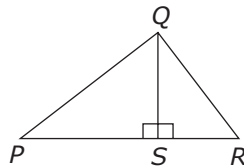# Quant Mastery B

Session Booklet

1. Car X began traveling at an average speed of 35 miles per hour. After 72 minutes, car Y began traveling at an average speed of 49 miles per hour. When both cars had traveled the same distance, both cars stopped. How many miles did car X travel from the time car Y began traveling until both cars stopped?

   ○   105
   ○   120
   ○   140
   ○   147
   ○   168

2. In the figure above, the measure of angle *PQR* is 90 degrees, and the measure of angle *QSP* is 90 degrees. What is the area of triangle *PQR*?

   (1) The length of *PS* is 16, and the length of *RS* is 9.
   (2) The length of *PR* is 25, and the ratio of the length of *PQ* to the length of *QR* is 4 to 3.

3. The ratio of the number of sophomores to juniors to seniors in a room is 3 to 5 to 34. If the number of seniors is 104 more than the sum of the sophomores and juniors, then what is the sum of the number of juniors and seniors in the room?

   ○   168
   ○   156
   ○   148
   ○   136
   ○   117

4. Darcy, Gina, Ray, and Susan will be the only participants at a meeting. There will be three soft chairs in the room where the meeting will be held and one hard chair. No one can bring more chairs into the room. Darcy and Ray will arrive simultaneously, but Gina and Susan will arrive individually. The probability that Gina will arrive first is $\frac{1}{3}$, and the probability that Susan will arrive first is $\frac{1}{3}$. The probability that Gina will arrive last is $\frac{1}{3}$, and the probability that Susan will arrive last is $\frac{1}{3}$. Upon arriving at the meeting, each of the participants will select a soft chair, if one is available. If Darcy and Ray arrive and see only one unoccupied soft chair, they will flip a fair coin to determine who will sit in that chair. By what percent is the probability that Darcy will sit in a soft chair greater than the probability that Gina will sit in a soft chair?

   ○   50%
   ○   25%
   ○ $16\frac{2}{3}$%
   ○ $12\frac{1}{2}$%
   ○   0%

5. Each of the 8 numbers *s, t, u, v, w, x, y*, and *z* is positive. Is the average (arithmetic mean) of *s, t, u, v, w, x, y*, and *z* greater than 46?

   (1) The average (arithmetic mean) of *s, t, u, v*, and *w* is greater than 74.

   (2) The average (arithmetic mean) of *x, y*, and *z* is greater than 120.

6. Jim and Tina begin running toward each other on a straight avenue that is intersected every quarter mile by a cross-street. As one proceeds up the avenue from south to north, its cross-streets are numbered sequentially from 1st Street to 100th Street, without skipping an integer. Jim begins running north from 16th Street at a speed of 38 blocks per hour. At the same time, Tina begins running south from 56th Street at a speed of 42 blocks per hour. At which street do they pass each other?

   ○   19th

   ○   21st

   ○   34th

   ○   35th

   ○   37th

7. A train traveled the first d miles of its journey at an average speed of 60 miles per hour, the next d miles of its journey at an average speed of y miles per hour, and the final d miles of its journey at an average speed of 160 miles per hour. If the train's average speed over the total distance was 96 miles per hour, what is the value of y?

    ◯   68

    ◯   84

    ◯   90

    ◯   120

    ◯   135

8. How many students in a room are currently taking either geography or history, but not both?

   (1) The number of students in the room who are taking at least one of the subjects history and geography is 127.

   (2) The number of students in the room who are taking both geography and history is 46.

9. What is the average (arithmetic mean) of x, y, and z?

   (1) $3x - 2y + 7z = 23$

   (2) $4x - 3y + 5z = 5$ and $-x + 6y - 2z = 58$

10. A new exhibit at a zoo is rectangular and measures 60 feet by 80 feet. An observation walkway around the whole exhibit will be added that is 10 feet wide. If it takes 1 ton of concrete to pave 10 square feet of walkway, how many tons of concrete will be needed to pave the entire walkway?

   ○   150

   ○   240

   ○   320

   ○   480

   ○ 2,400

11. In each of the years 2005, 2006, and 2007, the profits of company X were 10 percent greater than in the previous year. What were the profits of company X in the year 2004?

   (1) The sum of the profits of company X in 2006 and 2007 were $10,164,000.

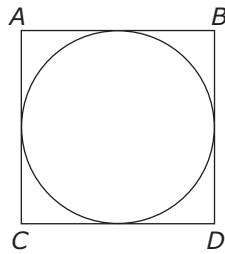   (2) The profits of company X in 2007 were $924,000 greater than the profits of company X in 2005.
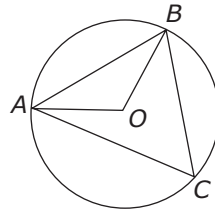
12. In the figure above, *O* is the center of the circle. What is the measure of angle *AOB*?

