

8th Grade Exam - 2001

1. Which one of the following statements is true?
 - a) There is a largest negative rational number.
 - b) There is a largest negative integer.
 - c) There is a smallest integer.
 - d) There is a smallest negative integer.
 - e) There is a smallest positive rational number.

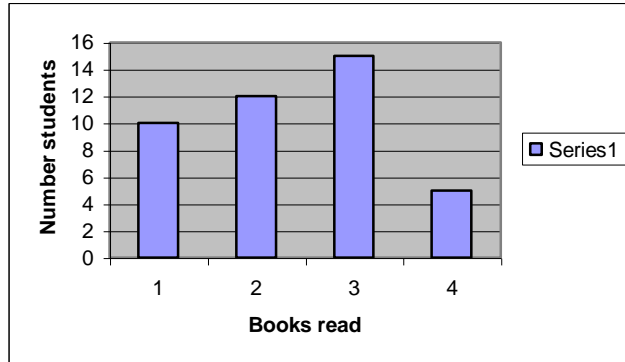
2. For his science project, David Data administered a survey to the students of Sam Houston Middle School. The survey listed three foods (broccoli, green olives, and jalapeno peppers) and instructed students to place a check by any of the foods that they liked. A survey of 300 students produced the following results: 100 checked broccoli, 200 checked green olives, and 50 checked jalapeno peppers. If 30 students checked all three foods and 20 students checked no foods, how many students checked exactly two of the three foods?
 - a) 10
 - b) 15
 - c) 30
 - d) 35
 - e) 40

3. The amount to which \$1,000 will grow in 5 years at a 6 percent annual interest rate compounded annually is
 - a) \$1343.92
 - b) \$1159.27
 - c) \$1790.85
 - d) \$1243.21
 - e) \$1338.23

4. If $a * b = a^2 + b^2$, then what does $(x - 2) * (-2x)$ equal?
 - a) $5x^2 - 4x + 4$
 - b) $x^2 - 6x + 4$
 - c) $5x^2 + 4x + 4$
 - d) $x^2 + 4$
 - e) $x^2 - 4$

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5. There are 42 eighth-graders enrolled at Longview Middle School. Below is a chart detailing how many books were read by the eighth grade students during October. What is the average number of books read by the eighth graders during October?



- a) $2 \frac{5}{14}$
b) $2 \frac{31}{42}$
c) $2 \frac{1}{42}$
d) 3
e) 2
6. If electricity costs x cents per kilowatt hour for the first 30 kilowatt hours and y cents per kilowatt hour for each additional kilowatt hour, what is the cost of z kilowatt hours ($z > 30$)?
- a) $30(x + y) - yz$
b) $30x + (y - 30)z$
c) $(z - 30)x + 30y$
d) $30(x - y) + yz$
e) $30 + yz$
7. A rectangular room measures 12 feet by 16 feet. Carpet is to be laid to cover the entire floor. The carpet costs \$45 per square yard, including pad and labor. Given that the cost of a fraction of a square yard also costs \$45, how much will it cost to carpet the room?
- a) \$960
b) \$990
c) \$1,690
d) \$8,610
e) \$8,640
8. The sum of the first n consecutive odd natural numbers is n^2 . Find the following sum:
 $1 + 3 + 5 + 7 + \dots + 117$
- a) 13,689

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- b) 13,456
- c) 3,600
- d) 3,481
- e) 3,364

9. Find the cardinal number of the set $\{\{i + j \mid i \in \{1,2,3\} \text{ and } j \in \{1,2,3\}\}\}$.

- a) 3
- b) 5
- c) 6
- d) 7
- e) 9

10. Find the sum (in base 5) of the following two base 5 addends:

$$\begin{array}{r} 2 \ 4 \ 3 \ 1 \\ + \ 3 \ 4 \ 0 \ 4 \\ \hline \end{array}$$

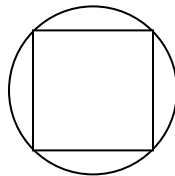
- a) 5,835
- b) 11,000
- c) 11,340
- d) 12,340
- e) 24,300

11. The set of all solutions to the system $\left\{ \begin{array}{l} x \geq 0 \\ y \geq 0 \\ 2x + 5y \geq 20 \\ 7x + 15y \leq 105 \end{array} \right\}$ is a quadrilateral region. How many units, to the nearest hundredth, are in the perimeter of the region?

