

## Graduate Management Admission Test (GMAT)

### Quantitative Section

- ✍ In the math section, you will have **75 minutes** to answer 37 questions:
- ✍ A of these question are **experimental** and would not be counted toward your score. There is no way to identify which questions are experimental as they one mixed in randomly through out the section.
- ✍ This section includes **two types of questions: Problem solving and Data sufficiency.**
- ✍ For each problem solving section, you are to solve the problem and indicate the best of the answer choices given.
- ✍ For each data sufficiency question, you are to decide whether the information given in each of two statements, labeled (1) and (2), is sufficient to answer the question, whether the information in the two statements together is sufficient, or if neither is sufficient.
- ✍ More detailed dissection will appear before the first occurrence of each question type. At any point in the test, you can read the direction for the question type you working on by clicking on HELP.

### Quantitative Section

Time: **75 minutes**

Solve the problem and indicate the best answer choices given.

**Number:** All the numbers used are **Real Numbers**

**Figure:** A figure accompanying used a problem solving is intended to provide information useful in solving the problem. Figures are drawn as accurately as possible **EXCEPT** when it is started in a specific problem that its figure is not drawn to scale.

Straight lines may some times appear jagged. All figure lie in a plane unless otherwise indicated.

**Question 1**

If  $-2 < a < 11$  and  $3 < b < 12$ , then which of the following is NOT true?

- (A)  $1 < a + b < 23$
- (B)  $-14 < a - b < 8$
- (C)  $-7 < b - a < 14$
- (D)  $1 < b + a < 23$
- (E)  $-24 < ab < 132$

**Question 2**

$a$ ,  $b$ , and  $c$  are integers and  $a < b < c$ .  $S$  is the set of all integers from  $a$  to  $b$ , inclusive.  $Q$  is the set of all integers from  $b$  to  $c$ , inclusive. The median of set  $S$  is  $(3/4)b$ . The median of set  $Q$  is  $(7/8)c$ . If  $R$  is the set of all integers from  $a$  to  $c$ , inclusive, what fraction of  $c$  is the median of set  $R$ ?

- (A)  $3/8$
- (B)  $1/2$
- (C)  $11/16$
- (D)  $5/7$
- (E)  $3/4$

**Question 3**

$a$ ,  $b$ , and  $c$  are positive integers. If  $a$ ,  $b$ , and  $c$  are assembled into the six-digit number  $abcabc$ , which one of the following must be a factor of  $abcabc$ ?

- (A) 16
- (B) 13
- (C) 5
- (D) 3
- (E) none of the above

**Question 4**

The average of  $(54,820)^2$  and  $(54,822)^2$  =

- (A)  $(54,821)^2$
- (B)  $(54,821.5)^2$
- (C)  $(54,820.5)^2$
- (D)  $(54,821)^2 + 1$
- (E)  $(54,821)^2 - 1$

**Question 5**

A certain club has exactly 5 new members at the end of its first week. Every subsequent week, each of the previous week's new members (and only these members) brings exactly  $x$  new members into the club. If  $y$  is the number of new members brought into the club during the twelfth week, which of the following could be  $y$ ?

- (A)  $\sqrt[12]{5}$
- (B)  $3^{11}5^{11}$
- (C)  $3^{12}5^{12}$

(D)  $3^{11}5^{12}$

(E)  $60^{12}$

**Question 6:**

**DATA SUFFICIENCY PROBLEM**

Directions: The data sufficiency problem consists of a question and two statements, labeled (1) and (2), in which certain data are given. You have to decide whether the data given in the statements are sufficient for answering the question. Using the data given in the statements plus your knowledge of mathematics and everyday facts (such as the number of days in July or the meaning of counterclockwise), you must indicate whether

**Choice: A** statement (1) ALONE is sufficient, but statement (2) alone is not sufficient to answer the question asked;

**Choice: B** statement (2) ALONE is sufficient, but statement (1) alone is not sufficient to answer the question asked;

**Choice: C** BOTH statements (1) and (2) TOGETHER are sufficient to answer the question asked, but NEITHER statement ALONE is sufficient;

**Choice: D** EACH statement ALONE is sufficient to answer the question asked;

**Choice: E** statements (1) and (2) TOGETHER are NOT sufficient to answer the question asked, and additional data specific to the problem are needed.

$x$  is a positive number. If  $9^x + 9^{x+1} + 9^{x+2} + 9^{x+3} + 9^{x+4} + 9^{x+5} = y$ , is  $y$  divisible by 5?

