Are you ready for Calculus?

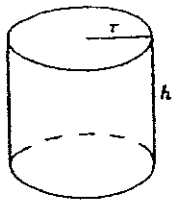
1. Money in a bank doubles every 8 years. If \$100 is deposited today, what will its value be after 24 years?

(A) \$300 (B) \$600 (C) \$800 (D) \$900 (E) \$1,100

2. The x-coordinate of the point of intersection of the graphs of $-2x+y=6$ and $x+y=-3$ is

(A) 3 (B) 0 (C) -1 (D) -2 (E) -3

3. The right circular cylinder shown on the right has a circular base and an open top. Its surface area, in terms of r and h is



(A) $\pi r^2 + 2\pi rh$

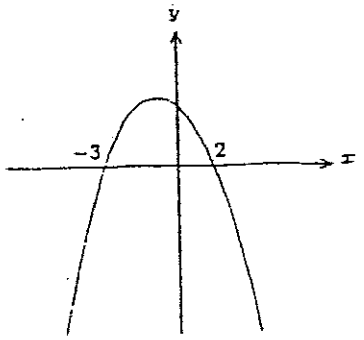
(B) $4\pi r + 2h$

(C) $\pi r^2 h$

(D) $2\pi r + h$

(E) $2\pi r^2 + 2\pi rh$

4. If f is a function whose graph is the parabola sketched to the right then $f(x) > 0$ whenever



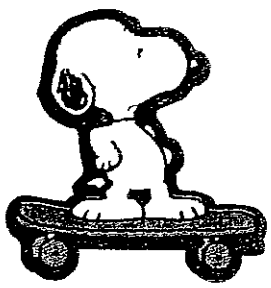
(A) $x > 0$

(B) $x < -3$

(C) $x > 2$

(D) $-3 < x < 2$

(E) $x < -3$ or $x > 2$



5. If $\log_5(x+8) = 2$ then $x =$

(A) 18 (B) 17 (C) 10 (D) 2 (E) $\dfrac{2}{\log_5 2} - 8$

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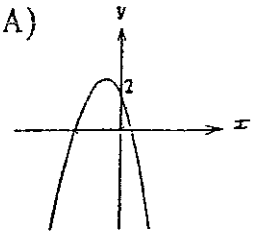
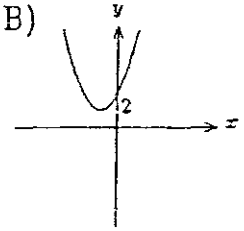
6. Of the following, which best represents the graph of $y = -x^2 - 2x + 2$?

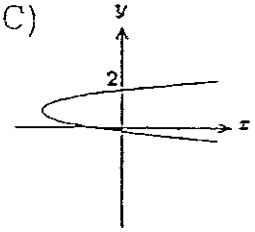
(A)



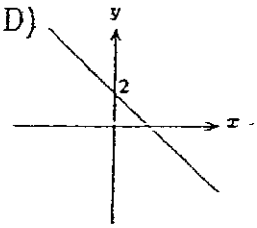
(B)



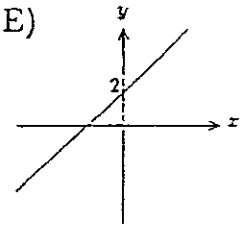
(C)



(D)



(E)



. $(32)^{1/5}(9)^{-1/2} =$

(A) 6 (B) $\dfrac{3}{2}$ (C) $\dfrac{2}{3}$ (D) $(288)^{-1/10}$ (E) -6

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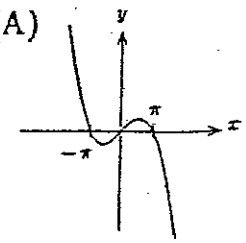
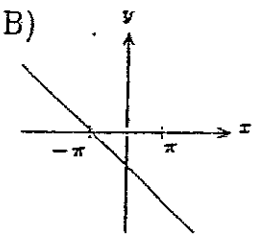
8. Definition: A function f is of period 2π if $f(x+2\pi) = f(x)$ for each x and $x+2\pi$ in the domain of f.

Of the following, which best represents the graph of a function of period 2π ?

