

## RELEASED ITEMS

## MATHEMATICS <br> GRADE 8

FALL 2005

1 Which shapes in this group are similar?


A 1 and 5
B 2 and 3
C 3 and 4
D 2 and 4

2 Omar asked 60 people at the local mall how many movies they had rented in the past month. The line plot below displays the data he collected.

## Movie Rental Survey



What is the mean number of movies rented by the people in Omar's survey?
A 1
B 2.5
C 3
D 4

3 Alicia owes Kiara \$4. She gets $\$ 10$ from her father, pays Kiara back, and buys a ticket for the school talent show for $\$ 3$. How much money does Alicia have now?

A $\$ 3$
B $\$ 7$
C $\$ 11$
D $\$ 17$

4 Jennifer swims 10 laps. Each lap is 50 meters. How many meters does J ennifer swim?

A 50 m
B 100 m
C 250 m
D 500 m

5 Which of the following figures is similar to the given figure?

A

B

C

D


6 Five high school students go to a baseball game. The tickets normally cost $\$ 8$ each, but students can buy tickets for half price. How much did they pay for the five tickets?

A $\$ 20$
B $\$ 25$
C $\quad \$ 32$
D $\$ 40$

7 Jefferson Middle School opened in 1998 with 42 eighth grade students. The table below shows the increase in the number of eighth graders.

Eighth Grade Enrollment

| Year | Number of <br> Students |
| :---: | :---: |
| 1998 | 42 |
| 1999 | 59 |
| 2000 | 76 |
| 2001 | 93 |

What is the rate of increase in the number of eighth graders at Jefferson Middle School?

A 17 students/year
B 23 students/year
C 42 students/year
D 51 students/year

8 Erika bought 24 folders and 24 bottles of glue at the office supply store. The folders cost $\$ 1.09$ each and the bottles of glue cost $\$ 1.29$ each. Which amount is closest to the amount Erika spent?

A $\$ 48$
B $\$ 60$
C $\$ 72$
D $\$ 120$

9 Mrs. Flynn needs to take a taxi to the doctor's office. The taxi ride costs $\$ 6.00$ for the first mile and $\$ 0.25$ for each $\frac{1}{10}$ mile thereafter. How much does Mrs. Flynn pay for a 2.3-mile taxi ride?

A $\$ 5.75$
B $\quad \$ 9.25$
C $\quad \$ 11.75$
D $\$ 12.75$

10 A surveyor is trying to find the distance across a canyon. The measurements he takes are pictured below.


What is the approximate distance across the canyon?
A 20 feet
B 27 feet
C 80 feet
D 120 feet

11 Which is the best approximation of $\sqrt{17}$ ?
A 4.1
B 4.5
C 4.8
D 4.9

12 There were four candidates, P, Q, R, and S, in a local election. Each received a percentage of the total votes cast, as shown in the chart.

Votes for Candidates

| Candidate | Percent of Votes |
| :---: | :---: |
| P | $27 \%$ |
| Q | $42 \%$ |
| R | $12 \%$ |
| S | $19 \%$ |

Which type of graph best illustrates the data?
A Election Results

B
Election Results

C

D Election Results

| Stem | Leaf |
| ---: | :--- |
| 1 | 29 |
| 2 | 7 |
| 3 |  |
| 4 | 2 |

Key $1 \mid 2=12$

13 Which of the following numbers does NOT have a multiplicative inverse?
A $-\frac{1}{3}$
B 0
C 1
D 3

14 The height of a horse is often measured in hands. A hand is the approximate length of the palm of a man's hand, or 4 inches. If a horse is 18 hands tall, how tall is the horse?

A 4 feet
B 6 feet
C 8 feet
D 18 feet

## PART 2

## DI RECTI ONS

You will now begin Part 2 of this test. You may use a calculator on this part of the test, and you may use open space in this test booklet for scratch paper. No additional sheets may be used.

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15 A class of 25 students got the following scores on a test:

$$
\begin{array}{lllllllllllll}
73, & 68, & 91, & 85, & 88, & 77, & 94, & 62, & 68, & 74, & 77, & 85, & 82, \\
78, & 61, & 66, & 72, & 77, & 81, & 93, & 99, & 84, & 64, & 75, & 82 . &
\end{array}
$$

The teacher did a tally of the grades and made a frequency table.

| Interval | Tally | Frequency |
| :---: | :---: | :---: |
| $60-69$ | I I | 6 |
| $70-79$ |  | 8 |
| $80-89$ | II | 7 |
| $90-99$ |  | 5 |
| Sum $=26$ |  |  |

When the teacher added the frequencies, he realized he had made an error. In which interval is the error?