- a) 35.32
- b) 27.75
- c) 44.00
- d) 32.50
- e) 36.00

12. A square is inscribed in a circle. The area of the circle is A square inches. What is the number of square inches in the area of the square?

- a) $\frac{A}{\pi}$
- b) $\frac{2A}{\pi}$
- c) $2\pi A$
- d) $\frac{A^2}{2\pi^2}$



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e) $\frac{\pi}{2A}$

13. What is the hundredth number in the following sequence? 1, 2, 4, 7, 11, 16 . . . ?

- a) 4,095
- b) 4,950
- c) 4,951
- d) 5,050
- e) 5,051

14. You are observing a chemistry experiment where a liquid is rising in a container. You determine that the amount of liquid is doubling every minute. At 60 minutes, the container is full. At what time is the container one-half full?

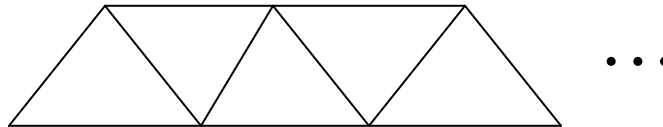
- a) 30 minutes
- b) 31 minutes
- c) 58 minutes
- d) 59 minutes
- e) Cannot be determined from the given information.

15. What is the units digit in 3^{99} ?

- a) 1
- b) 3
- c) 5
- d) 7
- e) 9

16. Below is a picture of 5 consecutive equilateral triangles formed by using 11 toothpicks. If the picture is continued so that 30 triangles were pictured, how many toothpicks would be used?

- a) 59
- b) 60
- c) 61
- d) 62
- e) 66



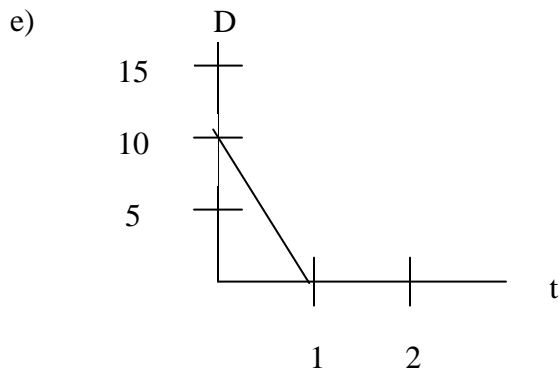
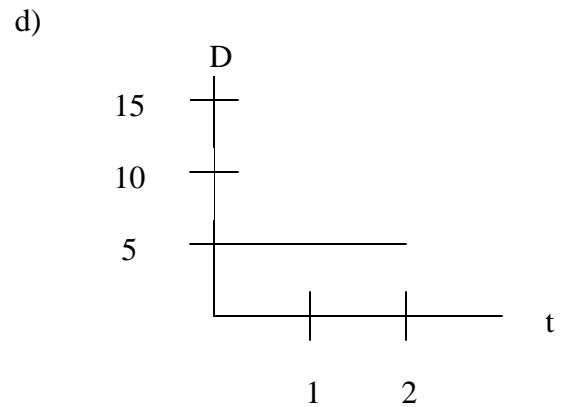
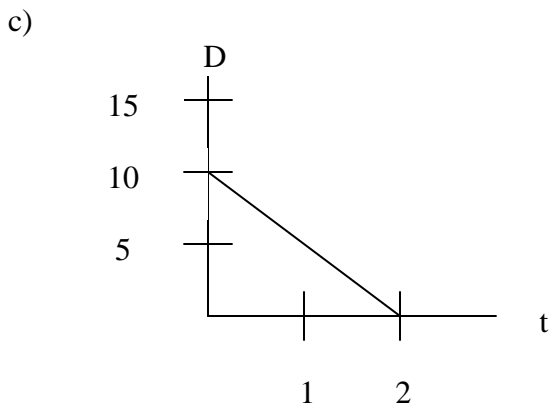
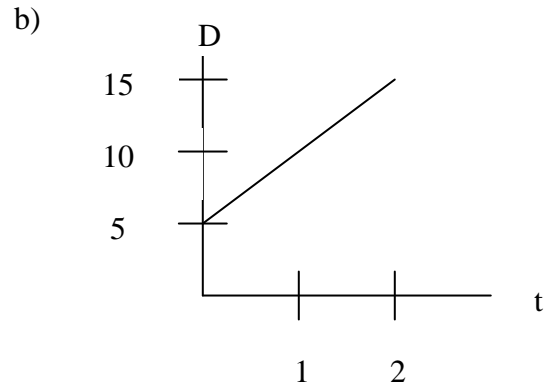
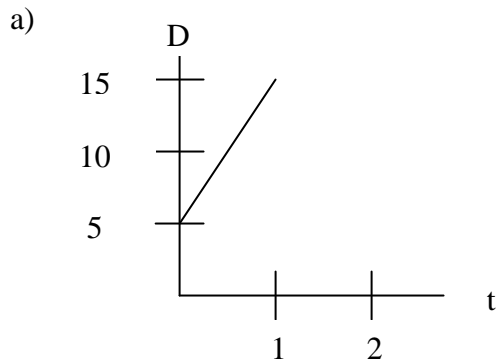
17. Which of the following are possible?

