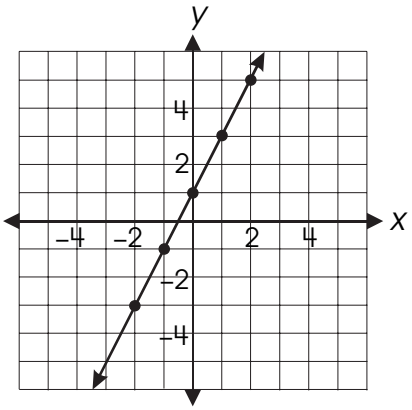

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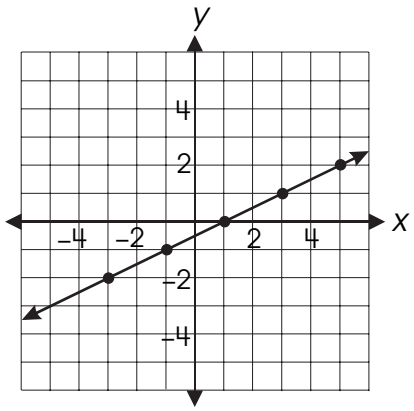


8. Jason made a model stop sign for his model train set. An actual stop sign measures 12 inches on each side. Jason's model stop sign measures $\frac{1}{2}$ inch on each side.

What is the scale of the model sign to the actual sign?

A. 1 : 2

B. 1 : 6

C. 1 : 12

D. 1 : 24

9. This stem-and-leaf plot represents the heights, in inches, of the students in Ms. Martin's class.

Ms. Martin's Class

4	8 9
5	0 2 4 4 5 6 8
6	1 3 4 5 5 5 6 7
7	0

Key: 5 \| 0 = 50 inches

What is the mode of these data?

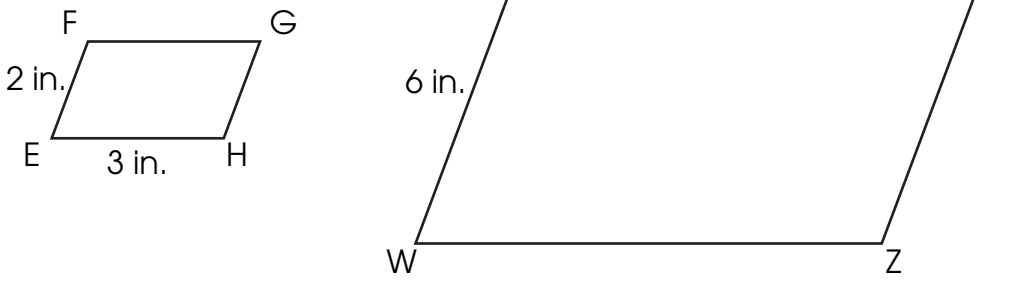
A. 54 inches

B. 59 inches

C. 60 inches

D. 65 inches

10. Parallelogram EFGH is similar to parallelogram WXYZ.



What is the length of $\overline{WZ}$?

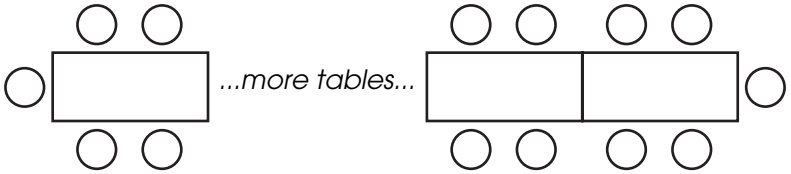
A. 3 in.

B. 6 in.

C. 7 in.

D. 9 in.

11. Sal is hosting a party for 50 people. He will have people sit at a long line of tables. Each table can seat 4 people, plus one person can sit at each end of the line of tables, as shown.



Sal uses this formula to find the number of people (p) who can sit at any number of tables (t).

$$p = 4t + 2$$

In your **Answer Document**, use the formula to find the number of tables he will need to seat 50 people. Show all steps you use to find the answer.

