



**High School Test
in
Mathematics**

*Released Items
Spring 2002*

2 Which type of graph would be **LEAST** effective for displaying population data over several decades?

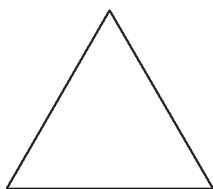
A line graph

B circle graph

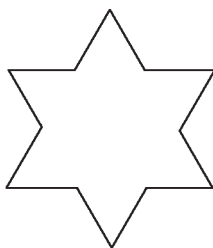
C vertical bar graph

D horizontal bar graph

4 What is the length of the side of the Stage 0 equilateral triangle if the perimeter of Stage 1 is 60 centimeters?



Stage 0



Stage 1

A 5 cm

B 10 cm

C 15 cm

D 20 cm

7 If Paul, Quin, Ray, and Sam are seated at a circular table, what is the probability that Paul and Quin are seated **NEXT** to each other?

A $\frac{1}{4}$

B $\frac{1}{2}$

C $\frac{2}{3}$

D $\frac{1}{1}$

12 What statistical measure would a store manager use to determine the best-selling item in the store?

A mean

B mode

C range

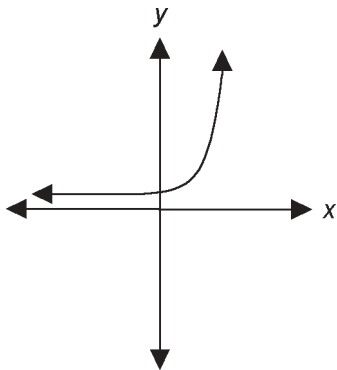
D median

- 14 The manager of Pete's high-rise apartment building assigns four parking spaces per floor. The parking spaces are numbered according to the following pattern:

1st floor	1100	1110	1120	1130
2nd floor	1200	1210	1220	1230
3rd floor	1300	1310	1320	1330
• •				
• •				
• •				
15th floor	2500	2510	2520	2530

According to the pattern, what are the parking space numbers for the 11th floor?

- A 1100 1110 1120 1130
- B 11,000 11,100 11,200 11,300
- C 21,000 21,100 21,200 21,300
- D 2100 2110 2120 2130
- 15 Which of the following equations does this graph represent?



- A $y = 3^x + 4$
- B $y = 3x^3 + 4$
- C $y = 3x + 4$
- D $y = \frac{3}{x} + 4$

18 (4 Points)

The owner of an automobile dealership selected a sample from a population of 750 customers who received maintenance services last year. Due to time limitations, she sampled only 20 customers.

- A** The owner used the last 20 customers who received repair service as the sample. Explain why that sample would **NOT** be suitable.
- B** Describe a method of sampling 20 customers in a way that maximizes the probability the sample will fairly represent the population.

Explain your answers, including supporting calculations, tables, diagrams, charts, drawings/graphs in your answer booklet.

**ANSWER THIS ITEM IN YOUR ANSWER BOOKLET.
NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.**

19 (4 Points)

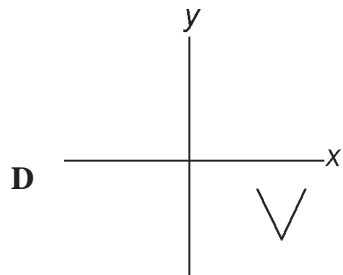
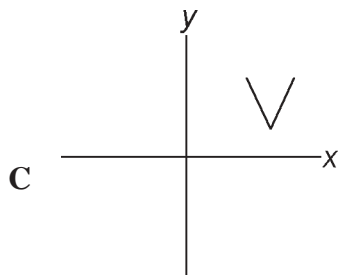
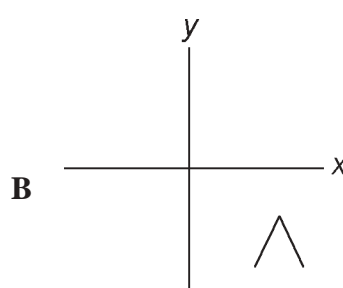
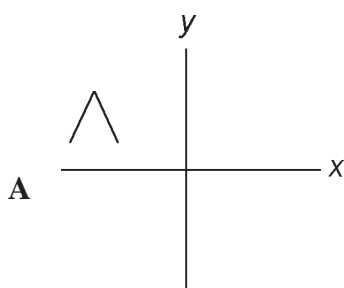
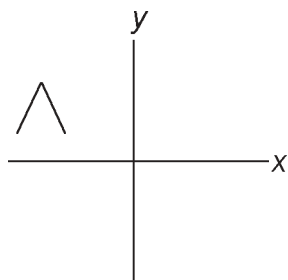
Toni's fully fueled race car completes one lap in 2 minutes 30 seconds but takes one second less for each successive lap as fuel is used. He makes a pit stop after every 10th lap to refuel. The pit stop lasts about 20 seconds. The race has 50 laps.

Assuming Toni doesn't make a pit stop on his final lap, how long will it take him to complete the race?

Explain your answer, including supporting calculations, tables, diagrams, charts, drawings/graphs in your answer booklet.

**ANSWER THIS ITEM IN YOUR ANSWER BOOKLET.
NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.**

- 24 Which graph is a 180° rotation about the origin with respect to the given graph?



