실전 11

1. If $\sqrt[3]{4-3x}=3$, what is the value x?

(A) -8.23

(B) -7.67

(C) -1.75

(D) 0.92

(E) 8.23

2. If $f(a,b)=\frac{a+b}{2}$, which of the following is equal to $f(4,8)$?

(A) $f(0,6)$

(B) $f(1,6)$

(C) $f(2,4)$

(D) $f(2,16)$

(E) $f(3,9)$

3. $\frac{6!}{3!\,5!}=$

(A) 60

(B) 24

(C) 6

(D) 1

(E) $\frac{1}{60}$

4. The graph of which of the following equations has a slope of $\frac{1}{2}$?

(A) $y=\frac{1}{2}$

(B) $y=2x$

(C) $y=2x+1$

(D) $y=x+\frac{1}{2}$

(E) $y=\frac{x}{2}+1$

5. If $f(x)=x+\sqrt{x}$ and $g(x)=f(f(x))$, then $g(1.7)=$

(A) 1.7

(B) 3.0

(C) 4.7

(D) 6.9

(E) 9.0

6. For all $m \neq 0$, $\dfrac{1-\dfrac{1}{m}}{\dfrac{1}{m}} =$

(A) 1

(B) $m-1$

(C) $\dfrac{m-1}{m}$

(D) $\dfrac{1-m}{m}$

(E) $m-\dfrac{1}{m}$

7. The graph of $y = bx - 1$ has points in the first quadrant if and only if

(A) $b \neq 0$

(B) $b < -1$

(C) $-1 < b < 1$

(D) $0 < b < 1$

(E) $b > 0$

8. If $\tan x = 5$, then $\dfrac{\tan x}{\cot x} =$

(A) 1

(B) $\dfrac{1}{5}$

(C) 5

(D) 10

(E) 25

9. If $\dfrac{a+bc}{we+f} = g$ and if $e \cdot f \cdot g \neq 0$, which of the following is equal to w?

(A) $\dfrac{a+bc-fg}{eg}$

(B) $\dfrac{a+bc-g}{e}$

(C) $\dfrac{a-bc+fg}{eg}$

(D) $\dfrac{a+bc-f}{eg}$

(E) $\dfrac{a+bc-eg}{fg}$

10. If the probability of a certain event occuring is $\frac{4}{9}$, what is the probability of this event not occurring?

(A) $\frac{4}{13}$

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

(C) $\frac{5}{9}$

(D) $\frac{9}{13}$

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

11. If $x^4 - 19 = 19$ and $x \geqq 0$, then $x =$

(A) 0

(B) 2.08

(C) 2.48

(D) 4.36

(E) 6.16

12. In Figure 1, if $\theta = 38^\circ$, what is the value of t?

(A) 0.15

(B) 0.20

(C) 2.46

(D) 3.13

(E) 3.15

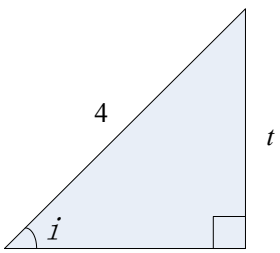


Figure 1

13. Joe has a test average of 87 in math. If his test average makes up 70 percent of his overall grade and the final exam makes up the remaining 30%, what must be his final exam score to give him an overall grade of exactly 90?

(A) 91

(B) 93

(C) 95

(D) 97

(E) 99

14. An operation is defined on pairs of integers by $(a,b)\triangledown(c,e)=(a-c,b-e)$. If $[(1,2)\triangledown(-3,6)]\triangledown(x,y)=(1,1)$, then $(x,y)=$

(A) (5,-5)
(B) (3,-7)
(C) (3,-5)
(D) (3,5)
(E) (-3,5)

