



Sample Test Questions

Mathematics



SAMPLE TEST QUESTIONS

The sample test questions in this document are designed to give you an introduction to the nature of the questions included in the Washington Educator Skills Tests—Endorsements (WEST-E). They represent the various types of questions you may expect to see on an actual test in this test field; however, they are *not* designed to provide diagnostic information to help you identify specific areas of individual strength or weakness or to predict your performance on the test as a whole.

Work through the sample questions carefully before referring to the answer key that follows. The answer key provides the correct response for each question and lists the objective within the test framework to which each question is linked. When you are finished with the sample questions, you may wish to review the test objectives and descriptive statements provided in the test framework for this test field.

In addition to reading and answering the sample questions, you should also utilize the following preparation materials available on the WEST Web site:

- Read **WEST-E Test-Taking Strategies** to understand how test questions are designed to measure specific test objectives and to learn important test-taking strategies for the day of the test.
- Review the **Test Summary and Framework** for your test field to familiarize yourself with the structure and content of the test. This document contains general testing information as well as the percentage of the total test score derived from each content domain described in the test framework.

Please note that a set of formulas is provided for this test. Please refer to this material as needed in responding to the sample test questions. This material is located in the Reference Materials section at the end of this document.

A graphing calculator may be used for this test as needed in responding to the sample test questions, and examinees may bring an approved model to the test administration. Please refer to the current WEST registration information regarding the use of calculators at the test administration.

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SAMPLE MULTIPLE-CHOICE QUESTIONS

1. Use the table below to complete the statement that follows.

Polyhedron	No. of Vertices (V)	No. of Edges (E)	No. of Faces (F)	$V - E + F$
tetrahedron	4	6	4	2
cube	8	12	6	2
octahedron	6	12	8	2
icosahedron	12	30	20	2

The conclusion from the table that $V - E + F = 2$ for all polyhedra would be an example of:

- A. deductive reasoning.
- B. inductive reasoning.
- C. indirect proof.
- D. proof by mathematical induction.



2. Which of the following is an example of a valid syllogistic argument?

- A. Hypothesis: $\begin{cases} \text{If } p \text{ then } (q \text{ and } r). \\ q \text{ is true and } r \text{ is true.} \end{cases}$
Conclusion: Therefore, p is true.
- B. Hypothesis: $\begin{cases} \text{If } p \text{ then } (q \text{ and } r). \\ p \text{ is false.} \end{cases}$
Conclusion: Therefore, q is false and r is false.
- C. Hypothesis: $\begin{cases} \text{If } p \text{ then } (q \text{ and } r). \\ q \text{ is false.} \end{cases}$
Conclusion: Therefore, p is false.
- D. Hypothesis: $\begin{cases} \text{If } p \text{ then } (q \text{ and } r). \\ r \text{ is true.} \end{cases}$
Conclusion: Therefore, p is true and q is true.

3. Use the information below to complete the statement that follows.

For every 9 books borrowed, the public library receives 3 extra dollars in state funding.

The statement above implies that the relationship between the total number of books borrowed and the total number of dollars received in state funding is:

- A. logarithmic.
- B. constant.
- C. linear.
- D. quadratic.



4. **Use the information below to answer the question that follows.**

An online business, which normally sells items at 25% over cost, has a sale where everything is marked down by 25%. The sale is very popular because customers believe that they are purchasing items at cost.

Which of the following statements describes the major flaw in the reasoning of the customers?

- A. The customers do not take into account the cost of shipping.
- B. The customers do not realize that the basis of the percentage differs in the two cases.
- C. The customers are confusing wholesale cost with retail cost.
- D. The customers are ignoring the cumulative effect of round-off error in the two cases.

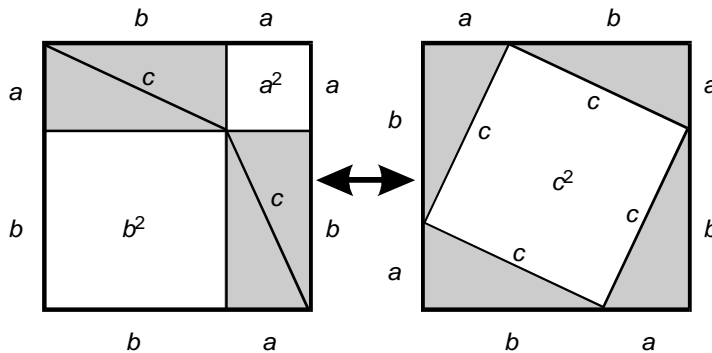


5. Use the graphing calculator screen below to complete the statement that follows.

$Y_1 = X^3 - 5$
 $Y_2 = X^5 - 3$
 $Y_3 = Y_2 - Y_1$
 $Y_4 =$

- The zeros of the graph of Y_3 represent:
- A. the x-coordinates of the intersections of Y_1 and Y_2 .
 - B. the y-coordinates of the intersections of Y_1 and Y_2 .
 - C. the difference of the zeros of Y_1 and Y_2 .
 - D. the average of the zeros of Y_1 and Y_2 .
6. A certain swimming pool can be drained in 5 hours using a large pump. The same swimming pool can be drained in 12 hours using a small pump. How long, rounded to the nearest hour, will it take to drain the swimming pool using 2 small pumps and 1 large pump?
- A. 1 hour
 - B. 2 hours
 - C. 3 hours
 - D. 4 hours