- 25 The area of a square made out of a length of yarn measures 225 square inches. How long is the yarn?

A 225.00 in **B** 60.00 in **C** 56.25 in **D** 15.00 in

- 26 During a visit to his physician, John received a single dose of medication that decays at a rate of 20% per hour. The amounts of medication that remain in his body at the end of each hour for the first 3 hours are represented by the sequence 150, 120, 96 mg. Approximately how many milligrams of medication remained in his body after the first 6 hours?

A 25 **B** 30 **C** 50 **D** 90

- 31 John and Bill drove their truck to California. John drove for three straight hours averaging 55 mph. Bill then took over the driving for four straight hours averaging 65 mph. They continued this pattern until they covered 2125 miles. How long was their trip?

A 14 hours B 35 hours C 44 hours D 60 hours

- 32 Officials of the Park District plan to send a newsletter to the residents. Each newsletter weighs 1.8 oz. How many newsletters can they afford to send if they can spend up to \$15,000?

Nonpresorted Bulk

First ounce or fraction of an ounce \$0.296
 Each additional ounce or fraction of an ounce \$0.245

Weight Not Exceeding Ounces	Rate
1.....	\$0.296
2.....	\$0.541
3.....	\$0.786

A 27,726 B 28,153 C 30,487 D 50,675

- 34 Vinny divided his total paycheck as follows:

$\frac{1}{2}$ into savings; $\frac{1}{10}$ for a payment; \$48.00 for spending

What was the total amount of his paycheck?

A \$96 B \$120 C \$130 D \$150

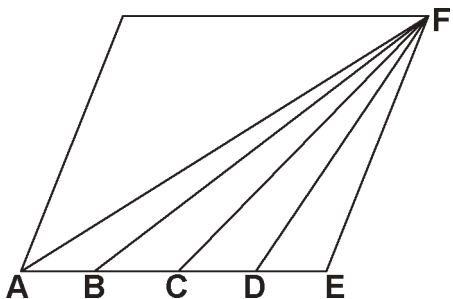
- 35 Heron's formula states that the area of any triangle with sides of lengths a , b , and c is:

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

where s is the semi-perimeter of the triangle, $s = \frac{a+b+c}{2}$

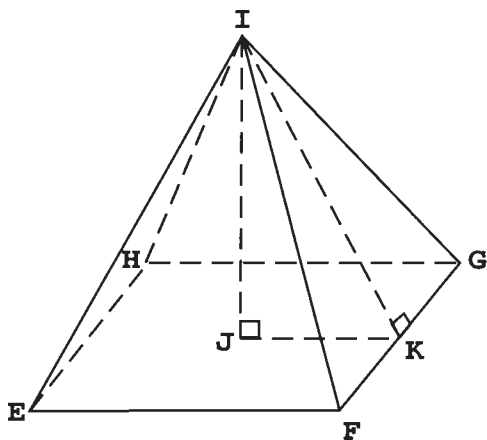
Use Heron's formula to find the area of a triangular plot of land with sides 9 meters, 11 meters, and 16 meters.

- A $18\sqrt{7}$ m² B $3\sqrt{14}$ m² C $30\sqrt{15}$ m² D $36\sqrt{22}$ m²
- 37 A can manufacturer plans to print the company name across the bottom of its cylindrical cans and also around the middle of the can. He discovered they could print the name, side by side, 7 times across the diameter of the bottom of each can. Approximately how many times could the name fit around the middle of the can?
- A 14 B 22 C 35 D 49
- 38 A mountain bike costs \$75 more than 3 times the amount a street bike costs. If the mountain bike sells for \$1,500, which equation can be used to find the price of the street bike?
- A $3x + 75 = 1500$ B $3x = 1500 + 75$
 C $3(x + 75) = 1500$ D $3x - 75 = 1500$
- 39 In the parallelogram, if $AB = BC = CD = DE$, what is the ratio of the area of triangle CDF to the area of triangle ABF ?



- A 1:4 B 1:2 C 1:1 D 4:1

- 40 The first five terms of a sequence are 5, 11, 17, 23, 29,...
Identify the 20th term (a_{20}).
- A 114 B 119 C 125 D 143
- 41 An economist is studying the supply and demand of a particular product. She determined that demand for the product decreases as its price, P , increases according to the demand equation $P = -\frac{2}{3}x + 30$. The supply of the product increases as its price increases according to the supply equation $P = \frac{4}{3}x$. At what price, x , are supply and demand in equilibrium?
- A 0 B 15 C 20 D 45
- 42 Which segment is the altitude of this pyramid?



- A \overline{IJ} B \overline{IG} C \overline{IK} D \overline{JK}

43 (4 Points)

Solve the following problem:

Squares will be cut from the corners of a 10-inch by 6-inch rectangular piece of sheet metal in order to form an open-top rectangular box with a bottom area of 32 square inches.

- A** Sketch a drawing of the rectangular sheet indicating where the cuts are to be made.
- B** What size squares should be cut from the corners?
- C** Give the computations used to find the size of the squares.

Explain your answers, including all supporting calculations, tables, diagrams, charts, drawings/ graphs in your answer booklet.

**ANSWER THIS ITEM IN YOUR ANSWER BOOKLET.
NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.**