

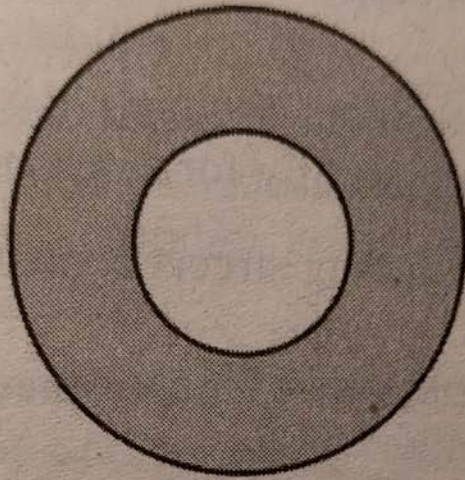
NUMBER OF SIBLINGS PER STUDENT  
IN A PRESCHOOL CLASS

Number of Siblings	Number of Students
0	3
1	6
2	2
3	1

8. The table above shows how many students in a class of 12 preschoolers had 0, 1, 2, or 3 siblings. Later, a new student joined the class, and the average (arithmetic mean) number of siblings per student became equal to the median number of siblings per student. How many siblings did the new student have?

- (A) 0
- (B) 1
- (C) 2
- (D) 3
- (E) 4

15. The Acme Plumbing Company will send a team of 3 plumbers to work on a certain job. The company has 4 experienced plumbers and 4 trainees. If a team consists of 1 experienced plumber and 2 trainees, how many different such teams are possible?



Note: Figure not drawn to scale.

16. The figure above consists of two circles that have the same center. If the shaded area is  $64\pi$  square inches and the smaller circle has a radius of 6 inches, what is the radius, in inches, of the larger circle?

17. If  $p$ ,  $r$ , and  $s$  are three different prime numbers greater than 2, and  $n = p \times r \times s$ , how many positive factors, including 1 and  $n$ , does  $n$  have?

$$h(t) = c - (d - 4t)^2$$

18. At time  $t = 0$ , a ball was thrown upward from an initial height of 6 feet. Until the ball hit the ground, its height, in feet, after  $t$  seconds was given by the function  $h$  above, in which  $c$  and  $d$  are positive constants. If the ball reached its maximum height of 106 feet at time  $t = 2.5$ , what was the height, in feet, of the ball at time  $t = 1$  ?

18. If the sum of the consecutive integers from  $-22$  to  $x$ , inclusive, is 72, what is the value of  $x$ ?

- (A) 23
- (B) 25
- (C) 50
- (D) 75
- (E) 94

19. If  $k$ ,  $n$ ,  $x$ , and  $y$  are positive numbers satisfying

$x^{-\frac{4}{3}} = k^{-2}$  and  $y^{\frac{4}{3}} = n^2$ , what is  $(xy)^{-\frac{2}{3}}$  in terms of  $n$  and  $k$ ?

(A)  $\frac{1}{nk}$

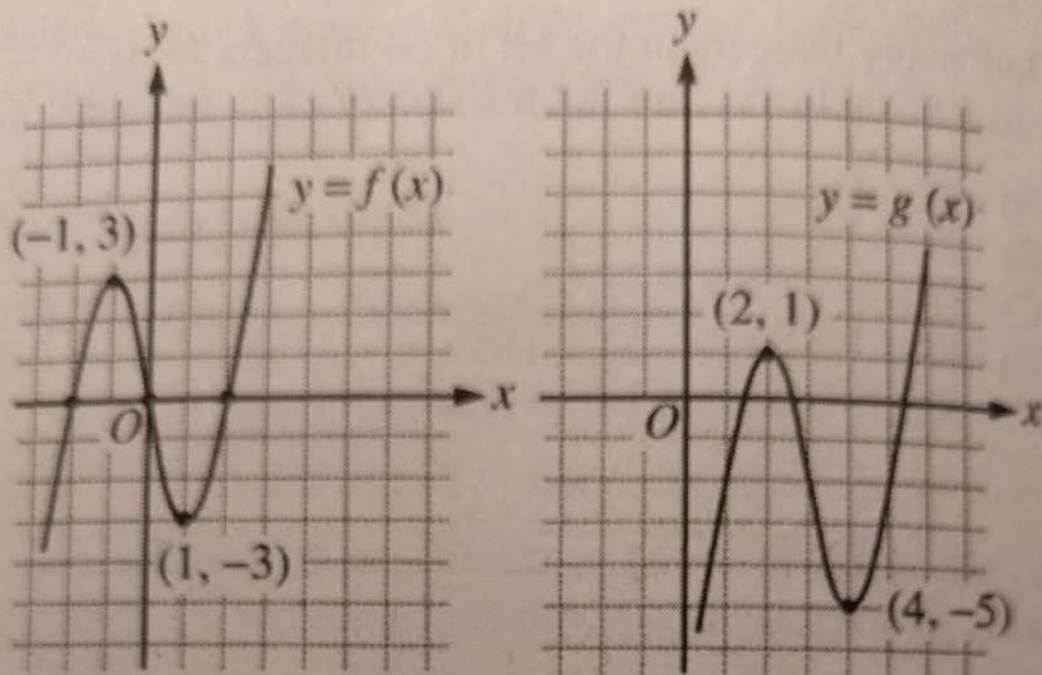
(B)  $\frac{n}{k}$

(C)  $\frac{k}{n}$

(D)  $nk$

(E) 1

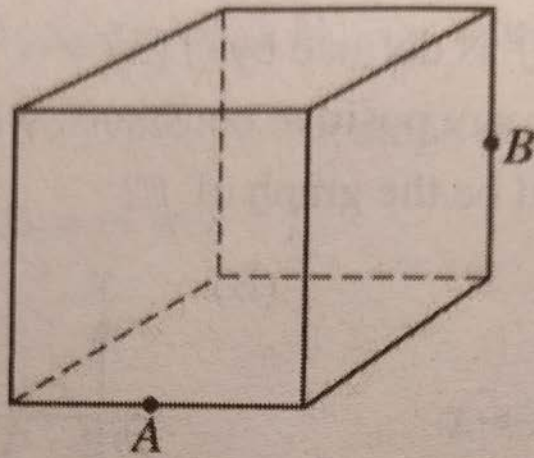




20. The figures above show the graphs of the functions  $f$  and  $g$ . The function  $f$  is defined by  $f(x) = x^3 - 4x$ . The function  $g$  is defined by  $g(x) = f(x + h) + k$ , where  $h$  and  $k$  are constants. What is the value of  $hk$ ?

- (A)  $-6$
- (B)  $-3$
- (C)  $-2$
- (D)  $3$
- (E)  $6$





15. The cube shown above has edges of length 2, and  $A$  and  $B$  are midpoints of two of the edges. What is the length of  $\overline{AB}$  (not shown) ?

- (A)  $\sqrt{2}$
- (B)  $\sqrt{3}$
- (C)  $\sqrt{5}$
- (D)  $\sqrt{6}$
- (E)  $\sqrt{10}$

16. Let  $\boxed{x}$  be defined as  $\boxed{x} = x^2 - x$  for all values of  $x$ . If  $\boxed{a} = \boxed{a-2}$ , what is the value of  $a$ ?

(A) 1

(B)  $\frac{1}{2}$

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

(D)  $\frac{6}{5}$

(E) 3