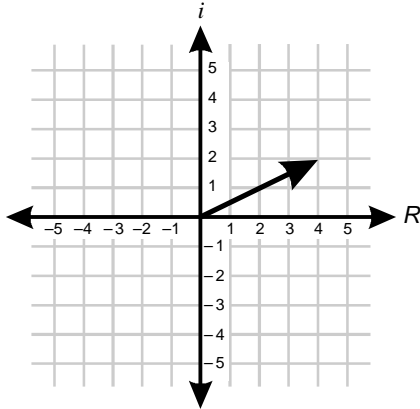
7. Use the diagram below to complete the statement that follows.



This diagram is a visual demonstration of a relationship that provides a connection between geometry and:

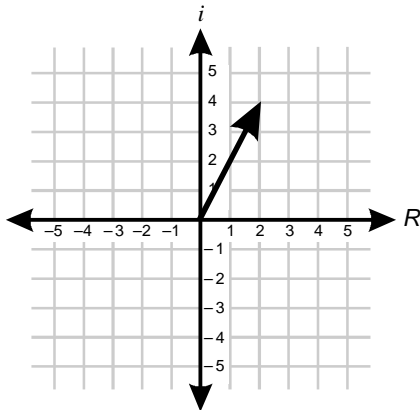
- A. combinatorics.
 - B. probability.
 - C. graph theory.
 - D. algebra.
8. The amount of light generated by a lightbulb is measured in lumens. The intensity of light perceived at a distance away from the bulb is measured in lux. This intensity is directly proportional to the number of lumens and inversely proportional to the square of the distance. A 465-lumen lightbulb produces 5000 lux of light intensity at a distance of 1 m. What is the intensity of the same light at a distance of 5 m?
- A. 40 lux
 - B. 200 lux
 - C. 500 lux
 - D. 1000 lux

9. Use the graph below to answer the question that follows.

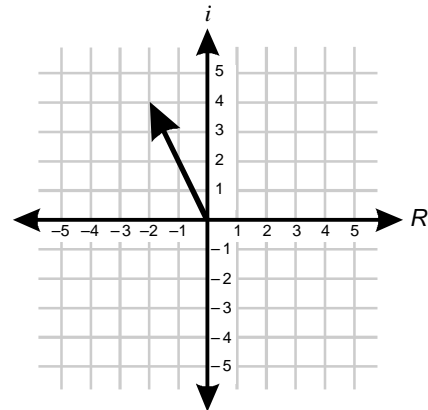


The vector in this graph represents the complex number z . Which of the following graphs represents the product zi ?

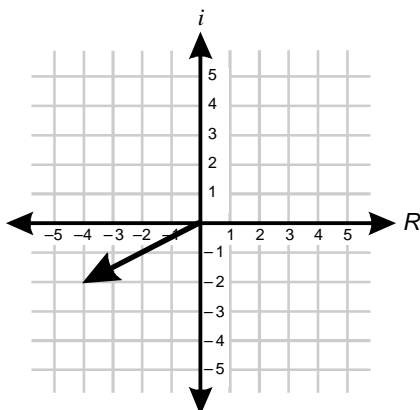
A.



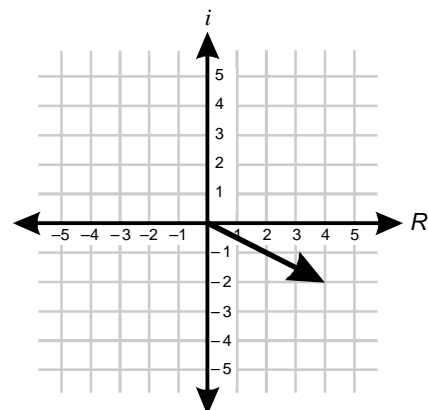
B.



C.



D.





10. In a particular base-5 number system, the possible digits are represented by the symbols 0, A, B, C, and D from smallest to largest. Which of the following represents the sum $DB + D$?
- A. A0A
 - B. AA
 - C. DA
 - D. DBD
11. The height of a radio station's broadcasting antenna in feet is directly proportional to the square of its maximum range in miles. A radio station with a 50-foot-tall antenna has a maximum range of 10 miles. Approximately how tall will the antenna have to be for the maximum range to be 15 miles?
- A. 225 feet
 - B. 113 feet
 - C. 75 feet
 - D. 61 feet



12. Use the matrix equations below to answer the question that follows.

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix} = \begin{bmatrix} 10 & 13 \\ 22 & 29 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix} \begin{bmatrix} 4 & 5 \\ 6 & 7 \end{bmatrix} = \begin{bmatrix} 26 & 31 \\ 46 & 55 \end{bmatrix}$$