A 60-69
B $\quad 70-79$
C 80-89
D 90-99

16 Linda is on the fourth floor of a building. Her car is in the parking garage three levels below the ground floor. She gets in the elevator and travels from the fourth floor above ground level to the third floor below ground level. How many floors did she travel?

A - 3
B 1
C 4
D 7

17 Which of the choices below best illustrates $8^{2}$ ?
A


B


C


D


18 Which is equivalent to ${ }^{-} 4$ times ${ }^{-7}$ ?
A $4 \times 7$
B $-4 \times 7$
C $\quad \frac{4}{7}$
D $-4 \times \frac{1}{7}$

19 Jeremiah made a data table of all his grades last quarter. Which statement about this data is true?

Jeremiah's Quarter Averages

| Course | Grade |
| :--- | :---: |
| Art | 85 |
| Music | 95 |
| History | 90 |
| Math | 96 |
| English | 87 |
| Science | 89 |

A The mean is greater than the median, so there are more data points above the mean than below.

B The mean is greater than the median, so there are more data points below the mean than above.

C The mean is greater than the median, so there are more data points below the median than above.

D The mean is less than the median, so there are more data points above the mean than below.

20 Matt is playing a video game that uses numbers to move the characters. Negative numbers move the characters to the left and positive numbers move the characters to the right. His character is at the starting point. Which of the following combinations of numbers will move his character around and then back to the starting point?

A $\quad(20)+\left({ }^{-} 10\right)+(5)+\left({ }^{-} 13\right)+\left({ }^{-} 7\right)$
B $\quad(-7)+(12)+(-6)+(2)+(2)$
C $\quad(-2)+(13)+(6)+(-9)+(-8)$
D $\quad(18)+(-22)+(4)+\left({ }^{-} 4\right)+\left({ }^{-} 1\right)$

21 Huyen is helping her friend Ida with math homework. She wants to explain the identity property of addition to Ida. Which of these equations should Huyen use as an example?

A $\quad 1+(2+3)=(1+2)+3$
B $\quad 15+{ }^{-1} 15=0$
C $\quad 8+12=12+8$
D $\quad 11+0=11$

22 Danielle is drawing two similar triangles in the sand. The smaller triangle has side lengths of 3 feet, 2 feet, and 4 feet. Two corresponding sides of the second triangle are 6 feet and 4 feet in length. What is the length of the third side of the larger triangle?

A 4 feet
B 5 feet
C 6 feet
D 8 feet

23 A swimming pool is being filled with water at a rate of 1 inch/minute. The owners started filling the pool at 6:00 a.m. What time was it when the water was 6 feet deep?

A 6:06 a.m.
B 7:06 a.m.
C 7:00 a.m.
D 7:12 a.m.

24 In a football game, a team lost 13 yards on one play, gained 7 on the next, and lost 3 on the third. What is their position (gain or loss) from their original location?

A loss of 3 yards
B loss of 9 yards
C gain of 3 yards
D gain of 17 yards

25 Max ran 1.5 miles in 12 minutes. What was his average speed in miles per hour (mph)?

A $\quad 7.5 \mathrm{mph}$
B $\quad 10.5 \mathrm{mph}$
C $\quad 12 \mathrm{mph}$
D $\quad 21 \mathrm{mph}$

26 Mr. Perez's and Mr. Lewis's classes collected data about how many CDs each student owns.

| Mr. Perez |  | Mr. Lewis |
| ---: | ---: | :--- |
| 7620 | 0 | 155 |
| 320 | 1 | 0117 |
| 521100 | 2 | 566 |
|  | 3 | 009 |
| 655000 | 4 |  |
| 930 | 5 | 278 |
|  | 6 | 5556 |
| 521 | 7 | 5 |
| 52 | 8 | 0 |
|  | 9 | 02 |
| 9 | 10 | 5 |

How many students are in Mr. Lewis's class?
A 11
B 25
C 53
D 64

27 A company is selling a new book in two sizes. The dimensions of the bigger book will be 18 inches by 12 inches. The ratio of the dimensions of the two books will be 3:1. What will be the dimensions of the smaller book?

A 54 inches $\times 36$ inches
B $\quad 15$ inches $\times 9$ inches
C 6 inches $\times 4$ inches
D 3 inches $\times 1$ inch

28 Tran saves $\$ 0.25$ each day during the month of December. Let d represent the date in December and $m$ represent the money Tran saved. Which equation can be used to find the total amount of money Tran saved by any date in December?