1) 5 is a factor of  $x$ .

2)  $x$  is an integer.

**Question 7**

If the range of the set of numbers {150, 90, 125, 110, 170, 155,  $x$ , 100, 140} is 95, which of the following could be  $x$ ?

(A) 80

(B) 85

(C) 95

(D) 125

(E) 185

**Question 8**

Frances can complete a job in 12 hours, and Joan can complete the same job in 8 hours. Frances starts the job at 9 a.m., and stops working at 3 p.m. If Joan starts working at 4 p.m. to complete the job, at what time is the job finished?

(A) 6 p.m.

(B) 7 p.m.

(C) 8 p.m.

(D) 10 p.m.

(E) 12 p.m.

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#### Question 9

A, B, C, D, and E are airline pilots with very busy travel schedules. Given that D is able to meet at any time that B cannot meet, do the schedules of A, B, C, D, and E allow three of these five individuals to meet together for two uninterrupted hours?

(1) Pilots A and C, who cannot meet together, are not able to end any meeting during the AM hours of any weekday.

(2) Pilots B and E, who can never meet for longer than 2 uninterrupted hours, are only available to meet for two straight hours starting at 10:30 PM on any weekday and not ending during the AM hours of any weekend day.

#### Question 10.

$$1/2^{12} + 2/2^{13} + 3/2^{14} + 4/2^{15} =$$

- (A)  $1/2^{10}$   
(B)  $1/2^{12}$   
(C)  $15/2^{15}$   
(D)  $2/2^{10}$   
(E)  $23/2^{16}$

#### Question 11

$1^1+2^2+3^3+\dots+10^{10}$  is divided by 5. What is the remainder?

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

**Question 12**

If  $n$  is an integer greater than 0, what is the remainder when  $9^{12n+3}$  is divided by 10?

- (A) 0
- (B) 1
- (C) 2
- (D) 7
- (E) 9

**Question 13**

Each of 435 bags contains at least one of the following three items: raisins, almonds, and peanuts. The number of bags that contain only raisins is 10 times the number of bags that contain only peanuts. The number of bags that contain only almonds is 20 times the number of bags that contain only raisins and peanuts. The number of bags that contain only peanuts is one-fifth the number of bags that contain only almonds. 210 bags contain almonds. How many bags contain only one kind of item?

- (A) 256
- (B) 260
- (C) 316
- (D) 320
- (E) It cannot be determined from the given information.

**Question 14**

What is the probability that  $\frac{u}{v}$  and  $\frac{x}{z}$  are reciprocal fractions?

- (1)  $v, w, y,$  and  $z$  are each randomly chosen from the first 100 positive integers.
- (2) The product  $(u)(x)$  is the median of 100 consecutive integers.

**Question 15**

If  $n$  is an integer greater than 5.3, then  $n!$  must be divisible by which of the following numbers?

- (A) 7
- (B) 11
- (C) 12
- (D) 13
- (E) 14

**Question 16**

what is population of the village

- 1. 7/11 of the village comprises of married people
- 2. 200 widows comprises 10% of the singles population

- (A)

- (B)
- (C)
- (D)
- (E)

**Question 17**

The sum of the ages of A, B and C is 137 years. What is C's age

1. the sum of the ages of A and C is 91 years
2. the sum of the ages of B and C is 104 years

- (A)
- (B)
- (C)
- (D)
- (E)

**Question 18**

Is the number  $x$  is divisible by 9.

1. The number  $x$  can be obtained by taking the difference between a number and another one obtained by reversing the digits.
2. The sum of the digits of  $x$  is divisible by 9.

- (A)
- (B)
- (C)
- (D)
- (E)

**Question 19**

In an election how many votes are cast.

1. the winning candidate gets 54% of the total votes
2. the winning candidate wins by 800

- (A)
- (B)
- (C)
- (D)
- (E)

**Question 20**

Is  $\frac{y}{x}(1+x)^2 \geq 2y$

1.  $xy \geq 0$
2.  $x \geq y \geq 5$

- (A)
- (B)
- (C)
- (D)

(E)

**Question 21**

Is  $\sqrt{x} > \frac{1}{x}$ ?

1.  $x > 0$
2.  $x < 2$

(A)  
(B)  
(C)  
(D)  
(E)

**Question 22**

Is  $x > \frac{1}{5}$ ?