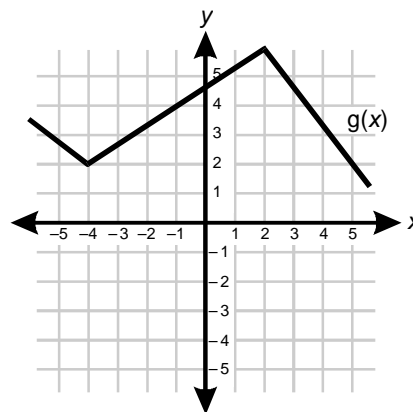
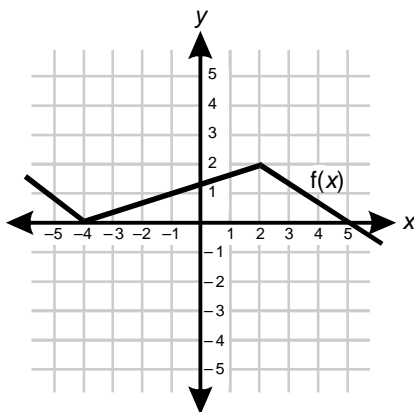
$$\begin{bmatrix} 10 & 13 \\ 22 & 29 \end{bmatrix} \begin{bmatrix} 4 & 5 \\ 6 & 7 \end{bmatrix} = \begin{bmatrix} 118 & 141 \\ 262 & 313 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 26 & 31 \\ 46 & 55 \end{bmatrix} = \begin{bmatrix} 118 & 141 \\ 262 & 313 \end{bmatrix}$$

What property of matrix multiplication is demonstrated by the equations above?

- A. the associative property
 - B. the transitive property
 - C. the commutative property
 - D. the distributive property
13. Given that a is divisible by b and that a is divisible by c , which of the following must be true?
- A. $2a$ is divisible by bc .
 - B. bc is divisible by ac .
 - C. a^2 is divisible by bc .
 - D. $(bc)^2$ is divisible by a .

14. Under what conditions must the least common multiple of two numbers be equal to the product of the two numbers?
- A. when the two numbers have no factors in common except for the number one
 - B. when one of the two numbers is a factor of the other number
 - C. when the two numbers have exactly the same set of prime factors
 - D. when the product of the two numbers is a perfect square number
15. Use the graphs below to answer the question that follows.



Which of the following equations represents the relationship between $f(x)$ and $g(x)$?

- A. $g(x) = f(2x) + 2$
- B. $g(x) = 2f(x) + 2$
- C. $g(x) = 2f(x + 2)$
- D. $g(x) = 2[f(x) + 2]$



16. Use the function below to answer the question that follows.

$$f(x) = 2 \tan(1 - x)$$

Which of the following represents $f^{-1}(x)$, the inverse of $f(x)$?

- A. $f^{-1}(x) = \frac{1}{2} \cot(x - 1)$
- B. $f^{-1}(x) = 1 - \cot \frac{x}{2}$
- C. $f^{-1}(x) = \frac{1}{2} \tan^{-1}(x - 1)$
- D. $f^{-1}(x) = 1 - \tan^{-1} \frac{x}{2}$
17. Use the table below to answer the question that follows.

x	y
n	$n - 5$
$n + 2$	$n - 6$

If the data in the table above are modeled with a linear function, what is the y -intercept of the graph of the function?

- A. $\frac{1}{2}n - 5$
- B. $\frac{3}{2}n - 5$
- C. $\frac{9}{2}n - 5$
- D. $\frac{13}{2}n - 5$



18. Use the system of inequalities below to answer the question that follows.

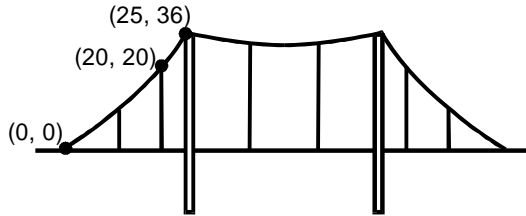
$$2y - 6x < 7$$

$$9x - 3y > 2$$

Which of the following inequalities represents the solution to the system above?

- A. $x > \frac{1}{3}y - \frac{7}{6}$
- B. $y < 3x - \frac{2}{3}$
- C. $\frac{1}{3}y - \frac{7}{6} < x < \frac{1}{3}y + \frac{2}{9}$
- D. $3x - \frac{2}{3} < y < 3x + \frac{7}{2}$
19. Which of the following equations for a parabola would be most useful for determining the coordinates of the vertex?
- A. $y = 2x^2 - 8x - 10$
- B. $y = 2(x^2 - 4x - 5)$
- C. $y = 2(x - 5)(x + 1)$
- D. $y = 2(x - 2)^2 - 18$

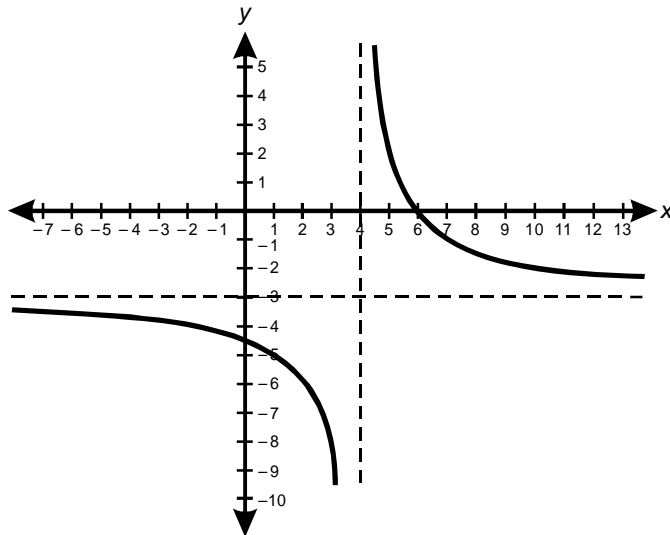
20. Use the diagram below to answer the question that follows.