- I. A triangle with two right angles.
- II. A right triangle that is also isosceles.
- III. A right triangle that is also equilateral.
- IV. A right triangle with sides 6, 8 and 10.
- V. A right triangle that has two acute angles.

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- a) II, III, IV, and V only
- b) I, II, and III only
- c) II, III, and IV only
- d) II, IV, and V only
- e) IV and V only

18. Kelly is riding her bike on a sunny afternoon after school. She starts out 5 miles from home and rides 10 miles per hour away from home. Which of the following graphs most accurately represents Kelly's distance from home at various times if t represents time in hours and D represents distance from home in miles?



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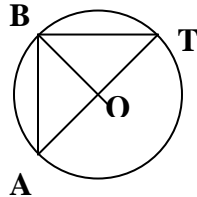
19. What is the difference, expressed as a percent of the original price, between a 20% discount followed by a 30% discount and a straight 45% discount?

- a) 12%
- b) 11%
- c) 5%
- d) 1%
- e) 4.9%

20. The ratio of onions to radishes in a salad is 9 to 4. If the number of onions is decreased by 20% and the number of radishes is increased by 30%, what is the new ratio of onions to radishes?

- a) $\frac{27}{13}$
- b) $\frac{18}{7}$
- c) $\frac{18}{13}$
- d) $\frac{1}{1}$
- e) $\frac{27}{18}$

21. The measure of $\angle BAO$ is 43° . The center of the circle is point O. Find the number of degrees in the measure of $\angle BTO$.



- a) 43
- b) 45
- c) 47
- d) 49
- e) 57

22. Every half second, a bicycle wheel with a diameter of 27 inches makes one complete revolution. To the nearest hundredth, how many miles per hour is the bicycle traveling?