For question 11, respond completely in your **Answer Document**. (2 points)

12. Jim divided –2 by an integer and his result was between –1 and 0.

Which integer could have been the divisor?

A. –4

B. –1

C. 1

D. 4

13. At 7:00 a.m., the temperature was 55°F. The temperature was 72°F at 3:00 p.m.

    Which is the most appropriate way to describe the average rate of change in temperature?

    A. degrees per hour

    B. degrees per minute

    C. hours per degree

    D. minutes per degree

14. The chart shows changes in population in Ohio's four largest cities from 1990 to 2002.

Population of Ohio Cities

City	1990 Population	2002 Population	% Change (approx.)
Cincinnati	365,000	324,000	–11%
Cleveland	505,000	468,000	–7%
Columbus	636,000	725,000	+14%
Toledo	333,000	309,000	–7%

Based on the chart, which claim misuses the data?

A. The population of Cincinnati decreased from 1990 to 2002.

B. Columbus was the only one of the four cities whose population increased.

C. The population of Columbus grew by about 14% from 1990 to 2002.

D. The population in Cleveland and Toledo decreased by the same number of people.

15. Kwame bought three rose bushes and two maple trees. Each rose bush costs $15. Kwame spent a total of $67. Let t represent the cost of one maple tree.

    Which equation is one way to represent this situation?

    A. $2t + 3(15) = 67$

    B. $2t + 3t = 67$

    C. $2t + 3t = 67t$

    D. $3t + 2(15) = 67$

16. John has a $100 budget to buy sandwich meat and cheese for a picnic. His shopping list and the prices at the deli are shown in the table. There is no tax on these food products.

Shopping List
6 lbs. of Turkey
? lbs. of Salami
5 lbs. of Roast Beef
6 lbs. of Cheese

Deli Prices	
Turkey	3 lbs. for $13
Salami	2 lbs. for $9
Roast Beef	1 lb. for $5
Cheese	2 lbs. for $8

In your **Answer Document**, determine how many pounds of salami John can buy after he purchases the turkey, roast beef and cheese that he needs. Be sure that John stays within his budget. Show or describe all the steps you use to find the number of pounds he can buy.

When John gets to the deli he finds that the cheese is on sale for $2.50 per pound. Write how you can determine how many additional pounds of salami John can now purchase and still stay within his budget.

For question 16, respond completely in your **Answer Document**. (4 points)

17. Aaron is tiling a floor. The floor measures 6 feet by 5 feet. Aaron is using square tiles with sides that measure 3 inches.

How many tiles will it take to cover the entire floor?

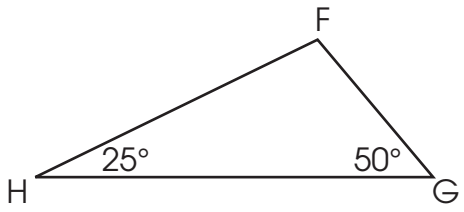
A. 30 tiles

B. 90 tiles

C. 270 tiles

D. 480 tiles

18. Two interior angles of triangle FGH measure 25° and 50°.



What is the measure of ∠HFG?

A. 15°

B. 25°

C. 90°

D. 105°

On the March 2005 Grade 7 Mathematics Achievement Test, items 19–24 are field-test items, which are not released.

25. Which expression is equivalent to $5(a + a + b)$?

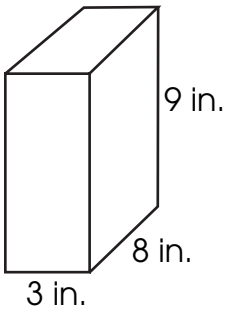
A. $15ab$

B. $10a + b$

C. $5a + 5b$

D. $10a + 5b$

26. A company needs to create a box shaped like a rectangular prism. The volume must be 216 cubic inches, but the surface area needs to be as small as possible. One possible box is shown.