Engineers model the curve of a suspension bridge cable based on the coordinates shown in the diagram above. If the model is of the form $y = ax^2 + bx + c$, which of the following sets of equations could be used to find the coefficients a , b , and c ?

- A. $a + b = 0$
 $b + c = 40$
 $c + a = 61$
- B. $b - a = 0$
 $c - b = 40$
 $a - c = 61$
- C. $c = 0$
 $40a + 20b = 20$
 $50a + 25b = 36$
- D. $c = 0$
 $400a + 20b = 20$
 $625a + 25b = 36$

21. Use the graph below to answer the question that follows.



The function $y = \frac{f(x)}{g(x)}$ is graphed above, where $f(x)$ and $g(x)$ are linear functions. Which of the following describes the x -intercepts of $f(x)$ and $g(x)$?

- A. $f(x)$ has an x -intercept equal to 4 and $g(x)$ has an x -intercept equal to 4.
- B. $f(x)$ has an x -intercept equal to 4 and $g(x)$ has an x -intercept equal to -3 .
- C. $f(x)$ has an x -intercept equal to 6 and $g(x)$ has an x -intercept equal to -4.5 .
- D. $f(x)$ has an x -intercept equal to 6 and $g(x)$ has an x -intercept equal to 4.



22. Which of the following is equivalent to the expression $\frac{1}{\sqrt{x} + 1}$?

A. $\frac{1 - \sqrt{x}}{x - 1}$

B. $\frac{1 - \sqrt{x}}{x + 1}$

C. $\frac{\sqrt{x} - 1}{x - 1}$

D. $\frac{\sqrt{x} - 1}{x + 1}$

23. If $\log x = r$ and $\log y = s$, which of the following expressions is equivalent to xy ?

A. 10^{r+s}

B. 10^{rs}

C. $\log(r + s)$

D. $\log(rs)$



24. A real estate consultant predicts that property values in a particular neighborhood will increase exponentially with values doubling every 6 years. Which of the following expressions represents the predicted number of years required for property values to triple?

A. $\frac{3 \log 6}{\log 2}$

B. $\frac{6 \log 3}{\log 2}$

C. $\frac{10 \log 6}{\log 3}$

D. $\frac{12 \log 3}{\log 6}$

25. Which of the following is equivalent to the expression

$$\sqrt{[1 + \sin \theta][1 + \sin(-\theta)]} \text{ when } 0 \leq \theta \leq \frac{\pi}{2}?$$

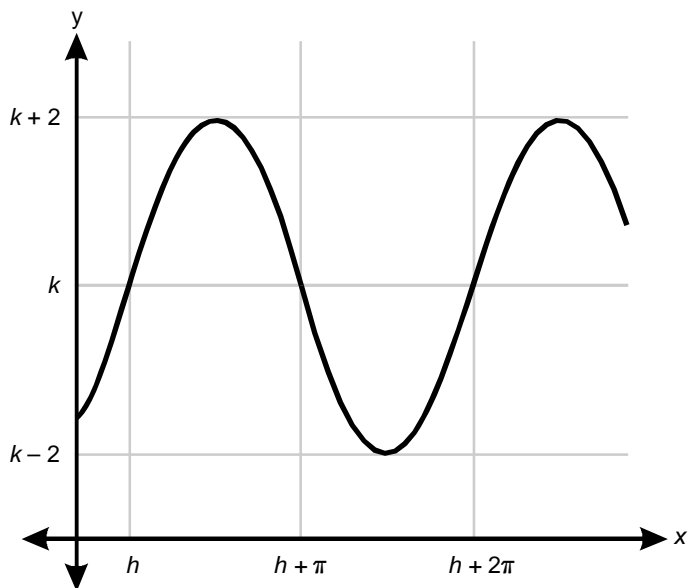
A. $\sin \theta$

B. $\pm \sin \theta$

C. $\cos \theta$

D. $\pm \cos \theta$

26. Use the graph below to answer the question that follows.



Which of the following equations is represented by the graph above?

- A. $y = 2 \sin(x - h) + k$
- B. $y = 2 \sin(x + h) + k$
- C. $y = 4 \sin(x - h) + k$
- D. $y = 4 \sin(x + h) + k$



27. Use the matrix equation below to answer the question that follows.

$$\begin{bmatrix} 3 & a \\ b & 2 \end{bmatrix} \begin{bmatrix} 7 \\ 4 \end{bmatrix} = \begin{bmatrix} 29 \\ 22 \end{bmatrix}$$

Which of the following sets of equations could be used to solve for a and b in the matrix equation above?

