



**SATPREP**  
**Heart of Algebra(Hard)**


**Hard**

71. As a part of a store's shoe sale, the first pair of shoes costs  $x$  dollars, and each additional pair on sale costs  $m$  dollars less than the first pair. Which of the following represents the total cost if a customer buys  $n$  pairs of shoes? 
- a)  $nx + m(n - 1)$
  - b)  $nx - m(n - 1)$
  - c)  $x + (n - 1)(x - m)$
  - d)  $x + n(x - m)$
72. A construction site orders certain inches length of pipe cut between  $18\frac{1}{12}$  and  $17\frac{11}{12}$  inches long. If they use a pipe that is  $x$  inches long, which of the following represents all possible values of  $x$ ? 
- a)  $|x - 17| < \frac{1}{12}$
  - b)  $|x - 17| > \frac{1}{12}$
  - c)  $|x - 18| < \frac{1}{12}$
  - d)  $|x - 18| > \frac{1}{12}$
73. Mrs. Matt provides some markers to her Arts class. If each student takes 3 markers, there will be 2 markers left. If 6 students take 4 markers each and the rest of students take 1 marker each, there will be no markers left. How many students are in Mrs. Matt's Arts class?

74. In the gym, a sports ball rack is stacked with 15 basketballs and 15 volleyballs. After Bob took 6 basketballs and 5 volleyballs, Steve took 8 more balls from the rack. What is the maximum number of volleyballs that Steve took in order for there to be more volleyballs than basketballs remaining on the rack?
- a) 8
  - b) 6
  - c) 4
  - d) 3
75. The cost of a long-distance call using phone company A is \$1.00 for the first three minutes and \$.25 for each additional minute. The same call using the phone company B is charged flat rate at \$0.30 per minute for any amount of time. For a call that lasts  $t$  minutes, the cost using company A is the same as the cost using the company B, what is the value of  $t$ ?
- a) 5
  - b) 10
  - c) 15
  - d) 20
76. The daily cost of phone services in a business building is \$.18 per hour from 8 AM through 5 PM, and \$.08 per hour at any other hours of the day. Which of the following expressions represents the cost, in dollars, of the phone service starting from 8 AM and lasting for 20 hours a day over 30 days?
- a)  $30 \times 9(.18) + 30(20 - 9)(.8)$
  - b)  $30(.18) + 30(20 - 9)(.8)$
  - c)  $30 \times 9(.18) + 30(20 - 9)$
  - d)  $30 \times 9(.18) + 30(.8)$
77. If  $K$  is a positive integer, find the least value of  $K$  for which  $27K$  is a perfect cube?
- a) 1
  - b) 3
  - c) 8
  - d) 9



78. The price of a pizza at the pizza store includes:
- The basic charge
  - An additional charge for each topping
- If the price of a 2-topping pizza is \$22 and the price of a 5-topping pizza is \$34, what is the price of a 7-topping pizza?

79. The fee of a car rental includes:
- a basic rental fee
  - an additional charge for every 20 miles
- If the fee to rent a car and drive 60 miles is \$210 and the fee to rent a car and drive 160 miles is \$260, how much does it cost to rent a car and drive 250 miles?

80. If the sum of three consecutive even integers is 108 and  $m$  represents the largest of the three integers, which of the following represents the statement above? 
- $3m + 6 = 108$
  - $m + 2 = 54$
  - $m - 2 = 54$
  - $m - 2 = 36$

81. The square of the sum of  $x$  and 1 is equal to  $y$ . If  $y$  is the square of the difference of  $x$  and 2, what is the value of  $x$ ?
- 2
  - $\frac{1}{2}$
  - $-\frac{1}{2}$
  - $-\frac{1}{4}$

82. If  $2x - y$  is equal to 80% of  $5y$ , what is the value of  $\frac{y}{x}$ ?
- $\frac{5}{2}$
  - $\frac{2}{5}$
  - $\frac{5}{3}$
  - $\frac{3}{5}$

83. If  $x$  and  $y$  are non-zero integers, what is  $x$  percent of  $y$  percent of 2500? 
- a)  $xy$
  - b)  $4xy$
  - c)  $10xy$
  - d)  $\frac{1}{4}xy$
84. If  $\frac{2}{5}$  of  $k$  is 20, what is  $\frac{3}{5}$  of  $k$
- a) 50
  - b) 40
  - c) 30
  - d) 20
85. The value of  $5n - 7$  is how much greater than the value of  $5n - 8$ ?
- a) 15
  - b) 1
  - c)  $10n + 1$
  - d)  $5n - 1$
86. How much less than  $r + 4$  is  $r - 7$ ?
87. For  $b > a$ , the product of 3 and  $(b - a)$  is equal to the average of  $a$  and  $b$ . If  $b$  is 49, what is  $a$ ?
- a) 21
  - b) 28
  - c) 32
  - d) 35
88. How much money was originally in Sue's checking account if she withdrew  $m$  dollars, deposited  $n$  dollars, and now has  $l$  dollars in her checking account? 
- a)  $l + m - n$
  - b)  $l - m - n$
  - c)  $m + n - l$
  - d)  $m + n + l$