Student Name: $\qquad$

# Ohio's <br> Achievement Tests <br>  <br> <br> Mathematics 

 <br> <br> 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.

Mathematics

1. A company's profit of $\$ 1.71 \times 10^{6}$ will be shared equally by its 3,800 employees.

How much money will each employee receive?
A. $\$ 4.5 \times 10^{1}$
B. $\$ 4.5 \times 10^{2}$
C. $\$ 4.5 \times 10^{3}$
D. $\$ 4.5 \times 10^{5}$
2. Aqua Water Company purchased a new water tank. The tank is a cylinder with a diameter of 14 feet and a height of 24 feet.


What is the volume of the tank in cubic feet?
A. $\quad 168 \pi$ cubic feet
B. $336 \pi$ cubic fee $\dagger$
C. $1,176 \pi$ cubic feet
D. $4,704 \pi$ cubic feet
3. The graph shows the number of VCRs and DVD players shipped to distributors in North America from 1997 to 2002.

VCRs and DVD Players Shipped


$$
\begin{aligned}
------- & =\text { VCRs } \\
& =\text { DVD Players }
\end{aligned}
$$

In what year did the number of DVD players shipped first exceed 10 million?
A. 1997
B. 1999
C. 2000
D. 2002

Mathematics
4. Three vertices of a trapezoid are located at points $(2,3),(-2,-2)$ and $(5,-2)$.


Which point could represent the fourth vertex of the figure?
A. $(5,0)$
B. $(5,4)$
C. $(-1,3)$
D. $(-1,5)$
5. The formula used for converting the temperature from Fahrenheit $(F)$ to Celsius (C) is ${ }^{\circ} \mathrm{C}=\frac{5}{9}\left({ }^{\circ} \mathrm{F}-32\right)$.
The outside temperature is $80^{\circ} \mathrm{F}$.
About what is this temperature in degrees Celsius?
A. $\quad 27^{\circ} \mathrm{C}$
B. $\quad 45^{\circ} \mathrm{C}$
C. $80^{\circ} \mathrm{C}$
D. $140^{\circ} \mathrm{C}$
6. Jason constructed the figure shown.


He knows $\triangle$ ERS is similar to $\Delta$ EFG and that $\overline{\mathrm{RS}} \| \overline{\mathrm{FG}}$.

Jason claims $\angle E R S \cong \angle E F G$.
In your Answer Document, identify two geometric properties that can be used to justify Jason's claim.
7. Sarah has five hats of different colors: red, blue, green, yellow, and orange.

How many different ways can Sarah arrange these hats next to each other on a shelf?
A. 5
B. 10
C. 25
D. 120

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

Mathematics
8. Marco is building a model of a square pyramid.


He wants to cover the entire model, including the base, with gray paper.
How many square feet of paper will he need to cover the model?
A. 40 square feet
B. 46 square feet
C. 56 square feet
D. 96 square feet
9. The table shows the relationship between the number of doughnuts ( $d$ ), and the total cost ( $C$ ) in dollars for an order of doughnuts.

| Number of Doughnuts (d) | Total Cost (c) (in dollars) |
| :---: | :---: |
| 1 | 0.40 |
| 2 | 0.65 |
| 3 | 0.90 |
| 4 | 1.15 |
| 5 | 1.40 |
| 6 | 1.65 |
| 7 | 1.90 |

Which equation shows the total cost for an order of doughnuts?
A. $\quad c=0.15 d+.25$
B. $\quad c=0.25 d+.15$
C. $c=0.28 d$
D. $c=0.40 d$
10. Which is the value of $x$ when $\frac{x}{3}+5=15$ ?
A. $x=30$
B. $x=40$
C. $x=50$
D. $x=60$
11. Will plans to buy at least 10, and possibly more, new CDs and is trying to decide between two different CD offers.

CD-Land charges $\$ 40$ to become a
member of a frequent buyers club and
$\$ 9$ for each CD you buy.
For question 11, respond completely in your Answer
Document. (2 points)
MUSICVILLE has no membership fee and charges $\$ 12$ for each CD you buy.

In your Answer Document, create and label a double line graph that shows the cost of 1 to 20 CDs for each of the two offers. Explain how Will can use this graph to decide which offer to accept.
12. A store sold 28 boxes of juice from a case containing 48 boxes.