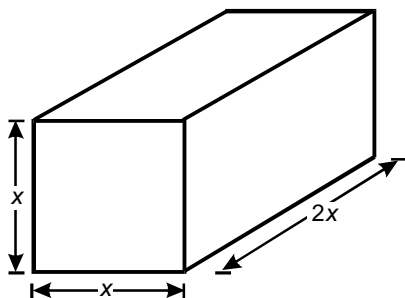
- A. $21 + 4a = 29$
 $7b + 8 = 22$
- B. $21 + 4b = 29$
 $7a + 8 = 22$
- C. $21 + 4a = 29$
 $4b + 14 = 22$
- D. $21 + 7b = 29$
 $4a + 8 = 22$
28. Use the matrix equations below to answer the question that follows.

$$\begin{bmatrix} 4 & 3 \\ 5 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 6 \\ 8 \end{bmatrix} \quad \begin{bmatrix} 4 & 3 \\ 5 & 4 \end{bmatrix}^{-1} = \begin{bmatrix} 4 & -3 \\ -5 & 4 \end{bmatrix}$$

Which of the following matrix expressions could be evaluated to solve for the variable matrix $\begin{bmatrix} x \\ y \end{bmatrix}$?

- A. $\begin{bmatrix} 6 \\ 8 \end{bmatrix} \begin{bmatrix} 4 & -3 \\ -5 & 4 \end{bmatrix}$
- B. $\begin{bmatrix} 4 & -3 \\ -5 & 4 \end{bmatrix} \begin{bmatrix} 6 \\ 8 \end{bmatrix}$
- C. $\begin{bmatrix} 6 \\ 8 \end{bmatrix} \begin{bmatrix} 4 & 3 \\ 5 & 4 \end{bmatrix} \begin{bmatrix} 4 & -3 \\ -5 & 4 \end{bmatrix}$
- D. $\begin{bmatrix} 4 & -3 \\ -5 & 4 \end{bmatrix} \begin{bmatrix} 4 & 3 \\ 5 & 4 \end{bmatrix} \begin{bmatrix} 6 \\ 8 \end{bmatrix}$

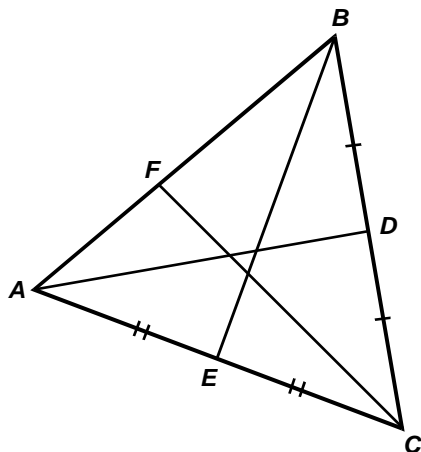
29. Use the diagram below to answer the question that follows.



The rectangular prism shown in the diagram above has a surface area of 120 square units. What is the volume of the prism?

- A. $48\sqrt{3}$ cubic units
- B. $80\sqrt{5}$ cubic units
- C. $80\sqrt{10}$ cubic units
- D. $60\sqrt{30}$ cubic units
30. The radius of a right cone is doubled and the height is kept the same. What is the effect on the volume?
- A. The volume increases by a factor of 2.
- B. The volume increases by a factor of $\frac{2}{3}$.
- C. The volume increases by a factor of 4.
- D. The volume increases by a factor of $\frac{4}{3}$.

31. Use the diagram below to answer the question that follows.



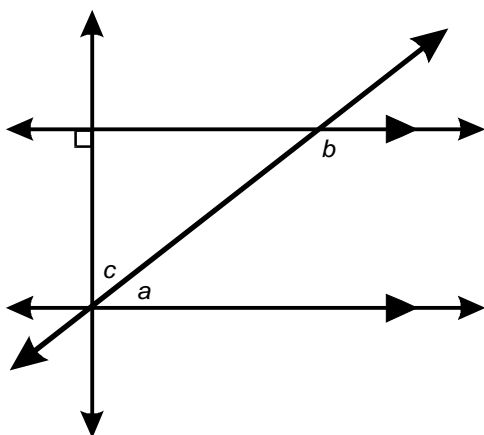
A mathematician sets out to prove that the three medians of any triangle intersect at exactly one point. The mathematician draws the labeled diagram shown above and starts an indirect proof with the assumption that \overline{FC} intersects \overline{AD} and \overline{BE} at two distinct points. In order to complete the proof, which of the following should the mathematician attempt to deduce from what is given?

- A. $AF \neq BF$
- B. $\overline{AD} \perp \overline{BC}$
- C. $\angle DAC \cong \angle EBC$
- D. $\triangle ADC \cong \triangle BEC$

32. Which of the following could represent the exact sum of the interior angles of a quadrilateral on the surface of a sphere?

- A. 180°
- B. 270°
- C. 360°
- D. 450°

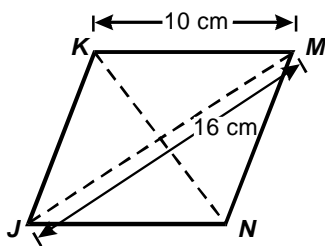
33. Use the diagram below to answer the question that follows.



If $x = m\angle b - m\angle c$, then what is the value of x ?