A $m=0.25 d$
B $\quad \mathrm{m}=\mathrm{d} \div 0.25$
C $\quad \mathrm{m}=\mathrm{d}+0.25$
D $\quad \mathrm{m}=\mathrm{d}-0.25$

29 Which two triangles are similar?


A triangle A and triangle B
B triangle B and triangle D
C triangle C and triangle A
D triangle D and triangle A

30 Eric swam 200 meters in 2 minutes 5 seconds. What was his speed in meters per second?

A $0.9 \mathrm{~m} / \mathrm{sec}$
B $\quad 1.6 \mathrm{~m} / \mathrm{sec}$
C $20 \mathrm{~m} / \mathrm{sec}$
D $40 \mathrm{~m} / \mathrm{sec}$

31 Four experimental cars, A, B, C, and D, are competing in a 500-mile race. Each car starts the course at a different time. Race officials record each car's distance from the starting line each hour. The following graph shows the location of each car from 3 p.m. to 5 p.m.


Which car was traveling at the greatest speed during the times observed?
A Car A
B Car B
C $\operatorname{Car} \mathrm{C}$
D Car D

32 Which of the following is another way to represent this expression?

$$
3 a(b+5 c)
$$

A $3 a(5 b c)$
B $\quad 3 \mathrm{a}(\mathrm{b})+5 \mathrm{c}$
C $3 a(b)+3 a(5 c)$
D $(3 a+b)(3 a+5 c)$

33 The distribution of grades in the eighth grade is shown below.

| Grade Range | Number of <br> Grades |
| :---: | :---: |
| $91-100$ | 49 |
| $81-90$ | 152 |
| $71-80$ | 206 |
| $61-70$ | 50 |
| $51-60$ | 33 |

What is the relative frequency of grades in the 91-100 range?
A $1 \%$
B $10 \%$
C $20 \%$
D $49 \%$

34 A scout troop marked off similar triangles on the ground in order to find the distance across a river.


What is the approximate distance across the river?
A 17.1 feet
B 20 feet
C 24 feet
D 28.3 feet

35 Peter bought a suit on sale. The original price of the suit was $\$ 149.50$. The price of the suit was reduced by $20 \%$. Approximately how much did Peter pay for the suit, including 5\% sales tax?

A $\$ 120$
B $\quad \$ 125$
C $\quad \$ 135$
D $\quad \$ 140$

36 What is equivalent to the value of $3.1(5-4)$ ?
A 15.5-12.4
B $3.1\left({ }^{-} 20\right)$
C $\quad-15.5+12.4$
D 15.5-4

37 What is the value of $\frac{32}{-8}-4$ ?

A ${ }^{-16}$
B $\quad-8$
C 0
D $\quad 16$

## PART 3

## DI RECTI ONS

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38 Javier recorded the amount he spent on lunch each day for a month. If he wants to find the mode of the data, which of the following must he find?

A the average amount spent
B the middle amount spent, when the amounts are ordered from least to greatest
C the amount he spent most often
D the difference between the greatest amount he spent and the least amount

39 An elevator can hold a maximum of 10 people who weigh an average of 180 pounds each. If a box of freight weighing 275 pounds is placed on the elevator, what strategy can be used to determine the number of people of average weight who can safely get on the elevator?

A Solve $275+180 x=1800$ and round down to the next whole number.
B Solve 180x = $1800+275$ and round up to the next whole number.
C Solve $275+180 x=1800$ and do not round.
D Solve $1800+180 x=275$ and do not round.

40 Which of the following is another way to represent this expression?

$$
3 x+(2 x-1)+5(x+2)
$$

A $10 x+4$
B $\quad 10 x+6$
C $10 x+9$
D $\quad 11 x+4$

41 Michael is mixing concrete. The directions say to add 1 quart of water per pound of concrete mix. The concrete mix comes in 30 -pound bags. What is the ratio of gallons of water per bag of concrete mix?

A 3.8 gallons/bag
B 7.5 gallons/bag
C 30 gallons/bag
D 120 gallons/bag

42 Which is the best approximation of the cube root of 31 ?
A $\quad 3.1$
B $\quad 3.5$
C 5.5
D 10

43 Jill is putting a tile floor in her kitchen. She needs 52 tiles to cover the whole floor. There are 24 tiles in a box. A box costs $\$ 23.95$. Individual tiles cost $\$ 2.95$. Sales tax is $5 \%$. Approximately how much will 52 tiles cost, including sales tax?

A $\$ 50$
B $\quad \$ 57$
C $\$ 60$
D $\$ 63$

44 A surveyor stood at point $S$ and measured the angles indicated below.


Which of the following equations could be used to find the number of degrees in each of these three angles?

Number of degrees in a straight line $=180$ degrees.
A $11 x+15=180$
B $\quad 11 x+50=180$
C $\quad 12 x+15=180$
D $36 x+50=180$

45 Mr. Stephens races pigs at the county fair. He is designing a new race track and has built the exterior rails with the dimensions shown below.