    (1) The measure of angle *ACB* is 59 degrees.

    (2) The measure of angle *OAB* is 31 degrees.

13. If $wxyz \neq 0$, is $\frac{w}{x} > \frac{y}{z}$?

    (1) $wz > xy$

    (2) $xz > 0$

14. In the figure above, *ABCD* is a square, and exactly one point of each side of square *ABCD* touches the circumference of the circle. Is the area of the circle greater than 25π?

    (1) The perimeter of square *ABCD* is greater than 40.

   (2) The diagonal of square *ABCD* is greater than $8\sqrt{3}$.

15. A magazine survey of its subscribers finds that 20 percent are male. If 70 percent of the subscribers are married and 10 percent of these are male, what percent of the male subscribers are not married?

  ○　7%
  ○　13%
  ○　35%
  ○　65%
  ○　90%

16. The length of a rectangular solid is 5, the width is 3, and the greatest possible distance between any two points on the surface of the rectangular solid is $7\sqrt{2}$. What is the volume of the rectangular solid?

  ○　84
  ○　90
  ○　105
 ○　120
  ○　$15\sqrt{73}$

> List L: v, w, x, y, z
>
> List M: $v + 12$, $w + 12$, $x + 12$, $y + 12$, $z + 12$
>
> List N: $8v$, $8w$, $8x$, $8y$, $8z$

17. What is the standard deviation of the numbers in list L?

  (1) The standard deviation of the numbers in list M is 3.5.
  (2) The standard deviation of the numbers in list N is 28.
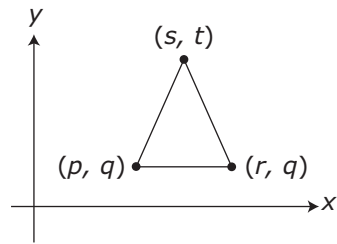
18. In the figure above, the area of the triangle is *a*. Which the following equations describing *t* is correct?

   ○ $t = \dfrac{2a}{r - p}$

   ○ $t = q + \dfrac{2a}{r - p}$

   ○ $t = q + \dfrac{2a}{p - r}$

   ○ $t = q + \dfrac{r - p}{2a}$

   ○ $t = q + \dfrac{2a}{q - p}$

19. The events *A* and *B* are independent. The probability that event *A* occurs is 0.6, and the probability that at least one of the events *A* and *B* occurs is 0.94. What is the probability that event *B* occurs?

   ○ 0.34
   ○ 0.65
   ○ 0.72
   ○ 0.76
   ○ 0.85
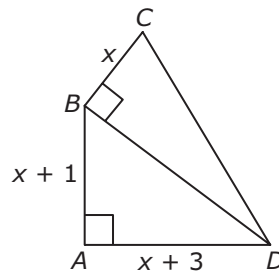
20. In the figure above, the length of *CD* is $5\sqrt{5}$. What is the value of *x*?

   ○ $2\frac{1}{2}$
   ○ 3
   ○ 4
   ○ $4\frac{2}{3}$
   ○ 5

21. In how many different ways can 3 sophomores, 3 juniors, and 4 seniors be standing in a line if the 3 sophomores are in 3 consecutive locations, the 3 juniors are in 3 consecutive locations, and the 4 seniors are in 4 consecutive locations?

   ○   864
   ○ 5,184
   ○ 6,048
   ○ 7,560
   ○ 8,640

22. If the perimeter of square *A* is 12 units and the volume of cube *B* is 8 cubic units, what is the ratio of the area of square *A* to the area of any face on cube *B*?

   ○ 2:27
   ○ 2:3
   ○ 3:2
   ○ 9:4
   ○ 9:2

23. For a certain exam, was the standard deviation of the scores for students U, V, W, X, Y, and Z less than the standard deviation of the scores for students A, B, and C?

   (1) The standard deviation of the scores of students U, V, and W was less than the standard deviation of the scores of students A, B, and C on the exam.
   (2) The standard deviation of the scores of students X, Y, and Z was less than the standard deviation of the scores of students A, B, and C on the exam.

24. The only contents of a bag are 4 pens that write blue and 3 pens that write green. If 4 of these pens are chosen at random, what is the probability that 2 of the pens write blue and 2 of the pens write green?

   ○ $\frac{2}{7}$
   ○ $\frac{1}{2}$
   ○ $\frac{18}{35}$
   ○ $\frac{4}{7}$
   ○ $\frac{9}{14}$