15. If $\cos t=\frac{5}{6}$, what is the value of $\cos 2t$?

(A) 0.92
(B) 0.39
(C) 0.28
(D) 0.15
(E) -0.83

16. Which of the following is a zero of $f(x)=2x^2-3x-1$?

(A) -1.00
(B) 0.28
(C) 0.50
(D) 1.78
(E) 3.56

17. What is the number of digits in the number obtained by multiplying 12,121,212 by 3,579?

(A) 4
(B) 9
(C) 10
(D) 11
(E) 12

18. If $\log_x 3=9$, then $x=$

(A) 0.50
(B) 1.13
(C) 1.22
(D) 2.00
(E) 2.08

19. Which of the following is a point at which the ellipse $\frac{x^2}{5}+\frac{y^2}{15}=1$ intersects the x-axis?

(A) (2.2, 0)
(B) (3.9, 0)
(C) (4.5, 0)
(D) (5.0, 0)
(E) (15.0, 0)

20. The function f is given by $f(x)=x-[x]$, where $[x]$ is defined to be the greatest integer that is less than or equal to x. If $1 \leqq x < 2$, then f is also given by $f(x)=$?

(A) $x-2$
(B) $x-1$
(C) x
(D) $x+1$
(E) $x+2$

21. In Figure 2, $r\sin\theta=$

(A) x
(B) y
(C) $\frac{x}{y}$
(D) $\frac{y}{x}$
(E) $x+y$

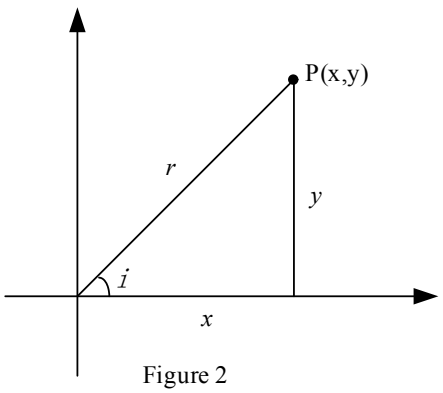


Figure 2

22. What is the remainder when $2x^4-3x^2-x+3$ is divided by $x+1$?

(A) -3
(B) -1
(C) 1
(D) 2
(E) 3

23. In Figure 3, what is the length of segment AC?
(A) 4.47
(B) 5.00
(C) 5.39
(D) 6.23
(E) 9.00

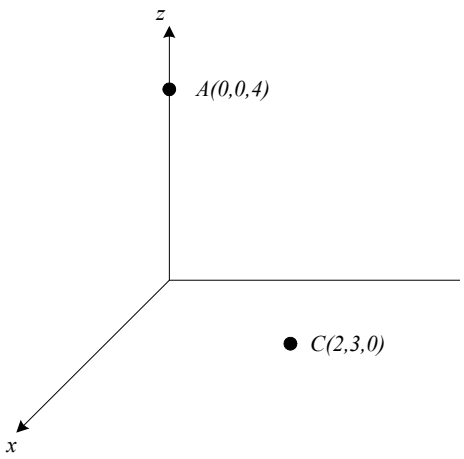


Figure 3

24. What is a value of $\cos(\arcsin 0.90)$??
(A) 0.44
(B) 0.58
(C) 0.67
(D) 0.71
(E) 0.90

25. What is the area of a triangle whose vertices are $(\sqrt{2},0)$, $(2,\sqrt{10})$, and $(5,0)$?
(A) 3.59
(B) 5.67
(C) 7.91
(D) 11.18
(E) 11.34

26. If $x=\sqrt{t}-1$ and $y=t^2$, what is y in terms of x?
(A) $(x+1)^4$
(B) $(x-1)^4$
(C) $(x+1)^2$
(D) $(x-1)^2$
(E) x^2+1

27. what is the maximum value of $f(x)=4-(x-1)^2$?
(A) 1
(B) 3
(C) 4
(D) 5
(E) 16

28. If a certain product now worth $450 increases in value at the rate of 8 percent per year, how much will it be worth 6 years from now?

(A) $630
(B) $661
(C) $666
(D) $714
(E) $771

29. The 1^{st} term of an arithmetic sequence is 3 and the 5^{th} term is 17. What is the 150^{th} term of the sequce?

(A) 420.2
(B) 521.5
(C) 528.0
(D) 524.5
(E) 698.3

30. The cosine of an angle is one-half the sine of the same angle. What is the tangent of this angle?

(A) 0
(B) $\frac{1}{2}$
(C) 1
(D) 2
(E) It cannot be determined from the information given.

