Section 11
## 30 Minutes　25 Questions

1. Kelly's raise increased his salary by what percent ?

  (1) Kelly's raise was $1,200.
  (2) Kelly's raise increased his taxes to $1,700.

2. Mouse population X doubles every week. How many weeks from now will population X first exceed 1,000,000 ?

  (1) The mouse population is now 65,536.
  (2) Fifteen weeks ago the mouse population was 2.

3. If no student took test T more than once, how many students took test T ?

  (1) The average (arithmetic mean) of the students' scores on test T was 72.
  (2) The sum of he students' scores on test T was 2,232.

4. if $\triangle$ denotes an operation, what is the value of $(a\triangle b)$ $\triangle c$?

  (1) a $\triangle$ $b = 5$
  (2) 5 $\triangle$ $c = 3$

5. If $x + 2y = 6$, what is the value of x ?

  (1) $2x + y = 9$
  (2) $3x + 2y = 14$

6. Is $\dfrac{x}{8} = \dfrac{3}{4}$

  (1) $x > 5.5$
  (2) $x < 7$

7. Last year $\dfrac{4}{5}$ of the applicants for a job on a police force passed the physical examination. If $\dfrac{3}{4}$ of the applicants who passed the physical examination also passed the written examination, how many of the applicants passed both examinations ?

  (1) The number of applicants who did not pass either examination was equal to the number who passed the written examination only.
  (2) There was a total of 100 applicants.

8. Is the integer n even ?

  (1) $n^2 - 1$ is odd.
  (2) $\sqrt{n}$ is an integer.

9. If today is Carol's birthday, how old is Carol?

  (1) 6 years ago she was half her present age.
  (2) 3 years from now she will be 3 times as old as she was 7 years ago.

10. If $x, y,$ and z are positive, what is the value of x ?

  (1) $x + y = z + y$
  (2) $z - y = 4 - y$

11. Is x an integer ?

  (1) $\dfrac{2}{3}x$ is an integer.
  (2) $x - 4$ is an integer.

12. If $y > 0$, is y greater than x ?

  (1) $3x = 2y$
  (2) $x + y = 5$

13. Did the population of Country S increase by less than 20 percent from 1965 to 1975 ?

(1) The population of Country S in 1965 was 180 million.

(2) The population of Country S in 1975 was 1.17 times what it was in 1965.

14. If a and b are positive integers, is

$\dfrac{a}{b} = \dfrac{2}{3}$?

(1) $3a = 2b$

(2) For integers m and n, $a = 2m$ and $b = 3n$

15. $G, P,$ and S are animal species. What is the average life span, in year, of S ?

(1) The average life span of S is twice that of P and $\dfrac{4}{5}$ that of G.

(2) The average life span of G is 30 years longer than that of P and 10 years longer than that of S.

16. If point X is inside a circle with center O and radius 2, is point Y inside the same circle?

(1) $OX = 1$

(2) $XY = 2\dfrac{1}{2}$

17. Four dollar amounts, w, x, y, and z, were invested in a business. Which amount was greatest'?

(1) $y < z < x$

(2) x was 25 percent of the total of the four investments.

18. If the measures of' the three interior angles of a triangle are $y°$, $15x°$, and $18x°$, what is the value of y ?

(1) $x = 5$

(2) $15x + y = 90$

19. What is the average (arithmetic mean) of x and y ?

(1) $\dfrac{x}{2} + \dfrac{y}{2} = 10$

(2) $x = 2y$

20. How many bags of grass seed were used for rectangular lawn X ?

(1) Lawn X has a perimeter of 720 feet.

(2) One bag of grass seed was used for each 5,000 square feet of lawn X

21. If x and y are positive. is $y < 2$?

(1) $x > 2y$

(2) $x < y + 2$

22. If n is a positive integer, is n divisible by at least six positive integers?

(1) n is the product of three different prime numbers.

(2) $n = 30$

23. A car traveled a distance of d miles in t minutes at an average rate of r miles per minute. What is the ratio of d to r ?

(1) $t = 30$

(2) $d = 25$

24. If b is the product of three consecutive positive integers $c, c + 1$, and $c + 2$, is b a multiple of 24 ?

(1) b is a multiple of 3,

(2) c is odd.