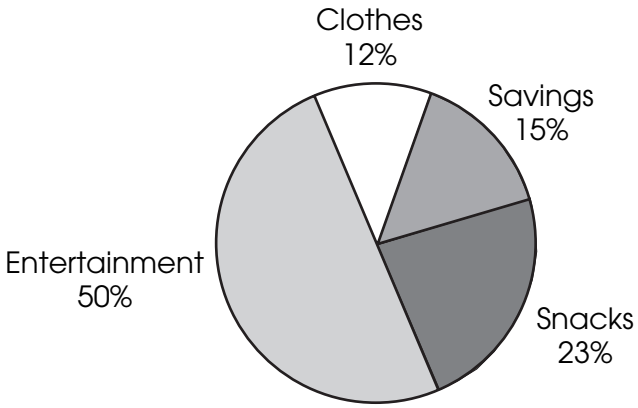
Box A

In your **Answer Document**, sketch or describe a different box that has the same volume as Box A, and a surface area less than that of Box A. Show work or provide an explanation to verify that the new box meets the criteria.

For question 26, respond completely in your **Answer Document**. (2 points)

27. Emily earns $12 every week. The circle graph shows how Emily uses her money each week.

Use of Emily's Allowance



Emily claims that she only spends about $10.00 each week.

Which statement supports Emily's claim?

A. She saves 15% of her money each week.

B. She spends $6.00 each week on entertainment.

C. She uses 12% of her money to buy clothes.

D. She buys almost $3.00 worth of snacks every week.

28. A microwave oven costs $92. It is on sale for 15% off.

Which proportion can be used to find the final price (n) of the microwave oven?

A. $\frac{85}{100} = \frac{n}{92}$

B. $\frac{n}{0.15} = 92$

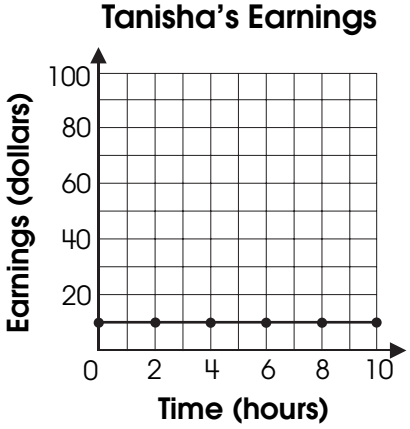
C. $\frac{92}{n} = \frac{85}{100}$

D. $\frac{92}{n} = \frac{15}{100}$

29. Tanisha earns $10 an hour at her job.

Which graph represents the amount of money that Tanisha will earn for any number of hours?

A.



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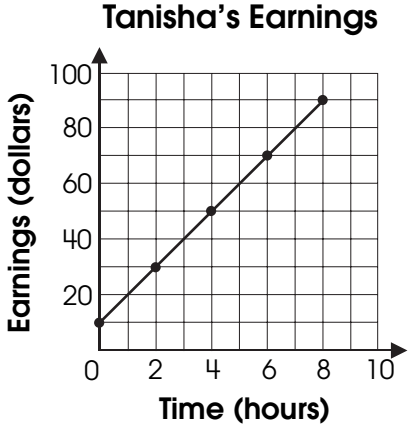

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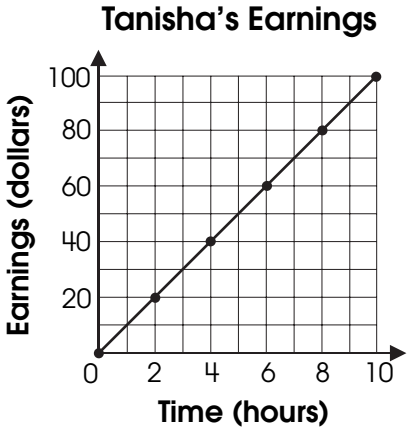