31. The graph in Figure 4 could be a portion of the graph of which of the following functions?

(A) I only
(B) II only
(C) III only
(D) II and III only
(E) I, II, and III.

I. $f(x) = x^3 + ax^2 + bx + c$
II. $g(x) = x^5 + ax^3 + bx + c$
III. $h(x) = x^7 + ax^6 + bx^5 + cx^4 + dx^3 + ex^2 + fx + g$

32. A right circular cylinder has radius 3 and height 3. If A and B are two points on its surface, what is the maximum straight-line distance between A and B?

(A) $3\sqrt{6}$
(B) $3\sqrt{5}$
(C) 6
(D) $3\sqrt{3}$
(E) $3\sqrt{2}$

33. What is the degree measure of the smallest positive angle θ for which $6\sin^2\theta - \sin\theta - 2 = 0$?

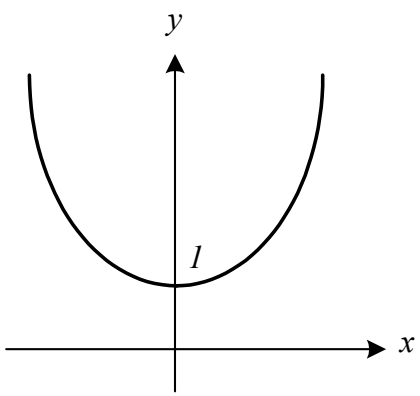
(A) 9.6°
(B) 19.5°
(C) 30°
(D) 41.8°
(E) 90°

34. The graph of $x^2 - y^2 - 2x - 4y - 4 = 0$ is a hyperbola centered at

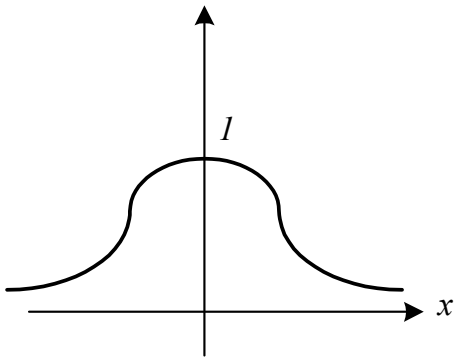
(A) (-1,-2)
(B) (-1,2)
(C) (1,-2)
(D) (1,2)
(E) (2,1)

35. Which of the following could be a portion of the graph of $f(x) = \frac{e^x + e^{-x}}{2}$?

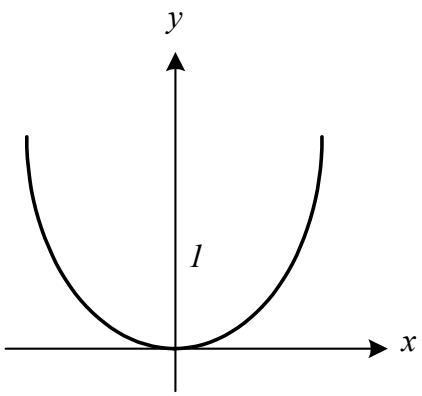
(A)



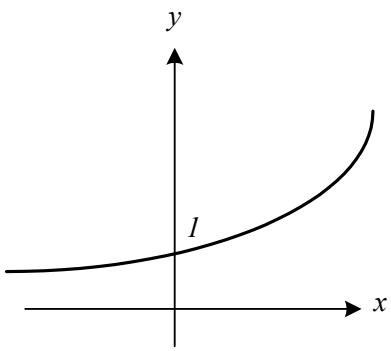
(B)



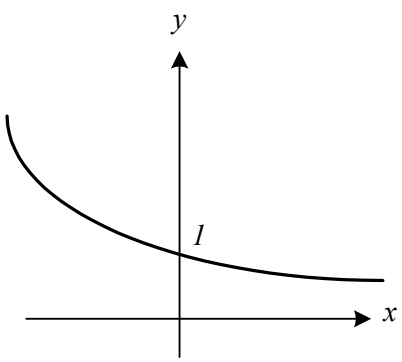
(C)



(D)



(E)