25. If x is a positive number, what is the value of x ?

(1) $|x - 2| = 1$

(2) $x^2 = 4x - 3$

Section 12
30 Minutes   25 Questions

1. What is the total number of employees in the per-sonnel and data processing divisions of Company S ?

   (1) The number of employees in the data processing division is 3 more than twice the number of employees in the personnel division.

   (2) The number of employees in the data process-ing division is 15.

2. If x and y are integers, is $x + y$ divisible by 6 ?

   (1) x is divisible by 6.

   (2) y is divisible by 6.
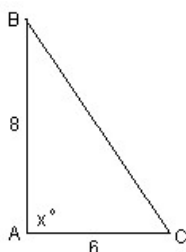
3. In the figure above, what is the length of segment BC ?

   (1) $x = 90$

   (2) The perimeter of $\triangle ABC$ is 24.

4. Of the books that are standing upright along the top shelf of a bookcase, some are $\frac{1}{2}$-inch thick and the rest are $\frac{3}{4}$-inch thick. What is the total number of books standing upright along the top shelf ?

   (1) Half of these books are $\frac{1}{2}$-inch thick.

   (2) The total thickness of all of these books is 25 inches.

5. In the terminating decimal equivalent of d, what is the number of nonzero digits to the right of the deci-mal point?

   (1) $d = 5 + \frac{416}{1,000}$

   (2) The terminating decimal equivalent of d has one nonzero digit to the left of the decimal point.

6. In a given class, what is the average (arithmetic mean) height per pupil ?

   (1) The average (arithmetic mean) height of the girls in the class is 61 inches.

   (2) The average (arithmetic mean) height of the boys in the class is 64 inches.

7. Richard's salary is greater than $25,000. Is Amy's salary greater than Brian's salary?

   (1) Brian's salary is 125 percent of Richard's salary, and Amy's salary is greater than 130 percent of Richard's salary.

   (2) Richard's salary is 75 percent of Amy's salary but is 80 percent of Brian's salary.

8. Are integers r and s consecutive ?

   (1) r is odd and s is even.

   (2) $r - s = 1$

9. There are exactly 6 teams in league X. What was the total number of games played by the 6 teams last season?

   (1) Each team in league X played each of the other teams at least once.

   (2) No team in league X played more than 7 games.

10. Does $x^2 = y$?

   (1) $\sqrt{y} = -x$
   (2) $x < y$
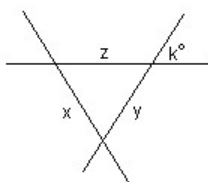
11. In the figure above, x, y, and z denote the lengths of the sides of a triangular flower bed bounded by three driveways. What is the perimeter of the flower bed ?

   (1) $x = y = 30$ feet.
   (2) $k = 60$

12. Is $r > s$?

   (1) $-r + s < 0$
   (2) $r < |s|$

13. A raincoat and an umbrella cost a total of $53.50. What is the cost of the raincoat?

   (1) If the cost of the raincoat were to increase by 10 percent, the raincoat and the umbrella would cost a total of $58.00.
   (2) The cost of the raincoat is $2.50 more than 5 times the cost of the umbrella.

14. What is the value of $x^2 + 2xy + y^2$?

   (1) $x + y = 7$
   (2) $x = 2$

15. If each of the positive integers a, b, and c is a prime number and $abc = 30$, what is the value of c ?

   (1) $a < b < c$
   (2) $a + b = c$

16. If $y = ax + b$, where a and b are constants, what is the value of y when $x = 10$?

   (1) When $x = 1$, $y = 5$.
   (2) When $x = 5$, $y = 13$.

17. If x and y are positive, then x is what percent of y?

   (1) 15 is 25 percent of y.
   (2) x is 10 percent of $2y$.

18. In year X a total of 355 billion dollars was spent for health care in the United States, 30 percent of which was spent by private health insurance compa-nies. Was the amount spent for health care by the federal government's medicare program less than 60 billion dollars?