The interior rails of the track need to form a smaller triangle similar to the exterior rails. Which of the following length rails can he use?

A 20 feet, 20 feet, 11 feet
B 17 feet, 20 feet, 20 feet
C 120 feet, 120 feet, 102 feet
D 6 feet, 6 feet, 5 feet

46 Mrs. Hong took her grandchildren fishing every day when they visited her during the summer. The number of fish they caught each day is recorded in the table below.

| Day | Number of Fish Caught |
| :--- | :---: |
| Tuesday | 8 |
| Wednesday | 10 |
| Thursday | 2 |
| Friday | 5 |
| Saturday | 8 |
| Sunday | 12 |

What is the range of the data?
A 7.5
B 8
C 10
D 12

47 What is the correct equation to find the points on the line in the graph below?


A $\quad y=x+3$
B $\quad y=x-3$
C $\quad y=2 x+3$
D $\quad x=y+3$

48 Four friends ride their bicycles at the speeds shown below.

| Jacob | 9 feet per second |
| :--- | ---: |
| Kendra | 170 yards per minute |
| Larry | 500 feet per minute |
| Selena | 5 miles per hour |

Who is riding his or her bicycle the fastest?
A Jacob
B Kendra
C Larry
D Selena

49 A girl 5.5 feet tall casts a shadow 70 inches long at the same time that a telephone pole casts a 314-inch shadow. Which proportion CANNOT be used to find the height of the telephone pole?


A $\left(\frac{70}{5.5}\right)=\left(\frac{314}{x}\right)$
B $\left(\frac{70}{314}\right)=\left(\frac{5.5}{x}\right)$
C $\left(\frac{x}{5.5}\right)=\left(\frac{314}{70}\right)$
D $\quad\left(\frac{70}{x}\right)=\left(\frac{5.5}{314}\right)$

50 Marcus is making a sailboat with two similar triangular sails. The side lengths of the larger sail are 3 times the dimensions of the smaller sail. How do the areas of the sails compare?

A The area of the larger sail is 3 times the area of the smaller sail.
B The area of the larger sail is 6 times the area of the smaller sail.
C The area of the larger sail is 9 times the area of the smaller sail.
D The area of the larger sail is 27 times the area of the smaller sail.

51 India counted the number of pages she wrote in her journal each week during her stay at her grandparents' house.

| Week | Number of Pages Written |
| :---: | :---: |
| 1 | 12 |
| 2 | 30 |
| 3 | 28 |
| 4 | 18 |

What is the median number of pages she wrote per week?
A 0
B 18
C 22
D 23

52 Micajah is landscaping his backyard. The first flower bed he created is pictured below:


12 feet
The second flower bed will be a similar triangle with an area of 12 square feet. What is the perimeter of the second flower bed?

A 11 feet
B 16 feet
C 26 feet
D 64 feet

53 Sharona found the number of times her heart beat in 10, 20, 30, 40, 50, and 60 seconds. She made a graph of the results.


Which equation does Sharona's graph represent? Use h to represent "heartbeats" and t to represent "time in seconds."

A $t=1.5 \mathrm{~h}$
B $\quad \mathrm{t}=\mathrm{h}+10$
C $\mathrm{h}=1.5 \mathrm{t}$
D $\mathrm{h}=\mathrm{t}+10$

54 Triangles M and N are similar. What is the area of triangle N ?


A 10 square centimeters
B 12 square centimeters
C 24 square centimeters
D 36 square centimeters

Part 1:

| Item \# | Answer Key |
| :---: | :---: |
| 1 | B |
| 2 | C |
| 3 | A |
| 4 | D |
| 5 | D |
| 6 | A |
| 7 | A |
| 8 | B |
| 9 | B |
| 10 | D |
| 11 | A |
| 12 | A |
| 13 | B |
| 14 | B |

Part 2:

| Item \# | Answer Key |
| :---: | :---: |
| 15 | D |
| 16 | D |
| 17 | B |
| 18 | A |
| 19 | B |
| 20 | C |
| 21 | D |
| 22 | D |
| 23 | D |
| 24 | B |
| 25 | A |
| 26 | B |
| 27 | C |
| 28 | A |
| 29 | D |
| 30 | B |
| 31 | C |
| 32 | C |
| 33 | B |
| 34 | D |
| 35 | B |
| 36 | A |
| 37 | B |

Part 3

| I tem \# | Answer Key |
| :---: | :---: |
| 38 | C |
| 39 | A |
| 40 | C |
| 41 | B |
| 42 | A |
| 43 | D |
| 44 | A |
| 45 | B |
| 46 | C |
| 47 | A |
| 48 | A |
| 49 | D |
| 50 | C |
| 51 | D |
| 52 | B |
| 53 | C |
| 54 | C |