1.  $x$  is positive
2.  $\frac{1}{x} > 5$

(A)  
(B)  
(C)  
(D)  
(E)

**Question 23.**

Is  $a^x > b^x$ ?

A.  $a > b, x > 0$

B.  $\frac{1}{a} > \frac{1}{b}, x > |x|$

(A)  
(B)  
(C)  
(D)  
(E)

**Question 24**

A printer numbered consecutively the pages of a book, beginning with 1 on the first page. In numbering the pages, he had to print a total of 187 digits. Find the number of pages in the book.

- A) 99                      B) 98                      C) 96                      D) 97                      E) 95

**Question 25**

In a drawer of shirts, 8 r blue, 6 r green, and 4 r magenta. If Mason draws 2 shirts at random, what is the probability that at least one of the shirts he draws will be blue?

- (A) 25/153
- (B) 28/153
- (C) 5/17
- (D) 4/9
- (E) 12/17

**Question 26**

$$\frac{x^2+2x-8}{x^2-6x+8} =$$

- (A) 1
- (B) -1
- (C)  $x/3$
- (D)  $\frac{x+4}{x-4}$
- (E)  $\frac{x+8}{x-8}$

**Question 27**

Which of the following CANNOT yield an integer when divided by 10?

- (i) Product of two prime numbers
- (ii) An integer less than 10
- (iii) Sum of three consecutive integers
- (iv) An odd integer

- A. (i) & (iv) only
- B. (ii) & (iv) only
- C. (ii), (iii) & (iv) only
- D. (iv) Only

**Question 28**

A number, K, is a positive integer with the special property that 3 times its unit is equal to 2 times its 10 digit. How many such numbers exist between 10 & 99?

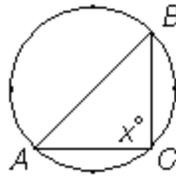
- (A) 2
- (B) 3
- (C) 4
- (D) 5

**Question 29**

If two digit integer M and N are positive and have same digits, but in reverse order, which of the following cannot be the sum of M and N.

- a) 181
- b) 165
- c) 121
- d) 99
- e) 44

**Question 30**



In the figure above, does  $x = 90$ ?

- (1) The length of  $AC$  is less than the length of  $BC$ .
  - (2) The length of  $AB$  is one-fourth the circumference of the circle.
- (A)
  - (B)
  - (C)
  - (D)
  - (E)

**Question: 31**

In a group of 8 semifinalists, all but 2 will advance to the final round. If in the final round only the top 3 will be awarded medals, then how many groups of medal winners are possible?

- (A) 20
- (B) 56
- (C) 120
- (D) 560
- (E) 720

**Question 32**

The marks scored by a student in three subjects are in the ratio of 4: 5: 6. If the candidate scored an overall aggregate of 60% of the sum of the maximum marks and the maximum mark in all three subjects is the same, in how many subjects did he score more than 60%?

- (A) 1
- (B) 2
- (C) 3
- (D) None of the subjects

**Question 33**

There are 6 boxes numbered 1, 2,...6. Each box is to be filled up either with a red or a green ball in such a way that at least 1 box contains a green ball and the boxes containing green balls are consecutively numbered. The total number of ways in which this can be done is

- (A) 5
- (B) 21

(C) 33

(D) 60

(E) 40

**Question 34**

A vendor sells 60 percent of apples he had and throws away 15 percent of the remainder. Next day he sells 50 percent of the remainder and throws away the rest. What percent of his apples does the vendor throw?

(A) 17 (B) 23

(C) 77 (D) None of these

(E) 75

35. The product of two positive numbers is  $p$ . If each of the numbers is increased by 2, the new product is how much greater than twice the sum of the two original numbers?

(A)  $p-2$

(B)  $p$

(C)  $p+2$

(D)  $p+4$

(E)  $2p+4$

36. If  $p$  and  $q$  are integers, such that  $p < 0 < q$ , which of the following must be true?

I.  $2p < 2q$

II.  $p^2 < q^2$

III.  $p+q=0$

(A) I only

(B) II only

(C) I and II only

(D) I and III only

(E) I, II and III

37. If  $\frac{12(22)(35)}{p}$  is an integer, which of the following CANNOT be the value of  $p$ ?

(A) 15

(B) 21

(C) 28

(D) 33

(E) 50

## Solutions

**Answer 1 (C).** If we work with the two inequalities we subtract the max of 2<sup>nd</sup> from min of 1<sup>st</sup> hence subtracting 11 from 3 gives us -8. Hence ineq. Should be  $-8 < b - a < 14$ .