   (1) In year X medicare spent more than $\dfrac{1}{2}$, but less than $\dfrac{2}{3}$, of the amount spent by the private health insurance companies for health care.
   (2) In year X medicare spent 50 billion dollars less for health care than the amount spent by private health insurance companies.

19. If $xyz \neq 0$. what is the value of $\dfrac{z}{y^2}$?

   (1) $x = \dfrac{3}{4} y$
   (2) $z = \dfrac{2}{3} x$

20. Jane is in a certain ticket line in which each of the other people in the line is either behind her or ahead of her. In the line, the number of people ahead of Jane is 5 more than the number of people behind her. What is the total number of people in the line?

   (1) There are 11 people ahead of Jane in the line.
   (2) The total number of people in the line is 3 times the number of people behind Jane.

21. In the rectangular coordinate system, if line λ is parallel to one of the axes, does line λ contain the point (4, 5) ?

   (1) Line λ contains the point (4, -5).
   (2) Line λ crosses the x-axis.
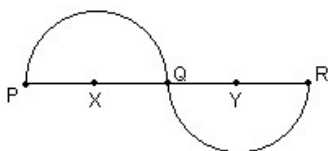
22. In the figure above, if *PR* is a line segment, what is the sum of the lengths of the curved paths from *P* to *Q* and from *Q* to *R* ?

   (1) $XQ = QY = 5$ centimeters.
   (2) Every point on arc *PQ* is 5 centimeters from point *X*, and every point on arc *QR* is 5 centimeters from point *Y*.

23. Last year Luis invested *x* dollars for one year, half at 8 percent simple annual interest and the other half at 12 percent simple annual interest. Now he wants to reinvest the *x* dollars for one year in the same two types of investments, but the lower rate has decreased. If the higher rate is unchanged, what fraction of the *x* dollars must he reinvest at the 12 percent rate so that the total interest earned from the *x* dollars will be the same for both years ?

   (1) The lower rate is now 6 percent.
   (2) The total amount of interest earned from the two investments last year was $3,000.

24. Is the integer *n* a multiple of 140 ?

   (1) *n* is a multiple of 10.
   (2) *n* is a multiple of 14.

25. If *x, y,* and *n* are positive integers, is

   $$\left(\frac{x}{y}\right)^{n}$$ greater than 1,000 ?

   (1) $x = y^{3}$ and $n > y$.
   (2) $x > 5y$ and $n > x$.

Section 13
30 Minutes   25 Questions

1. Who is older, Akira or Michiko?

  (1) Akira and Michiko are 3 years apart in age.

  (2) Akira's younger brother is 11 years old.

2. What is the value of x ?

  (1) $3x = 30$

  (2) $x + y = 40$

3. How many hours does it take 12 machines with identical production rates, running simultaneously without stopping, to fill a certain production order ?

  (1) It takes each machine alone, running continuously, 60 hours to fill the production order.

  (2) It takes 10 of these machines, running simultaneously without stopping, 6 hours to fill the production order.

4. If n is a positive number, what is the value of n ?

  (1) $1 + n = \dfrac{5}{4}$

  (2) $n^2 = \dfrac{1}{16}$

5. What are the populations of Cities Y and Z ?

  (1) The population of City Z is 275,000 more than the population of City Y.

  (2) The ratio of the population of City Z to the population of City Y is 76 to 21.

6. If n is an integer, is n odd ?

  (1) The tens digit of n is odd.

  (2) n^2 is odd.

7. If $x > y$, is $cx > cy$?

  (1) $c > 0$

  (2) $xy > 0$

8. Terry and Pat collected cans for recycling. What was the ratio of the number of carts Terry collected to the number of cans Pat collected?

  (1) Pat collected 50 percent of the cans that they collected.

  (2) Terry collected 140 cans.

9. Is the integer n equal to 25 ?

  (1) n is the square of an integer.

  (2) $15 < n < 37$

10. Is line λ parallel to the y-axis?

  (1) The equation of line λ is $x = 4$.

  (2) The points (4. 2) and (4, - 5) are on line λ.

DISTRIBUTION OF SALES INCOME
FOR STORE S LAST WEEK

Meat, Fish, and Poultry 40%
Fruits and Vegetables x%
Other 8%
Baked Goods y%
28% Dairy Products

100% = $100,000

11. According to the graph above, the sale of fruits and vegetables in Store S last week accounted for what percent of the total sales income for the week?