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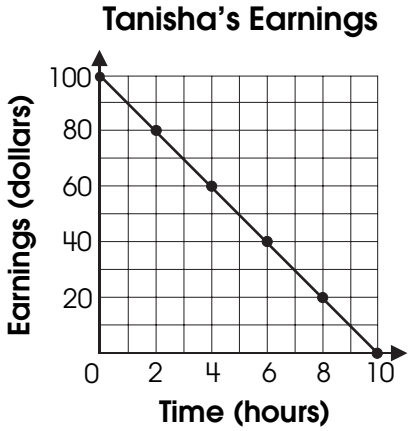


30. Melvin worked for eight weeks at a summer job. For each of the first seven weeks, his mean (average) earnings was $150 per week. In the last week, he earned $430 because he received a bonus.

    How was Melvin's mean weekly earnings for the eight weeks affected by the bonus?

    A. did not change

    B. increased by $35

    C. increased by $280

    D. increased by $430

31. A cone with a height of 7 inches and a base with a diameter of 3 inches is standing on its base. A cylinder with a height of 7 inches and a base with a diameter of 3 inches is also standing on its base next to the cone.

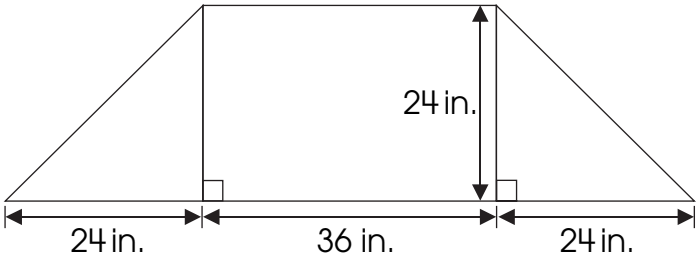
    In your **Answer Document**, draw a sketch of the cone and the cylinder. Label the dimensions.

    Describe how the cone and the cylinder will look when each object is viewed from the top. Draw and label sketches of this top-view perspective.

    Now describe how the cone and the cylinder will look when each object is viewed from the front. Draw and label sketches of this front-view perspective.

For question 31, respond completely in your **Answer Document**. (4 points)

32. Tina created a display as shown below.



What is the total area of her display?

A. 1,152 square inches

B. 1,440 square inches

C. 2,016 square inches

D. 2,880 square inches

33. During a quality control check, a factory found that 5% of the parts it produces are defective. The factory recently completed an order for 144,000 parts.

Approximately how many of the parts from the order may be defective?

A. 2,800

B. 7,200

C. 28,000

D. 72,000

34. Which pattern is non-linear?

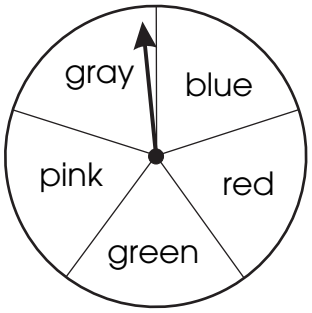
A. –4, 2, 8, 14, 20, . . .

B. 2, 4, 8, 16, 32, . . .

C. 3, 6, 9, 12, 15, . . .

D. 5, 9, 13, 17, 21, . . .

35. Sam spins this spinner 120 times.



How many times can Sam expect to land on blue?

A. 5

B. 12

C. 20

D. 24

36. Below are the total points scored by two players for six games.

	Game 1	Game 2	Game 3	Game 4	Game 5	Game 6
Player A	45	88	90	86	92	98
Player B	50	78	65	62	74	72

The players are each allowed to drop their lowest score before their averages are calculated.

In your **Answer Document**, explain which player would benefit the most by dropping their lowest score.

For question 36, respond completely in your **Answer Document**. (2 points)

37. Jackson has a board that is $6\frac{1}{2}$ feet long. He needs a board that is $\frac{1}{4}$ of this length.

What is the length of the board that Jackson needs?