Approximately what percent of the case of juice has been sold?
A. $20 \%$
B. $30 \%$
C. $40 \%$
D. $60 \%$

## Mathematics

13. The Hernandez family has a monthly income of $\$ 4,500$. The Thomas family has a monthly income of $\$ 3,200$. The two circle graphs show the monthly budgets of two families.


Thomas Family
$(\$ 3,200)$


Which statement is supported by the data in the two graphs?
A. The Thomas family spends more dollars each month on transportation than the Hernandez family does.
B. The Hernandez family spends more dollars each month on food than the Thomas family does.
C. Both families spend more dollars on "other" than on transportation.
D. Both families spend the same amount of dollars each month on housing.
14. Which subset of the real numbers contains $\sqrt{5}$ ?
A. integers
B. whole numbers
C. rational numbers
D. irrational numbers
15. $\triangle P Q R$ is similar to $\triangle X Y Z$.


What is the perimeter of $\triangle X Y Z$ ?
A. 21 cm
B. 63 cm
C. 105 cm
D. 126 cm
16. A wooden fence was built around a construction site. The wall is 600 feet long and 8 feet high. Each 12 -foot length of the fence has a 2 -foot by 2 -foot window cut into the wall so people can watch the construction.


Drawing not to scale
The city council asked the construction company to paint the side of the fence facing the street. A gallon of paint will cover approximately 250 square feet.

For question 16, respond completely in your Answer
Document. (2 points)
In your Answer Document, determine how many gallons of paint are needed to paint one side of the fence. Show your work to support your answer.

Mathematics
17. Ray found the paper cut-out shown.


Which 3-dimensional object is formed when the cut-out is assembled?
A. cone
B. cylinder
C. prism
D. sphere
18. In a number game, Rick was supposed to find the square root of a number. Instead, he squared the number and said "16."

What number should Rick have given?
A. 2
B. 4
C. 8
D. 16

## Mathematics

25. Each student brought 3,4 or 5 pieces of candy to class. There are 17 students in the class.

Which number is NOT a reasonable total for the number of pieces of candy the students brought?
A. 45
B. 55
C. 65
D. 75
26. There are 8 homes for sale near Bell Middle School. The chart below shows the square footage and cost of each house.

| Square Feet | Cost |
| :---: | :---: |
| 1400 | $\$ 95,000$ |
| 4275 | $\$ 350,000$ |
| 2100 | $\$ 239,000$ |
| 1850 | $\$ 139,000$ |
| 2550 | $\$ 259,000$ |
| 3100 | $\$ 299,000$ |
| 1900 | $\$ 189,000$ |
| 2200 | $\$ 160,000$ |

In your Answer Document, create a scatter plot that represents the data in the chart. Be sure to label your axes and create appropriate scales.

Use the scatter plot to explain the relationship that exists between the number of square feet and the cost of the 8 houses.

Use the data to predict the approximate cost of a house that has 6,000 square feet. Use mathematics to explain or support your prediction.

For question 26, respond completely in your Answer Document. (4 points)
27. Which integer is a perfect square?
A. 125
B. 200
C. 225
D. 300
28. The graph of $y=x^{2}-9$ is shown.


For what values of $x$ does $x^{2}-9=0$ ?
A. $x=2$ and $x=-2$
B. $x=3$ and $x=-3$
C. $x=4.5$ and $x=0$
D. $x=-9$ and $x=0$

## Mathematics

29. Dave wants to estimate the distance from Harrisburg to Jonestown. The distance on the map is about 13 inches. The scale on the map indicates that 2.5 inches $=6$ miles.

About how many miles is it from Harrisburg to Jonestown?
A. 5 miles
B. 15 miles
C. 31 miles
D. 39 miles
30. Circle $A$ has a radius that is twice the length of the radius of Circle $B$.

Which is an accurate statement about the relationship of the areas of Circles $A$ and $B$ ?
A. The area of Circle $A$ is four times the area of Circle $B$.
B. The area of Circle $A$ is twice the area of Circle $B$.
C. The area of Circle $A$ is one-half the area of Circle $B$.
D. The area of Circle $A$ is one-fourth the area of Circle $B$.
31. The first four steps in a pattern are shown:


Step 1 Step 2 Step 3 Step 4

In your Answer Document, write an equation or a rule that can be used to find the number of $\mathbf{x}^{\prime}$ s in any step of the pattern. Use your equation or rule to find the number of the $\mathbf{x}^{\prime}$ s for step 50.
32. A bag contains 4 sour-apple candies and 3 watermelon candies. One piece of candy is chosen at random and returned to the bag. Then a second piece of candy is chosen at random.