  (1) Last week the total income from the sale of fruits and vegetables in Store S was $16,000.

  (2) $x = 2y$

12. In a sequence of numbers in which each term after the first term is 1 more than twice the preceding term, what is the fifth term?
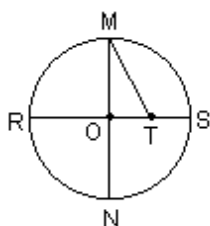
   (1) The first term is 1.
   (2) The sixth term minus the fifth term is 32.

13. Larry saves x dollars per month. Will Larry's total savings one year from now exceed his present savings by at least $500 ? (Assume that there is no interest.)

   (1) In 6 months Larry's total savings will be $900.
   (2) In 3 months Larry's total savings will exceed his present savings by $150.

14. Is $|x - 3| < 7$?

   (1) $x > 0$
   (2) $x < 10$

15. In the figure above, what is the area of the circular region with center O ?

(1) MN is perpendicular to RS.
   (2) The area of triangular region OMT is 4.

16. Pat is reading a book that has a total of 15 chapters. Has Pat read at least $\dfrac{1}{3}$ of the pages in the book?

   (1) Pat has just finished reading the first 5 chapters.
   (2) Each of the first 3 chapters has more pages than each of the other 12 chapters in the book..

17. If $a_1, a_2, a_3, \ldots, a_n, \ldots$ is a sequence such that $a_n = 2n$ for all $n \geqslant 1$, is a_i greater than a_j ?

   (1) i is odd and j is even
   (2) $i^2 > j^2$

18. What was the average (arithmetic mean) monthly rainfall during 1984 in region Y?

   (1) In region Y the total rainfall for the first 6 months of 1984 was twice the total rainfall for the last 6 months of 1984.
   (2) In region Y the average monthly rainfall for the first 6 months of 1984 was 2.31 inches more than the average monthly rainfall for the last 6 months of 1984.

19. If $2x + 3y = 5$, what is the value of x ?
   (1) $x + z = 3 + 2y + z$
   (2) $y = -\dfrac{1}{7}$

20. If S is the sum of the first n positive integers, what is the value of n ?

   (1) $S < 20$
   (2) $s^2 > 220$

21. A small factory that produces only upholstered chairs and sofas uses 1 cushion for each chair and 4 cushions for each sofa. If the factory used a total of 300 cushions on the furniture it produced

last week, how many sofas did it produce last week ?

(1) Last week the factory produced more chairs than sofas.
(2) Last week the factory produced a total of 150 chairs and sofas.

22. If integer p is a factor of 42, is p a prime number?

(1) $p > 6$
(2) $p < 21$

23. What is the value of t ?

(1) The average (arithmetic mean) of t^2 and $8t$ is -8.

(2) $\sqrt{t^4} = 16$

24. What is the area of a rectangular surface that has length x feet and width y feet ?

(1) y is the reciprocal of x.
(2) The perimeter of the rectangular surface is 5 feet.

25. What is the greatest common divisor of positive integers m and n ?

(1) m is a prime number.
(2) m and n are consecutive integers.

Section 14
25 Minutes   20 Questions

1. Is $1 < x < 2$?
(1) $0 < x$
(2) $x < 3$

2. Water is pumped into a partially filled tank at a constant rate through an inlet pipe. At the same time, water is pumped out of the tank at a constant rate through an outlet pipe. At what rate, in gallons per minute, is the amount of water in the tank increasing?

(1) The amount of water initially in the tank is 200 gallons.
(2) Water is pumped into the tank at a rate of 10 gallons per minute and out of the tank at a rate of 10 gallons every $2\dfrac{1}{2}$ minutes.

3. If P, Q, and R are three distinct points, do line segments PQ and PR have the same length ?

(1) P is the midpoint of line segment QR.
(2) Q and R lie on the same circle with center P.

4. What distance did Jane travel?

(1) Bill traveled 40 miles in 40 minutes.
(2) Jane traveled at the same average rate as Bill.