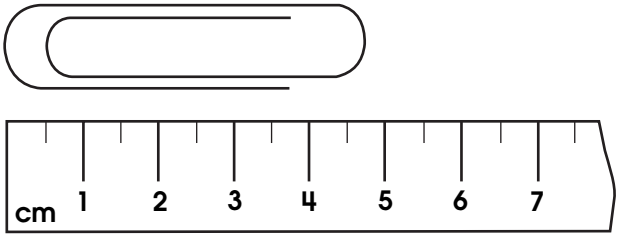
A. $1\frac{5}{8}$ feet

B. $2\frac{1}{6}$ feet

C. $2\frac{1}{2}$ feet

D. $6\frac{1}{4}$ feet

38. Dagny measured a paper clip as shown.



Which measurement is closest to the exact length of the paper clip?

A. 4.25 cm

B. 4.5 cm

C. 4.75 cm

D. 4.95 cm

39. Tony has one green, one white, one red and one blue shirt. He also has one pair of black jeans and one pair of blue jeans. He randomly chooses a shirt and a pair of jeans from his closet.

What is the probability that Tony chooses a white shirt and a pair of blue jeans?

A. $\frac{1}{8}$

B. $\frac{1}{4}$

C. $\frac{1}{2}$

D. $\frac{3}{4}$

40. The relationship between x and y is $y = -2x + 7$.

    How does the value of y change when x increases from 0 to 3?

    A. y decreases by 6

    B. y decreases by 3

    C. y increases by 5

    D. y increases by 7

41. Alberto subtracts different negative integers from 13.

    In your **Answer Document**, show three different examples of what Alberto does. Explain what happens when you subtract different negative integers from 13.

    For question 41, respond completely in your **Answer Document**. (2 points)

42. Which statement is a characteristic of all parallelograms?

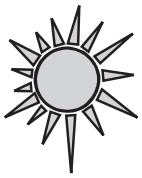
    A. Adjacent sides are congruent.

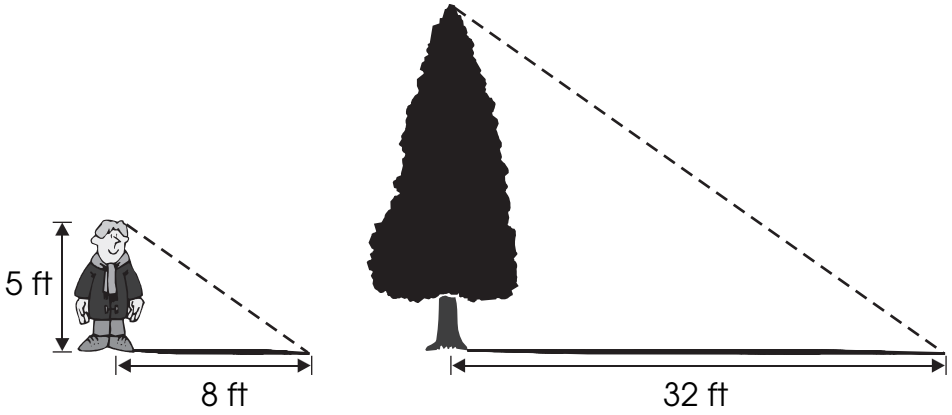
    B. Adjacent sides are perpendicular.

    C. Opposite angles are congruent.

    D. Opposite angles are supplementary.

43. Lance is 5 feet tall. His shadow is 8 feet long.





At the same time of day, a tree's shadow is 32 feet long.

What is the height of the tree?

A. 20 feet

B. 24 feet

C. 29 feet

D. 51 feet

44. A packing company is changing the size of a shipping carton.

The carton is in the shape of a rectangular prism. The height of the carton will be doubled and the width will be tripled.

By what scale factor will the volume of the original carton increase?

A. 5

B. 6

C. 9

D. 36

45. A sequence of numbers is shown.

0, 4, 12, 28, . . .

Which describes how to find the next term?

A. Add 8 to the previous term.

B. Add 16 to the previous term.

C. Add 4 to the previous term and then multiply the result by 3.

D. Add 2 to the previous term and then multiply the result by 2.