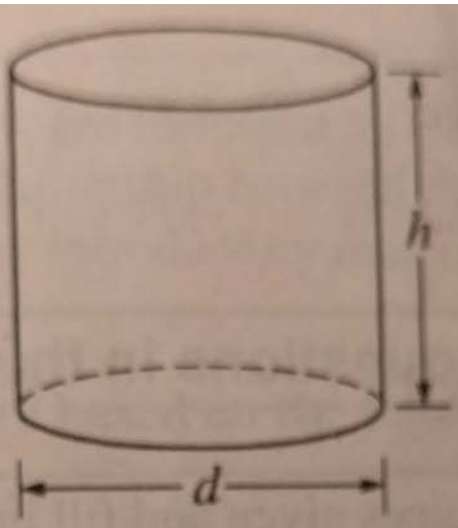
SAT Hards (from older SAT tests) – Test_2

15. For all positive integers x, let $x▲$ be defined to be $(x - 1)(x + 1)$. Which of the following is equal to $6▲ - 5▲$?

(A) $2▲ + 1▲$
(B) $3▲ + 2▲$
(C) $4▲ + 3▲$
(D) $5▲ + 4▲$
(E) $6▲ + 5▲$



18. The right circular cylinder above has diameter d and height h. Of the following expressions, which represents the volume of the smallest rectangular box that completely contains the cylinder?

(A) dh

(B) d^2h

(C) dh^2

(D) d^2h^2

(E) $(d + h)^2$

19. The square of x is equal to 4 times the square of y. If x is 1 more than twice y, what is the value of x?

(A) -4

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

(C) $-\frac{1}{4}$

(D) $\frac{1}{4}$

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

20. In the xy-coordinate plane, lines ℓ and q are perpendicular. If line ℓ contains the points $(0, 0)$ and $(2, 1)$, and line q contains the points $(2, 1)$ and $(0, t)$, what is the value of t?

(A) -3
(B) -2
(C) 2
(D) 3
(E) 5

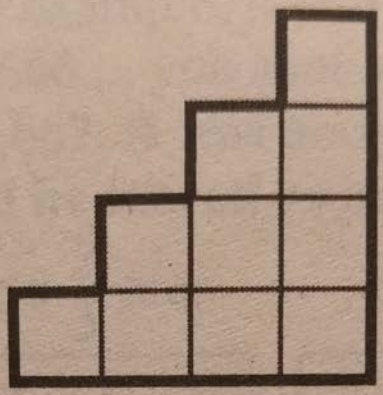
8. Meredith has a red hat, a blue hat, and a white hat. She also has three sweaters—one red, one blue, and one white—and three pairs of jeans—one red, one blue, and one white. Meredith wants to wear a red, white, and blue outfit consisting of one hat, one sweater, and one pair of jeans. How many different possibilities does she have?

(A) 3
(B) 6
(C) 9
(D) 12
(E) 27

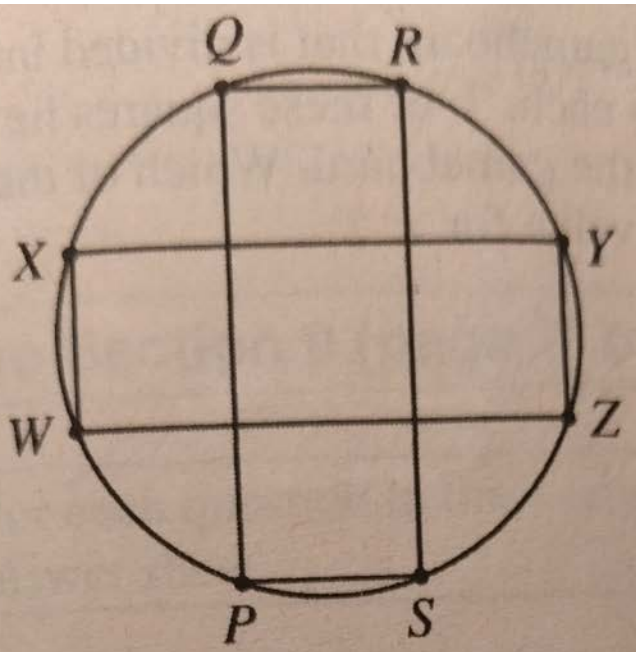
12. If $\frac{3x + y}{y} = \frac{6}{5}$, what is the value of $\frac{x}{y}$?