5. The profit from the sale of a certain appliance increases, though not proportionally, with the number of units sold. Did the profit exceed $4 million on sales of 380,000 units ?

(1) The profit exceeded $2 million on sales of 200,000 units.

(2) The profit exceeded $5 million on sales of 350,000 units.
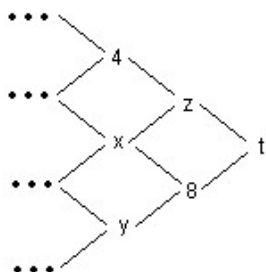
6. Each number in the arrangement above is obtained from the two nearest numbers in the column imme-diately to the left by subtracting the upper number from the lower number. What is the value of z ?

(1) $x = 7$
(2) $t = 5$

7. How many people are directors of both Company K and Company R ?

(1) There were 17 directors present at a joint meeting of the directors of Company K and Company R, and no directors were absent.
(2) Company K has 12 directors and Company R has 8 directors.

8. What is the value of $xy - yz$?

(1) $y = 2$
(2) $x - z = 5$

9. The length of the edging that surrounds circular garden K is $\dfrac{1}{2}$ the length of the edging that surrounds circular garden G. What is the area of garden K ? (Assume that the edging has negligible width.)

(1) The area of G is 25π square meters.
(2) The edging around G is 10π meters long.

10. If the average (arithmetic mean) of six numbers is 75, how many of the numbers are equal to 75 ?

(1) None of the six numbers is less than 75.
(2) None of the six numbers is greater than 75.

11. An employee is 1.5 times the regular hourly rate for each hour worked in excess of 40 hours per week, excluding Sunday, and 2 times the regular hourly rate for each hour worked on Sunday. How much was the employee paid last week?

(1) The employee's regular hourly rate is $10.
(2) Last week the employee worked a total of 54 hours but did not work more than 8 hours on any day.

12. If n and k are greater than zero, is $\dfrac{n}{k}$ an integer ?

(1) n and k are both integers.
(2) n^2 and k^2 are both integers.

13. At Larry's Auto Supply Store, Brand X antifreeze is sold by the gallon and Brand Y motor oil is sold by the quart. Excluding sales tax, what is the total cost for 1 gallon of Brand X antifreeze and 1 quart of Brand Y motor oil?

(1) Excluding sales tax, the total cost for

6 gallons of Brand X antifreeze and 10 quarts of Brand Y motor oil is $58. (There is no quantity discount.)

(2) Excluding sales tax, the total cost for 4 gallons of Brand X antifreeze and 12 quarts of Brand Y motor oil is $44. (There is no quantity discount.)

14. If x is an integer, is $x\,|\,x\,| < 2^x$

(1) $x < 0$
(2) $x = -10$

15. By what percent did the median household income in Country Y decrease from 1970 to 1980 ?

(1) In 1970 the median household income in Country Y was $\dfrac{2}{3}$ of median household income in Country X.

(2) In 1980 the median household income in Country Y was $\dfrac{1}{2}$ of the median household income in Country X.

16. If n is a positive integer, is

$$\left(\frac{1}{10}\right)^n < 0.01 \ ?$$

(1) $n > 2$
(2) $\left(\dfrac{1}{10}\right)^{n-1} < 0.1$

17. If $x < 0$, is $y > 0$?

(1) $\dfrac{x}{y} < 0$
(2) $y - x > 0$

18. If x, y, and z are positive integers, is $x - y$ odd ?

(1) $x = z^2$
(2) $y = (z-1)^2$

19. What is the tens digit of positive integer x ?

(1) x divided by 100 has a remainder of 30.
(2) x divided by 110 has a remainder of 30.

20. If x and y are positive, is the ratio of x to y greater than 3 ?

(1) x is 2 more than 3 times y.
(2) The ratio of $2x$ to $3y$ is greater than 2.

Section 15
25 Minutes   20 Questions

1. The regular price per eight-ounce can of brand X soup is $0.37, regardless of the number of cans purchased. What amount will be saved on the purchase of 3 eight-ounce cans of brand X soup if the regular price is reduced ?

