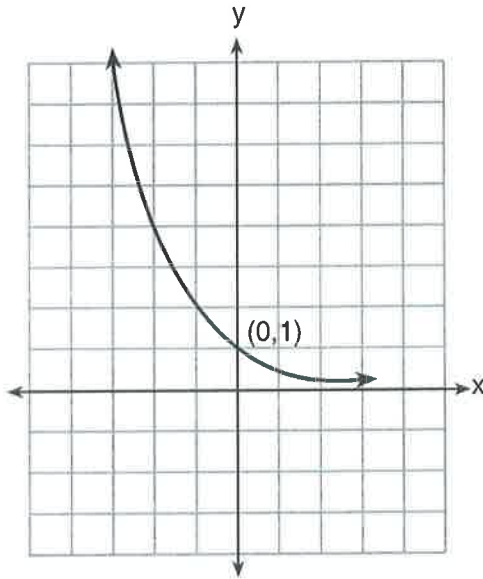


Answer all 27 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet. [54]

1 What is the equation of the graph shown below?

Use this space for computations.



(1) $y = 2^x$

(2) $y = 2^{-x}$

(3) $x = 2^y$

(4) $x = 2^{-y}$

2 Which ordered pair is a solution of the system of equations shown below?

$$x + y = 5$$

$$(x + 3)^2 + (y - 3)^2 = 53$$

(1) (2,3)

(2) (5,0)

(3) (-5,10)

(4) (-4,9)

Use this space for
computations.

3 The relationship between t , a student's test scores, and d , the student's success in college, is modeled by the equation $d = 0.48t + 75.2$. Based on this linear regression model, the correlation coefficient could be

- (1) between -1 and 0 (3) equal to -1
(2) between 0 and 1 (4) equal to 0

4 What is the common ratio of the geometric sequence shown below?

$-2, 4, -8, 16, \dots$

- (1) $-\frac{1}{2}$ (3) -2
(2) 2 (4) -6

5 Given the relation $\{(8,2), (3,6), (7,5), (k,4)\}$, which value of k will result in the relation *not* being a function?

- (1) 1 (3) 3
(2) 2 (4) 4

6 Which expression is equivalent to $(9x^2y^6)^{-\frac{1}{2}}$?

- (1) $\frac{1}{3xy^3}$ (3) $\frac{3}{xy^3}$
(2) $3xy^3$ (4) $\frac{xy^3}{3}$

Use this space for
computations.

7 In a certain high school, a survey revealed the mean amount of bottled water consumed by students each day was 153 bottles with a standard deviation of 22 bottles. Assuming the survey represented a normal distribution, what is the range of the number of bottled waters that approximately 68.2% of the students drink?

- (1) 131–164 (3) 142–164
(2) 131–175 (4) 142–175

8 What is the fourth term in the binomial expansion $(x - 2)^8$?

- (1) $448x^5$ (3) $-448x^5$
(2) $448x^4$ (4) $-448x^4$

9 Which value of k satisfies the equation $8^{3k+4} = 4^{2k-1}$?

- (1) -1 (3) -2
(2) $-\frac{9}{4}$ (4) $-\frac{14}{5}$

10 There are eight people in a tennis club. Which expression can be used to find the number of different ways they can place first, second, and third in a tournament?

- (1) ${}_8P_3$ (3) ${}_8P_5$
(2) ${}_8C_3$ (4) ${}_8C_5$

Use this space for
computations.

11 If $\sin A = \frac{1}{3}$, what is the value of $\cos 2A$?

(1) $-\frac{2}{3}$

(3) $-\frac{7}{9}$

(2) $\frac{2}{3}$

(4) $\frac{7}{9}$

12 In the interval $0^\circ \leq x < 360^\circ$, $\tan x$ is undefined when x equals

(1) 0° and 90°

(3) 180° and 270°

(2) 90° and 180°

(4) 90° and 270°

13 If $f(x) = \sqrt{9 - x^2}$, what are its domain and range?

(1) domain: $\{x \mid -3 \leq x \leq 3\}$; range: $\{y \mid 0 \leq y \leq 3\}$

(2) domain: $\{x \mid x \neq \pm 3\}$; range: $\{y \mid 0 \leq y \leq 3\}$

(3) domain: $\{x \mid x \leq -3 \text{ or } x \geq 3\}$; range: $\{y \mid y \neq 0\}$

(4) domain: $\{x \mid x \neq 3\}$; range: $\{y \mid y \geq 0\}$

14 When $x^2 + 3x - 4$ is subtracted from $x^3 + 3x^2 - 2x$, the difference is

(1) $x^3 + 2x^2 - 5x + 4$

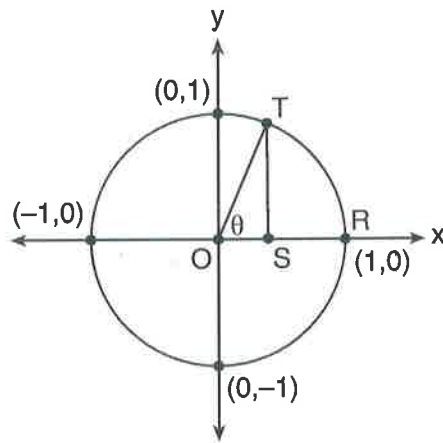
(3) $-x^3 + 4x^2 + x - 4$

(2) $x^3 + 2x^2 + x - 4$

(4) $-x^3 - 2x^2 + 5x + 4$

Use this space for computations.