- a) 9.63
- b) 9.64
- c) 9.65
- d) 9.66
- e) 9.67

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23. Which one of the following is always true?
- a) The diagonals of a parallelogram are congruent.
 - b) The diagonals of a parallelogram are perpendicular.
 - c) The diagonals of a parallelogram bisect each other.
 - d) The diagonals of a parallelogram bisect the angles of the parallelogram.
 - e) Each of the above is sometimes false.
24. A box contains 5 red socks and 5 blue socks. Two socks are drawn from the box. What is the probability of getting a matching pair of socks?
- a) $\frac{4}{9}$
 - b) $\frac{1}{2}$
 - c) $\frac{1}{4}$
 - d) $\frac{2}{9}$
 - e) $\frac{1}{25}$
25. A small airplane can make a trip of 600 miles in 5 hours against the wind. The return trip with the wind takes only 4 hours. What is the speed of the wind?
- a) 5 mph
 - b) 10 mph
 - c) 15 mph
 - d) 20 mph
 - e) 25 mph
26. Three blocks of cheese weigh 650 kilograms, 680 kilograms, and 760 kilograms. For the purpose of packing and to avoid waste, the cheese is to be cut into pieces of equal weight. The total weight of all these pieces is to be as great as possible. How much should each piece weigh if the total number of pieces is to be as small as possible?
- a) 20 kg
 - b) 10 kg
 - c) 5 kg
 - d) 2 kg
 - e) 1 kg
27. A large cube has a surface area of 216 square centimeters. What is the total surface area of a smaller cube whose edges are half as long as those of the large cube?
- a) 27 sq. cm.
 - b) 36 sq. cm.
 - c) 54 sq. cm.
 - d) 64 sq. cm.
 - e) 108 sq cm.
28. If $x > y$, where x and y are real numbers, then which statement must be true?

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- a) $\frac{1}{x} < \frac{1}{y}$
- b) $x - y < 0$
- c) $x^2 > y^2$
- d) $y > 0$

29. Define the operation $*$ on the integers by $a * b = (a + b) - 1$ (for example $2 * 3 = (2+3)-1 = 4$). What is the identity element for $*$?

- a) -1
- b) 0
- c) 1
- d) -2
- e) 2

30. If the graph in Figure 1 is reflected about the x-axis the resulting graph will be

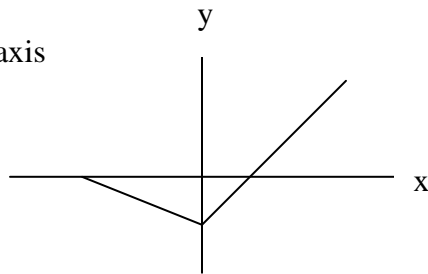
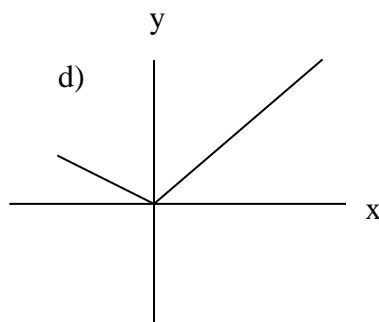
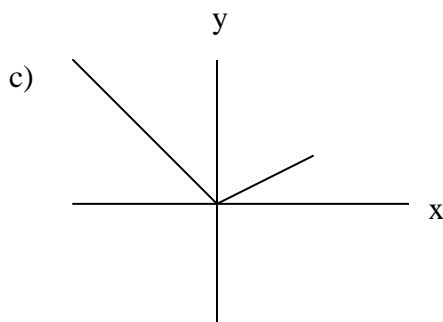
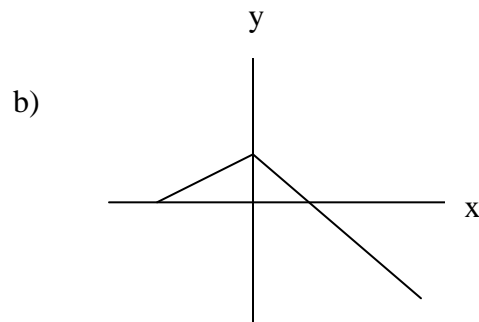
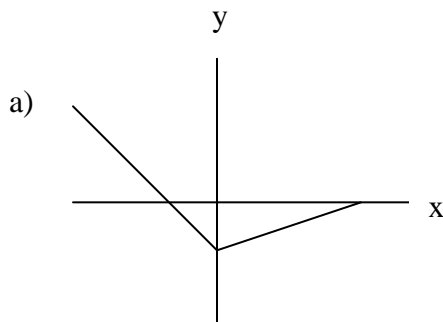


Figure 1



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e)