- A. 45°
- B. 60°
- C. 75°
- D. 90°

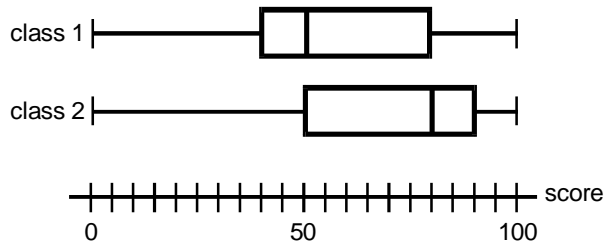
34. Use the diagram below to answer the question that follows.



- In rhombus $JKMN$, the length of side KM is 10 cm and the length of diagonal JM is 16 cm. What is the length of diagonal KN ?
- A. 6 cm
B. 10 cm
C. 12 cm
D. 13 cm
35. The vertices of a kite have coordinates $(14, 2)$, $(10, -4)$, $(6, 2)$, and $(10, y)$. If the kite has an area of 64 square units, what is the value of y ?
- A. 8
B. 10
C. 12
D. 14

36. When two people stand at the foci of an elliptical room, all of the sound of the person speaking is reflected off the elliptical wall directly toward the other person. Such rooms are called whispering chambers because the two people can hear each other clearly even if they whisper. If a whispering chamber measures 60 feet long and 30 feet wide, approximately how far apart will the two people be when they are standing at the foci?
- A. 26 feet
 - B. 36 feet
 - C. 45 feet
 - D. 52 feet

37. Use the box-and-whisker plot below to answer the question that follows.



Which of the following statements is supported by the box-and-whisker plot shown above?

- A. 90% of class 2 scored better than 80% of class 1.
- B. 80% of class 2 scored better than 50% of class 1.
- C. 75% of class 2 scored better than 50% of class 1.
- D. 25% of class 2 scored better than 50% of class 1.



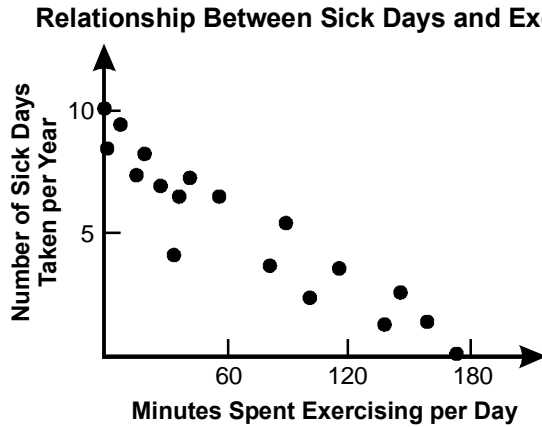
38. An employer requires all job applicants to take a nationally administered general skills aptitude test before being considered for employment. An applicant's score on the test placed the applicant in the 96th percentile. Which of the following can be concluded?
- A. The applicant got at most 4% of the questions wrong.
 - B. The applicant's score was 4% lower than the highest score.
 - C. The applicant answered 96% of the questions correctly.
 - D. The applicant scored higher than 96% of those who took the test.
39. **Use the information below to answer the question that follows.**

A local employer argues that its employees are highly paid. To support this argument, the employer cites the fact that their average salary is 10 percent higher than the median household income for the community.

Which of the following statements best explains why the employer's argument is an invalid use of statistics?

- A. The argument does not take into account the difference between salary and household income.
- B. The argument does not include the effect of standard deviation on the comparison.
- C. The argument assumes that the salary distribution is symmetrical about the mean.
- D. The argument is based on a percentage instead of an actual amount.

40. Use the graph below to answer the question that follows.



The results of an employee survey are shown above. Which of the following is a valid conclusion that can be drawn from these results?

- A. An employee can decrease the number of sick days taken per year by exercising more each day.
- B. The employees who were often out sick were unable to keep up an extensive exercise program.
- C. Employees with a stronger work ethic tended to take fewer sick days.
- D. The employees who took more sick days per year tended to spend fewer minutes per day exercising.



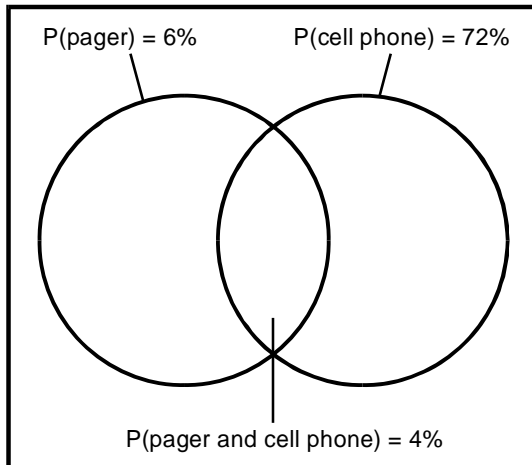
41. Use the table below to answer the question that follows.

Television Screen Supplier Statistics		
Screen Supplier	Number of Screens Purchased	Percentage That Fail in the First 5 Years
X	10,000	8%
Y	40,000	7%
Z	60,000	5%

A company that makes television sets purchases all of their screens from suppliers X, Y, and Z. Based on the information in the table above, what is the probability that a randomly chosen television set from this company will have a screen failure within the first 5 years of operation?