- 15 In the diagram below, the length of which line segment is equal to the exact value of $\sin \theta$?



- (1) \overline{TO} (3) \overline{OR}
 (2) \overline{TS} (4) \overline{OS}

- 16 The area of triangle ABC is 42. If $AB = 8$ and $m\angle B = 61$, the length of \overline{BC} is approximately

- (1) 5.1 (3) 12.0
 (2) 9.2 (4) 21.7

- 17 When factored completely, the expression $3x^3 - 5x^2 - 48x + 80$ is equivalent to

- (1) $(x^2 - 16)(3x - 5)$
 (2) $(x^2 + 16)(3x - 5)(3x + 5)$
 (3) $(x + 4)(x - 4)(3x - 5)$
 (4) $(x + 4)(x - 4)(3x - 5)(3x - 5)$

Use this space for
computations.

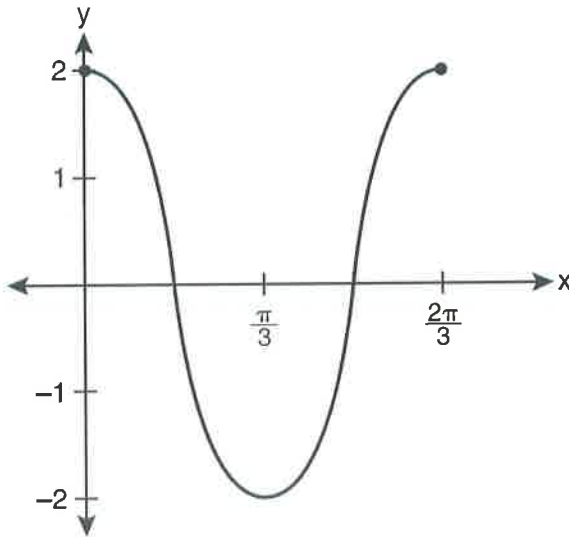
18 The value of $\sin(180 + x)$ is equivalent to

- (1) $-\sin x$ (3) $\sin x$
(2) $-\sin(90 - x)$ (4) $\sin(90 - x)$

19 The sum of $\sqrt[3]{6a^4b^2}$ and $\sqrt[3]{162a^4b^2}$, expressed in simplest radical form, is

- (1) $\sqrt[6]{168a^8b^4}$ (3) $4a\sqrt[3]{6ab^2}$
(2) $2a^2b\sqrt[3]{21a^2b}$ (4) $10a^2b\sqrt[3]{8}$

20 Which equation is represented by the graph below?



- (1) $y = 2 \cos 3x$ (3) $y = 2 \cos \frac{2\pi}{3}x$
(2) $y = 2 \sin 3x$ (4) $y = 2 \sin \frac{2\pi}{3}x$

Use this space for
computations.

21 The quantities p and q vary inversely. If $p = 20$ when $q = -2$, and $p = x$ when $q = -2x + 2$, then x equals

- (1) -4 and 5 (3) -5 and 4
(2) $\frac{20}{19}$ (4) $-\frac{1}{4}$

22 What is the solution set of the equation $-\sqrt{2} \sec x = 2$ when $0^\circ \leq x < 360^\circ$?

- (1) $\{45^\circ, 135^\circ, 225^\circ, 315^\circ\}$ (3) $\{135^\circ, 225^\circ\}$
(2) $\{45^\circ, 315^\circ\}$ (4) $\{225^\circ, 315^\circ\}$

23 The discriminant of a quadratic equation is 24 . The roots are

- (1) imaginary
(2) real, rational, and equal
(3) real, rational, and unequal
(4) real, irrational, and unequal

24 How many different six-letter arrangements can be made using the letters of the word "TATTOO"?

- (1) 60 (3) 120
(2) 90 (4) 720

Use this space for
computations.

25 Expressed in simplest form, $\frac{3y}{2y-6} + \frac{9}{6-2y}$ is equivalent to

(1) $\frac{-6y^2 + 36y - 54}{(2y-6)(6-2y)}$

(3) $\frac{3}{2}$

(2) $\frac{3y-9}{2y-6}$

(4) $-\frac{3}{2}$

26 If $\log 2 = a$ and $\log 3 = b$, the expression $\log \frac{9}{20}$ is equivalent to

(1) $2b - a + 1$

(3) $b^2 - a + 10$

(2) $2b - a - 1$

(4) $\frac{2b}{a+1}$

27 The expression $(x+i)^2 - (x-i)^2$ is equivalent to

(1) 0

(3) $-2 + 4xi$

(2) -2

(4) $4xi$