16. A positive integer is said to be "tri-factorable" if it is the product of three consecutive integers. How many positive integers less than 1,000 are tri-factorable?

17. The cost of a telephone call using long-distance carrier A is \$1.00 for any time up to and including 20 minutes and \$0.07 per minute thereafter. The cost using long-distance carrier B is \$0.06 per minute for any amount of time. For a call that lasts t minutes, the cost using carrier A is the same as the cost using carrier B. If t is a positive integer greater than 20, what is the value of t ?



18. The figure above shows an arrangement of 10 squares, each with side of length k inches. The perimeter of the figure is p inches. The area of the figure is a square inches. If $p = a$, what is the value of k?



12. In the figure above, rectangles $PQRS$ and $WXYZ$ each have perimeter 12 and are inscribed in the circle. How many other rectangles with perimeter 12 can be inscribed in the circle?

(A) One
(B) Two
(C) Three
(D) Four
(E) More than four

13. If n is a positive integer and $2^n + 2^{n+1} = k$, what is 2^{n+2} in terms of k?

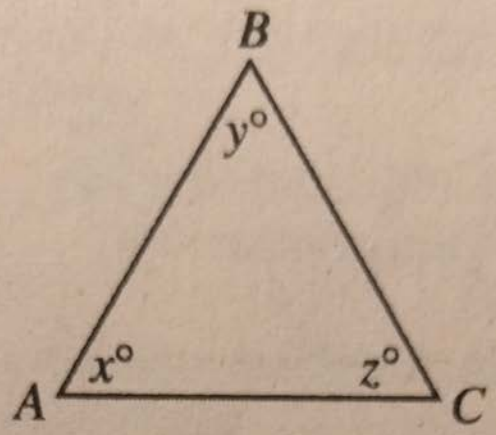
(A) $\frac{k-1}{2}$

(B) $\frac{4k}{3}$

(C) $2k$

(D) $2k + 1$

(E) k^2

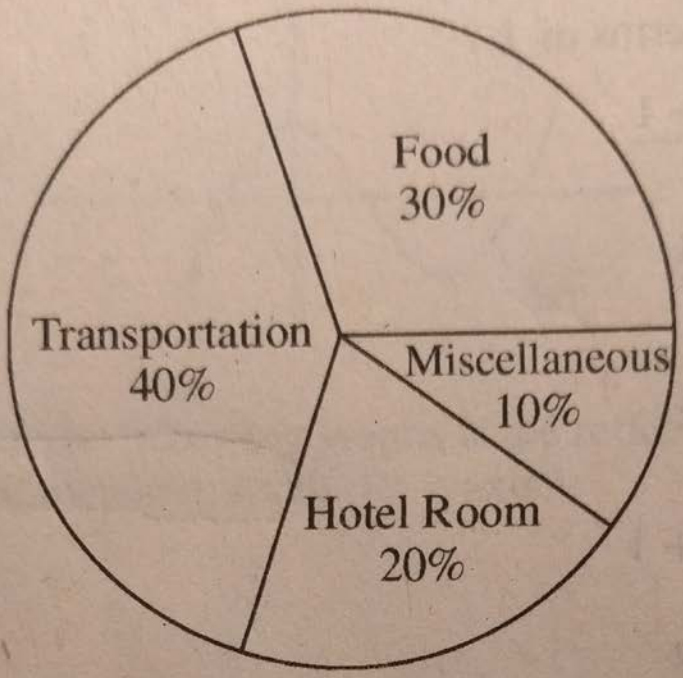


Note: Figure not drawn to scale.

14. The triangle above is isosceles and $AB > AC$. Which of the following must be FALSE?

(A) $AB = BC$
(B) $BC = AC$
(C) $x = y$
(D) $x = z$
(E) $y = z$

TOM'S TRIP EXPENSES



15. The graph above shows the distribution of Tom's $240 trip expenses. The amount Tom paid for the hotel room was only part of the total hotel room cost, because he shared the cost of the room equally with 3 other people. What was the total cost of the hotel room?

(A) $20
(B) $80
(C) $144
(D) $192
(E) $240

16. On a square gameboard that is divided into n rows of n squares each, k of these squares lie along the boundary of the gameboard. Which of the following is a possible value for k ?

(A) 10
(B) 25
(C) 34
(D) 42
(E) 52