- A. 6.0%
- B. 6.5%
- C. 6.6%
- D. 6.7%

42. Use the Venn diagram below to answer the question that follows.



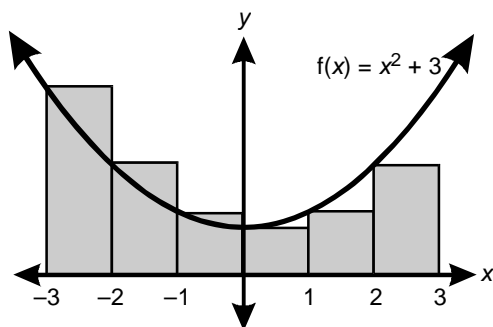
The Venn diagram above shows the probability that a member of a certain population has a cell phone, a pager, or both. Based on the diagram, what is the probability that a randomly chosen member does *not* have either a cell phone or a pager?

- A. 26%
- B. 24%
- C. 22%
- D. 18%
43. What is the second finite difference of the sequence $a_n = 3n^2$?
- A. 0
- B. 1
- C. 3
- D. 6

44. One hundred people are waiting for a bus from Olympia to Seattle. Two empty buses arrive at the bus stop to drive this route. If one bus can take 40 passengers and the other bus can take 60 passengers, which of the following expressions represents the total number of different ways that the people could be divided between the two buses?

- A. $(60!)(40!)$
- B. $(100!)(40!)$
- C. $\frac{100!}{60!}$
- D. $\frac{100!}{(60!)(40!)}$

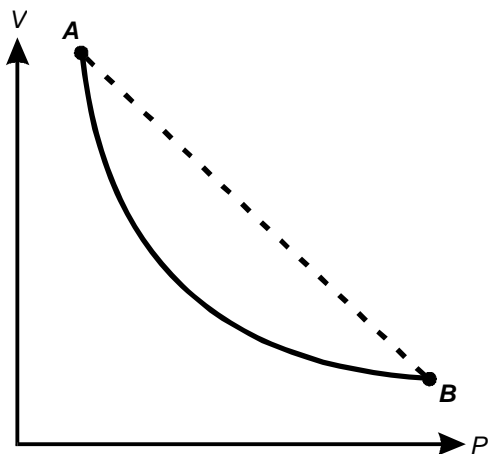
45. Use the graph below to answer the question that follows.



The graph above shows a geometric approximation of the area under the curve $f(x) = x^2 + 3$ for values of x between -3 and 3 . What is the area based on this approximation?

- A. 36 square units
- B. 37 square units
- C. 46 square units
- D. 48 square units

46. Use the graph below to answer the question that follows.



The solid curve in the graph above represents the volume V of a fixed quantity of gas at a constant temperature as a function of pressure P . The curve is described by the equation $PV = KT$ where K is a constant and T is the absolute temperature of the gas. Which of the following is represented by the slope of the dotted line in the graph?

- A. the absolute temperature T of the gas multiplied by the constant K
- B. the absolute temperature T of the gas divided by the constant K
- C. the average rate of change of the volume of the gas with respect to pressure between points A and B
- D. the instantaneous rate of change of the volume of the gas with respect to pressure halfway between points A and B



47. Use the function below to answer the question that follows.

$$f(x) = \sqrt[3]{\frac{1}{2}x^2}$$

Which of the following expressions is equivalent to $f'(x)$?

- A. $\frac{1}{3}\left(\frac{1}{2}x^2\right)^{-\frac{2}{3}}$
- B. $\frac{2}{3}\left(\frac{1}{2}x^2\right)^{-\frac{2}{3}}$
- C. $\frac{x}{3}\left(\frac{1}{2}x^2\right)^{-\frac{2}{3}}$
- D. $\frac{2x}{3}\left(\frac{1}{2}x^2\right)^{-\frac{2}{3}}$
48. A spherical bacteria cell is expanding exponentially according to the equation $r(t) = 0.02e^t$ where r represents the radius of the circular cross section of the cell in micrometers, and t represents time in seconds. Which of the following expressions represents $\frac{dA}{dt}$, the rate of change of the area of the cross section with respect to time?
- A. $0.04\pi e^t$
- B. $0.04\pi e^{2t}$
- C. $0.0008\pi e^t$
- D. $0.0008\pi e^{2t}$



49. If $f(x)$ is continuous and positive on interval $[a, b]$ and $F(x)$ is an antiderivative of $f(x)$, then which of the following quantities is represented by $F(b) - F(a)$?
- A. the area between the graph of $f(x)$ and the lines $y = a$, $y = b$, and $x = 0$
 - B. the area between the graph of $f(x)$ and the lines $x = a$, $x = b$, and $y = 0$
 - C. the area between the graph of $f'(x)$ and the lines $y = a$, $y = b$, and $x = 0$
 - D. the area between the graph of $f'(x)$ and the lines $x = a$, $x = b$, and $y = 0$
50. A ball is thrown vertically into the air with a velocity in meters per second described by the function $v(t) = -9.8t + 20$, where t represents the time in seconds after the ball is released. What is the total distance traveled by the ball during the first 2 seconds?
- A. 19.6 m
 - B. 20.4 m
 - C. 30.2 m
 - D. 39.6 m