36. If $\frac{p}{r}$ is an integer, which of the following must also be an integer?

(A) $p-r$

(B) $p+2r$

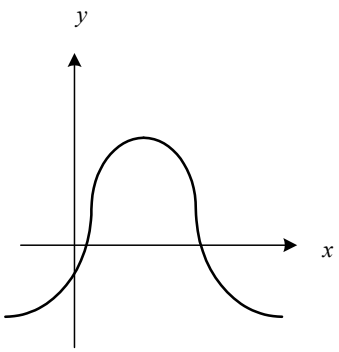
(C) $\frac{r}{p}$

(D) pr

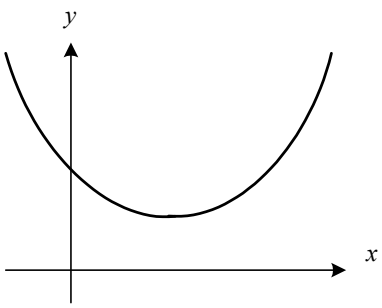
(E) $\frac{2p}{r}$

37. A function "f" has the property that whenever $x_2 > x_1$, then $f(x_2) \geqq f(x_1)$. Which of the following could be the graph of "f"?

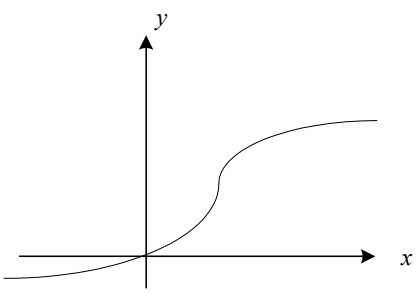
(A)



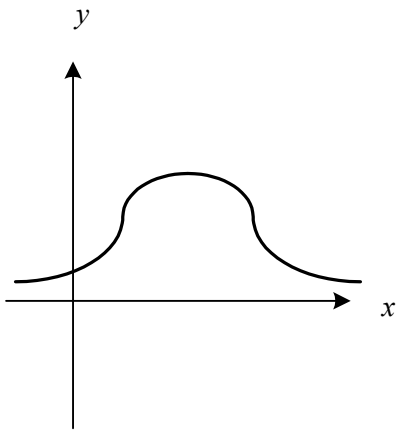
(B)



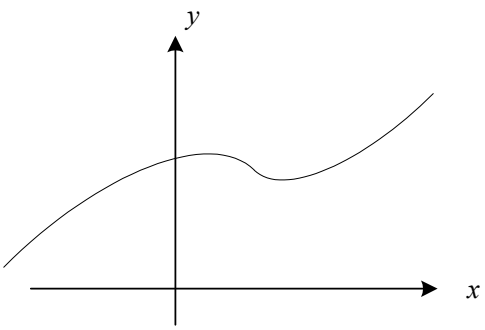
(C)



(D)



(E)



38. The two circles $x^2+y^2=1$ and $(x-\sqrt{2})^2+(y-\sqrt{2})^2=1$ are tangent to each other. What are the coordinates of the point of tangency?

(A) (0, 0.71)
(B) (0.5, 0.5)
(C) (0.71, 0)
(D) (0.71, 0.71)
(E) (1.41, 1.41)

39. What is $\lim_{x\to -2}\dfrac{(2x^2+3x-2)}{x^2-4}$?

(A) 1.25
(B) 1.0
(C) 0.5
(D) 0
(E) The limit does not exist.

40. A function f is an even function if, for all values of x in the domain, $f(-x)=f(x)$, which of the following is an even function?

(A) $f(x)=2^x$
(B) $f(x)=x^2+x$
(C) $f(x)=x$
(D) $f(x)=\sin x$
(E) $f(x)=\cos x$

41. Two cars start from the same point P and travel along separate straight highways. If these two highways originate at P_0 forming an anlge of 80°, how many miles apart are the two cars after each has traveled 110 miles?