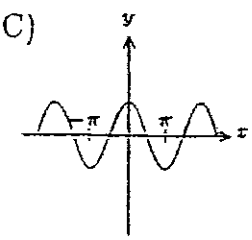
(A)



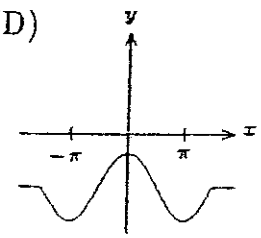
(B)



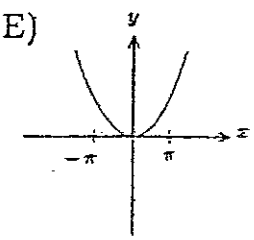
(C)



(D)



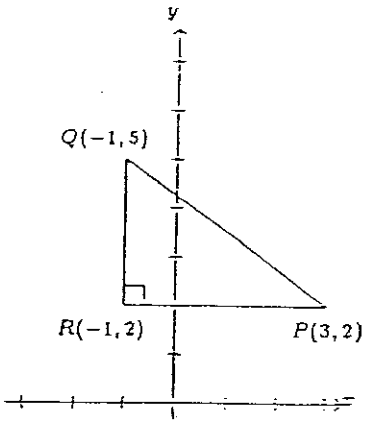
(E)



9. If 5^5 is approximately equal to 3000, then, of the following, which best approximates 5^{10} ?

(A) 6,000 (B) 90,000 (C) 900,000 (D) 9,000,000 (E) 3000^5

10. In the figure shown to the right, what is the distance between the points P and Q?



(A) 4

(B) 5

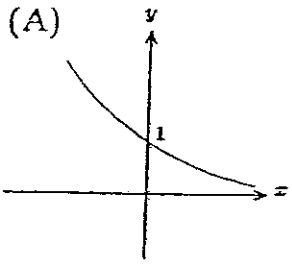
(C) 7

(D) 8

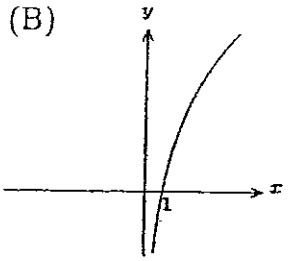
(E) 9

Of the following, which best represents the graph of $y = 2^x$?

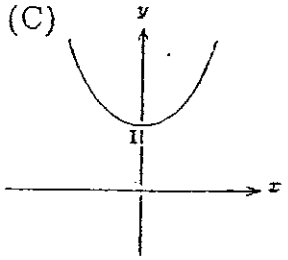
(A)



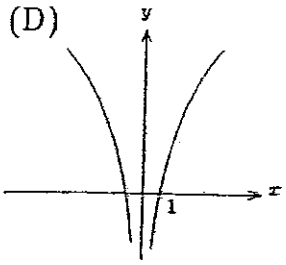
(B)



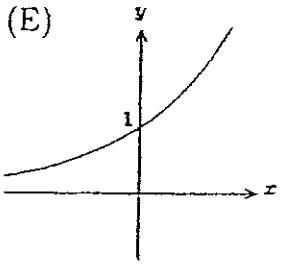
(C)



(D)



(E)



12. If $\frac{(3x+1)(x-3)}{x+4} = 0$ then $x =$

(A) 3 or $-\frac{1}{3}$ (B) $3, -4$ or $-\frac{1}{3}$ (C) 3 or -4 (D) -3 or $\frac{1}{3}$

(E) $-3, 4$ or $\frac{1}{3}$

13. In a standard coordinate system, the graph of the equation $y = -6x + 7$ is

(A) a vertical line.

(B) a horizontal line.

(C) not a line.

(D) a line falling to the right.

(E) a line rising to the right.

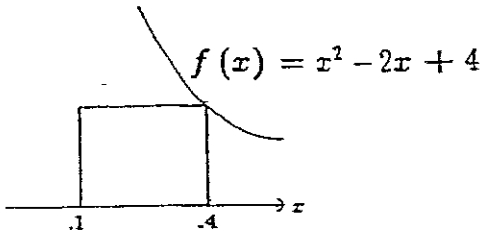
14. The quantity $p + q$ is a factor of how many of the following?

$p^2 - q^2$ $p^2 + q^2$ $p^3 - q^3$ $p^3 + q^3$

(A) none (B) one only (C) two only (D) three only (E) four

15. What is the area of the rectangle shown in the figure to the right?

Note: The figure is not drawn to scale.