What is the probability that both pieces of candy chosen will be sour-apple?
A. $\frac{1}{16}$
B. $\frac{12}{49}$
C. $\frac{16}{49}$
D. $\frac{8}{7}$

Mathematics
33. The graph of an equation is shown on the coordinate plane.


Which table of values represents coordinate points that lie on the line?

A. | $\boldsymbol{x}$ | $\boldsymbol{y}$ |
| ---: | ---: |
| -3 | -2 |
| 0 | -1 |
| 3 | 0 |
| 6 | 1 |

B. | $\boldsymbol{x}$ | $\boldsymbol{y}$ |
| ---: | ---: |
| -2 | -3 |
| -1 | 0 |
| 0 | 3 |
| 1 | 6 |

C. | $\boldsymbol{x}$ | $\boldsymbol{y}$ |
| ---: | ---: |
| 3 | -2 |
| 0 | -1 |
| -3 | 0 |
| -6 | 1 |

D. | $\boldsymbol{x}$ | $\boldsymbol{y}$ |
| ---: | ---: |
| -2 | 3 |
| -1 | 0 |
| 0 | -3 |
| 1 | -6 |

34. The box-and-whisker plots show the distribution of weight among dogs in two different pet stores.

Weight of Dogs


How much greater is the median weight of the dogs in Pet Store 2 than in Pet Store 1?
A. 5
B. 10
C. 15
D. 20
35. In the figure, lines $j$ and $k$ are parallel.


Which angle is congruent to $\angle 1$ ?
A. $\angle 2$
B. $\angle 3$
C. $\angle 4$
D. $\angle 5$

## Mathematics

36. Cheryl is a member of the basketball team. She made 44 out of 50 foul shots last year. Cheryl has made 18 out of 20 foul shots so far this year.

In your Answer Document, write what Cheryl could say to convince her coach that she is shooting foul shots better this year. Use the data to support your answer.

For question 36 , respond completely in your Answer Document. (2 points)
37. A light year is defined as approximately $5,880,000,000,000$ miles.

Which distance is the same as a light year?
A. $5.88 \times 10^{13}$ miles
B. $5.88 \times 10^{12}$ miles
C. $5.88 \times 10^{11}$ miles
D. $5.88 \times 10^{10}$ miles
38. Three lines intersect as shown.


What is the sum of the measures of angles 1, 2 and 3 in this figure?
A. $450^{\circ}$
B. $360^{\circ}$
C. $270^{\circ}$
D. $180^{\circ}$
39. The parallelogram shown is translated 4 units to the left and 2 units down.


Which property will remain the same?
A. length of the sides
B. coordinates of the vertices
C. coordinates of the $y$-intercept
D. distance from the vertices to the origin
40. Which statement is true about the quotient when 12 is divided by a fraction greater than zero and less than one?
A. The quotient is undefined.
B. The quotient is equal to 12 .
C. The quotient is less than 12.
D. The quotient is greater than 12 .

## Mathematics

41. The data show the ages of 2 groups of grandparents.

| Group 1 | 65 | 70 | 70 | 70 | 79 | 88 | 88 | 90 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Group 2 | 60 | 70 | 70 | 75 | 80 | 82 | 83 | 85 |

Which statistic has a greater value for Group 1 than Group 2?
A. the mean
B. the median
C. the mode
D. the range
42. Which graph represents a linear relationship?
A.

B.

C.

D.

43. The line segment $\overline{\mathrm{AB}}$ is shown on the coordinate system.


What is the slope of $\overline{\mathrm{AB}}$ ?
A. $\frac{2}{7}$
B. $-\frac{7}{2}$
C. $-\frac{2}{7}$
D. $\frac{7}{2}$
44. A cup of water is heated in a pan on the stove. The temperature of the water increased from $22^{\circ} \mathrm{C}$ to $35^{\circ} \mathrm{C}$ in 20 seconds.

At this rate how long would it take the water temperature to increase from $22^{\circ} \mathrm{C}$ to $100^{\circ} \mathrm{C}$ ?
A. 2 minutes
B. 3 minutes
C. 5 minutes
D. 6 minutes