(A) 86
(B) 141
(C) 156
(D) 191
(E) 220

42. The shaded portion in Figure 5 shows the graph of

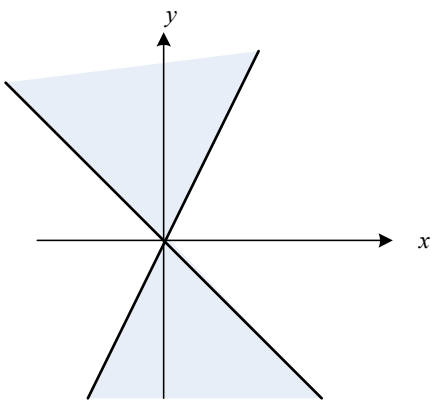


Figure 5

(A) $\left(y-\frac{1}{2}x\right)(y+x)\geqq 0$
(B) $(y-2x)(y+x)\leqq 0$
(C) $(y-2x)(y+x)\geqq 0$
(D) $(y+2x)(y-x)\leqq 0$
(E) $(y+2x)(y-x)\geqq 0$

43. If $f(n)=\frac{1}{e^n}$, what is the least integer n such that $f(n)<0.0001$?

(A) 9
(B) 10
(C) 11
(D) 12
(E) 13

44. In right $\triangle ABC$ in Figure 6, $\frac{\sin A+\cos B}{\cos B}$ is equal to which of the following?

(A) 2

(B) $\frac{a+c}{c}$

(C) $\frac{2a}{b}$

(D) $\frac{2b}{c}$

(E) $\frac{2a}{c}$

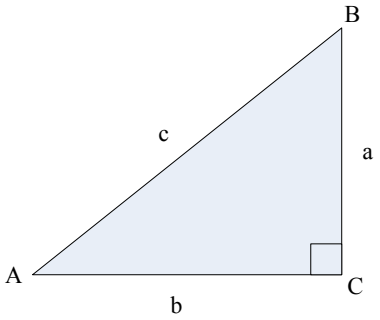


Figure 6

45. What is the volume, in cubic centimeters, of a rectangular solid that has faces with areas 2, 4, and 8 square centimeters?

(A) 128

(B) 64

(C) 32

(D) 16

(E) 8

46. For every positive number t, a function f_t is defined by

$$f_t(x)=\begin{cases}1 & , \ x<0\\ 1-\left(\frac{1}{t}\right)x & , \ 0\leqq x<t\\ 0 & , \ x>t\end{cases}$$

If $t>5$, then $f_t(2)=$

(A) 0

(B) 1

(C) $\frac{5-t}{t}$

(D) $\frac{t+5}{t}$

(E) $\frac{t-2}{t}$

47. In Figure 7, $ABCDE$ is a regular pentagon with side of length 2, what is the $x-$coordinate of D?

(A) 2.62
(B) 3.62
(C) 3.73
(D) 3.90
(E) 4.90

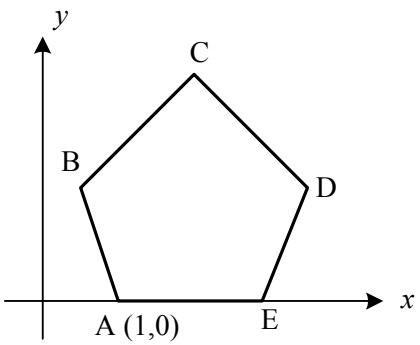


Figure 7

48. If f is the function with domain $[0,12]$ and range $[0,1]$ whose graph is the line segment shown in Figure 8, what is $f^{-1}(0.4)$?

(A) 30
(B) 4.8
(C) 2.5
(D) 0.25
(E) 0.033

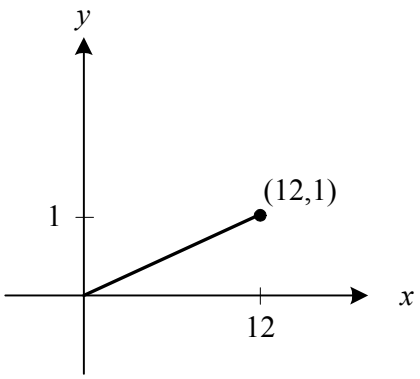


Figure 8

49. What does $|3+5i|$ equal?

(A) 0.80
(B) 1.67
(C) 3.97
(D) 5.83
(E) 8.00

50. A committee of 3 math majors and 4 history majors is to be chosen from a group of 20 math majors and 16 history majors, respectively. How many different committees can be formed?

(A) 12
(B) 320
(C) 2,960
(D) 2,074,800
(E) 2.86×10^{15}