(A) 0.04 (B) 0.1008 (C) 0.3 (D) 1.008 (E) 3.36

16. If $f(x) = \dfrac{4x+2}{x+4}$ then $f(b+1) =$

(A) $\dfrac{6}{5}$ (B) $\dfrac{4b+6}{b+5}$ (C) $\dfrac{4b+3}{b+5}$ (D) $\dfrac{4b+2}{b+5}$ (E) $\dfrac{4b+2}{b+4}$

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17. The length of a certain rectangle is 3 meters more than twice its width. What is the width of the rectangle if the perimeter of the rectangle is 186 meters?

(A) 9m (B) 18m (C) 30m (D) 32m (E) 61m

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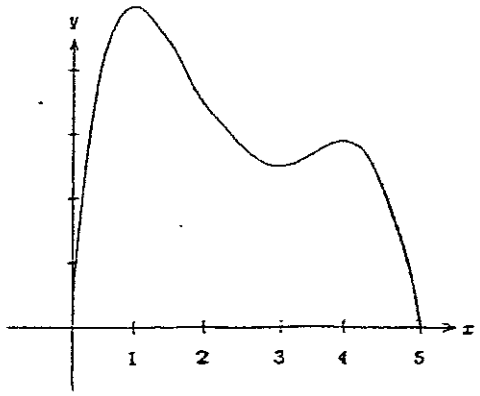
18. Definition: A function f has a maximum value at c if $f(c) \geq f(x)$ for every x in the domain of f.

The domain of the function whose graph is shown to the right is [0,5]. At which of the following numbers does the function appear to have a maximum value?



(A) 5

(B) 4

(C) 3

(D) 2

(E) 1

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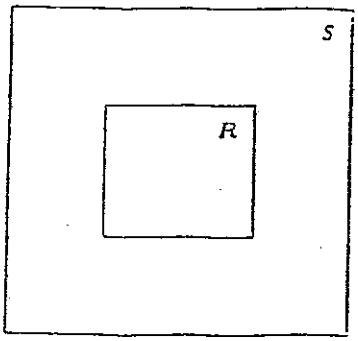
19. A rectangle R has width x and length y. A rectangle S is formed from R by multiplying each of the sides of the rectangle R by 8 as shown in the figure to the right. What is the area of the portion of S lying outside R?

Note: The figure is not drawn to scale.



(A) xy (B) $8xy$ (C) $63xy$ (D) $64xy$ (E) x^8y^8

. The inequality $|x-4| \leq 2$ is equivalent to

(A) $x \geq 6$ (B) $x \leq 2$ (C) $-6 \leq x \leq 6$ (D) $2 \leq x \leq 6$

(E) $-6 \leq x \leq -2$

21. For which of the following values of x is $\sec x$ not defined?

(A) $\frac{\pi}{2}$ (B) $\frac{\pi}{4}$ (C) 0 (D) $-\frac{\pi}{3}$ (E) $-\pi$

22. $\sec\theta \cot\theta \sin^2\theta =$

(A) $\cos\theta$ (B) $\csc\theta$ (C) $\cot\theta$ (D) $\sec\theta$ (E) $\sin\theta$

23. If $f(x) = \cos(3x)$ then $f\left(\frac{\pi}{6}\right) =$

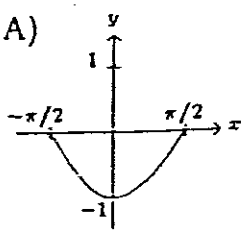
(A) 0 (B) $\frac{1}{2}$ (C) $\frac{1}{\sqrt{2}}$ (D) $\frac{\sqrt{3}}{2}$ (E) 1

24. $\sin^2\theta - 1 =$

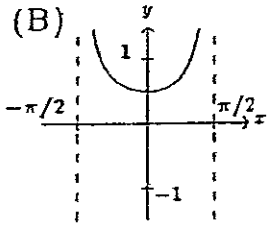
(A) $-\cos\theta$ (B) $-\cos^2\theta$ (C) $-\csc^2\theta$ (D) $\cos^2\theta$ (E) $-\cos 2\theta$

25. Of the following, which best represents the graph of $y = \cos x$ for x between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$?

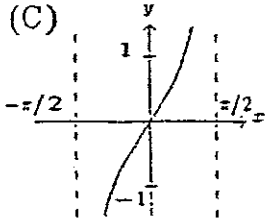
(A)



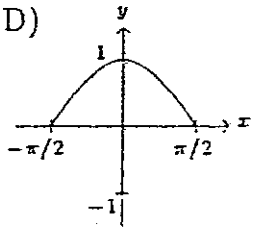
(B)



(C)



(D)



(E)