ANSWER KEY

Question Number	Correct Response	Test Objective
1	B	0001
2	C	0001
3	C	0002
4	B	0002
5	A	0003
6	C	0003
7	D	0004
8	B	0004
9	B	0005
10	A	0005
11	B	0006
12	A	0006
13	C	0007
14	A	0007
15	B	0008
16	D	0008
17	B	0009
18	B	0009
19	D	0010
20	D	0010
21	D	0011
22	C	0011
23	A	0012
24	B	0012
25	C	0013

Question Number	Correct Response	Test Objective
26	A	0013
27	A	0014
28	B	0014
29	A	0015
30	C	0015
31	A	0016
32	D	0016
33	D	0017
34	C	0017
35	C	0018
36	D	0018
37	C	0019
38	D	0019
39	C	0020
40	D	0020
41	A	0021
42	A	0021
43	D	0022
44	D	0022
45	B	0023
46	C	0023
47	C	0024
48	D	0024
49	B	0025
50	B	0025



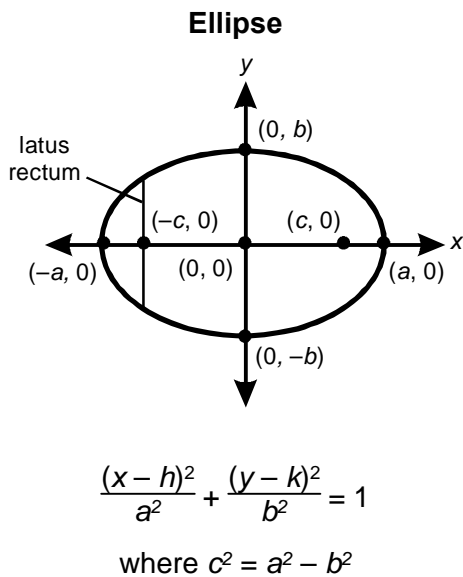
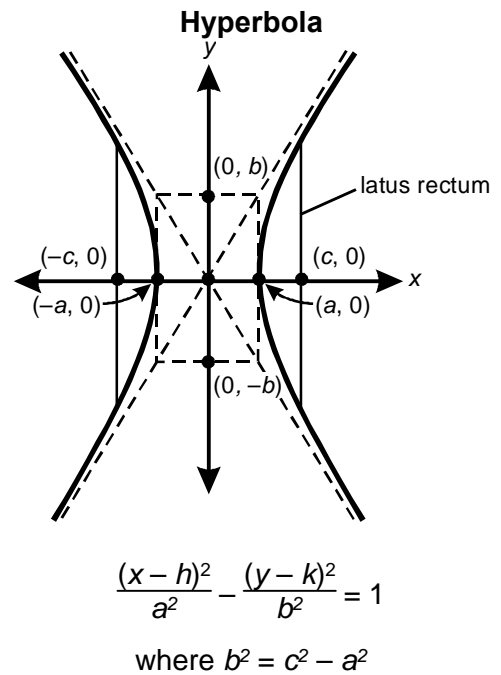
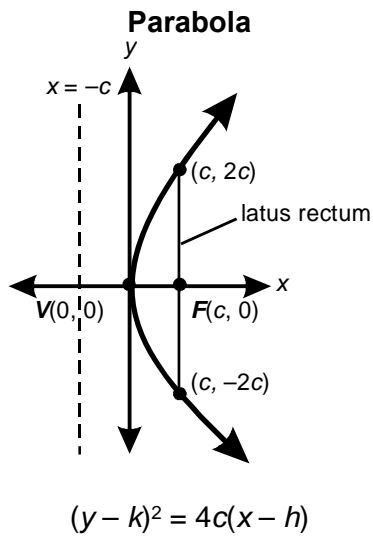
REFERENCE MATERIALS

Please use the reference material on the following pages as needed in responding to the sample test questions. This material will also appear in test booklets.

FORMULAS

Formula	Description
$V = \frac{1}{3}Bh$	Volume of a right cone and a pyramid
$A = 4\pi r^2$	Surface area of a sphere
$V = \frac{4}{3}\pi r^3$	Volume of a sphere
$A = \pi r\sqrt{r^2 + h^2}$	Lateral surface area of a right circular cone
$S_n = \frac{n}{2}[2a + (n - 1)d] = n\left(\frac{a + a_n}{2}\right)$	Sum of an arithmetic series
$S_n = \frac{a(1 - r^n)}{1 - r}$	Sum of a geometric series
$\sum_{n=0}^{\infty} ar^n = \frac{a}{1 - r}, r < 1$	Sum of an infinite geometric series
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	Distance formula
$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	Midpoint formula
$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$	Slope
$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$	Law of sines
$c^2 = a^2 + b^2 - 2ab \cos C$	Law of cosines
$s^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}$	Variance
$s = r\theta$	Arc length, where θ is measured in radians
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	Quadratic formula
$I = Prt$	Simple interest
$A = P\left(1 + \frac{r}{n}\right)^{nt}$	Compound interest
$A = Pe^{rt}$	Continuous compound interest

CONIC SECTIONS



NOTES FOR MATHEMATICS TEST

In this examination, assume all functions are real valued functions unless otherwise noted.

In this examination, diagrams may not be drawn to scale.

In this examination, assume all geometry problems imply the use of Euclidean geometry unless otherwise noted.