   (1) At the reduced price, 3 eight-ounce cans of brand X soup will cost $0.99
   (2) The amount that will be saved on each eight-ounce can of brand X soup purchased at the reduced price is $0.04.

2. Does Joe weigh more than Tim?

   (1) Tim's weight is 80 percent of Joe's weight.
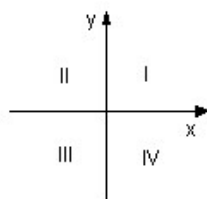   (2) Joe's weight is 125 percent of Tim's weight.

3. Not scored

4. What is the value of xy ?

   (1) $x + y = 10$
   (2) $x - y = 6$

5. Elena receives a salary plus a commission that is equal to a fixed percentage of her sales revenue. What was the total of Elena's salary and commission last month ?

   (1) Elena's monthly salary is $1,000.
   (2) Elena's commission is 5 percent of her sales revenue.

6. Point (x, y) has in which quadrant of the rectangular coordinate system shown above ?

   (1) $x + y < 0$
   (2) $x = 1$ and $y = -7$

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

   (1) $x + y = 5$
   (2) $y + z = 7$

8. Chan and Micko drove separate cars along the entire length of a certain route. If Chan made the trip in 15 minutes, how many minutes did it take Micko to make the same trip ?

   (1) Micko's average speed for the trip was $\frac{3}{4}$ of Chan's average speed.
   (2) The route is 14 miles long.

9. If $xy \neq 0$, is $\frac{x}{y} < 0$?

   (1) $x = y$
   (2) $-x = -(-y)$

10. What is the value of the two-digit integer x ?

   (1) The sum of the two digits is 3
   (2) x is divisible by 3

11. Is the number x between 0.2 and 0.7 ?

   (1) $560x < 280$
   (2) $700x > 280$

12. Is x an integer ?

(1) $\dfrac{x}{2}$ is an integer.

(2) $2x$ is an integer.

13. A swim club that sold only individual and family memberships charged $300 for an individual membership. If the club's total revenue from memberships was $480,000, what was the charge
for a family membership ?

(1) The revenue from individual

memberships was $\dfrac{1}{4}$ of the total

revenue from memberships.

(2) The club sold 1.5 times as many family member- ships as individual memberships.

14. If *x, y,* and *z* are positive numbers, is $x > y > z$?

(1) $xz > yz$

(2) $yx > yz$

15. Can the positive integer *p* be expressed as the product of two integers, each of which is greater than 1 ?

(1) $31 < p < 37$

(2) *p* is odd

16. Currently there are 50 picture books each shelf in the children's section of a library. If these books were to be placed on smaller shelves with 30 picture books on each shelf, how many of the smaller shelves would be needed to hold all of these books ?

(1) The number of smaller shelves needed is 6 more than the current number of shelves.

(2) Currently there are 9 shelves in the

children's section.

17. Is *y* = 6 ?

(1) $y^2 = 36$

(2) $y^2 - 7y + 6 = 0$
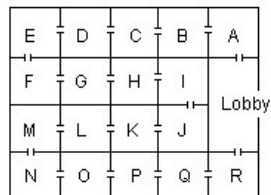
18. The figure above represents the floor plan of an art gallery that has a lobby and 18 rooms. If Lisa goes from the lobby into room A at the same time that Paul goes from the lobby into room R, and each goes through all of the rooms in succession, entering by one door and exiting by the other, which room will they be in at the same time ?

(1) Lisa spends 2*x* minutes in each room and Paul spends 3*x* minutes in each room.

(2) Lisa spends 10 minutes less time in each room than Paul does.
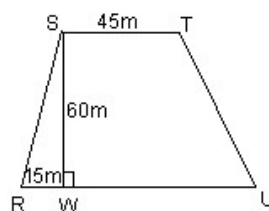
19. Quadrilateral *RSTU* shown above is a site plan for a parking lot in which side *RU* is parallel to side *ST*   and *RU* is longer than *ST*. What is the area of the parking lot ?

(1) *RU* = 80 meters

(2) *TU*= $20\sqrt{10}$ meters

20. If *xy* = -6 , what is the value of *xy(x+y)* ?

(1) $x - y = 5$

(2) $xy^2 = 18$