### Answer 2 (C)

Since  $S$  contains only consecutive integers, its median is the average of the extreme values  $a$  and  $b$ . We also know that the median of  $S$  is  $\frac{3}{4}b$ . We can set up and simplify the following equation:

$$\begin{aligned}\frac{a+b}{2} &= \frac{3b}{4} \rightarrow \\ 4a + 4b &= 6b \rightarrow \\ 4a &= 2b \rightarrow \\ 2a &= b\end{aligned}$$

Since set  $Q$  contains only consecutive integers, its median is also the average of the extreme values, in this case  $b$  and  $c$ . We also know that the median of  $Q$  is  $\frac{7}{8}c$ . We can set up and simplify the following equation:

$$\begin{aligned}\frac{b+c}{2} &= \frac{7c}{8} \rightarrow \\ 8b + 8c &= 14c \rightarrow \\ 8b &= 6c \rightarrow \\ 4b &= 3c\end{aligned}$$

We can find the ratio of  $a$  to  $c$  as follows:

Taking the first equation,  $2a = b \rightarrow 8a = 4b$

and the second equation,  $4b = 3c$

and setting them equal to each other, yields the following:

$$8a = 3c \rightarrow \frac{a}{c} = \frac{3}{8}$$

Since set  $R$  contains only consecutive integers, its median is the average of the extreme

values  $a$  and  $c$ :  $\frac{a+c}{2}$ . We can use the ratio  $\frac{a}{c} = \frac{3}{8}$  to substitute  $\frac{3c}{8}$  for  $a$ :

$$\frac{\frac{3c}{8} + c}{2} \rightarrow$$

$$\frac{\frac{11c}{8}}{2} \rightarrow$$

$$\frac{11}{16}c$$

Thus the median of set  $R$  is  $\frac{11}{16}c$ . The correct answer is C.

**Answer 3 (B)**

This question looks daunting, but we can tackle it by thinking about the place values of the unknowns. If we had a three-digit number  $abc$ , we could express it as  $100a + 10b + c$  (think of an example, say 375:  $100(3) + 10(7) + 5$ ). Thus, each additional digit increases the place value tenfold.

If we have  $abcabc$ , we can express it as follows:

$$100000a + 10000b + 1000c + 100a + 10b + c$$

If we combine like terms, we get the following:

$$100100a + 10010b + 1001c$$

At this point, we can spot a pattern in the terms: each term is a multiple of 1001. On the GMAT, such patterns are not accidental. If we factor 1001 from each term, the expression can be simplified as follows:

$$1001(100a + 10b + c) \text{ or } 1001(abc).$$

Thus,  $abcabc$  is the product of 1001 and  $abc$ , and will have all the factors of both. Since we don't know the value of  $abc$ , we cannot know what its factors are. But we can see whether one of the answer choices is a factor of 1001, which would make it a factor of  $abcabc$ .

1001 is not even, so 16 is not a factor. 1001 doesn't end in 0 or 5, so 5 is not a factor. The sum of the digits in 1001 is not a multiple of 3, so 3 is not a factor. It's difficult to know whether 13 is a factor without performing the division:  $1001/13 = 77$ . Since 13 divides into 1001 without a remainder, it is a factor of 1001 and thus a factor of  $abcabc$ .

The correct answer is B.

**Answer 4 (D)**

We can simplify this problem by using variables instead of numbers.

$$x = 54,820$$
$$x + 2 = 54,822$$

The average of  $(54,820)^2$  and  $(54,822)^2 =$

$$\frac{(54,820)^2 + (54,822)^2}{2} = \frac{x^2 + (x+2)^2}{2}$$
$$= \frac{x^2 + (x^2 + 4x + 4)}{2} = \frac{2x^2 + 4x + 4}{2} = x^2 + 2x + 2$$

Now, factor  $x^2 + 2x + 2$ . This equals  $x^2 + 2x + 1 + 1$ , which equals  $(x + 1)^2 + 1$ .

Substitute our original number back in for  $x$  as follows:

$$(x + 1)^2 + 1 = (54,820 + 1)^2 + 1 = (54,821)^2 + 1.$$

The correct answer is D.

### **Answer 5 (D)**

At the end of the first week, there are 5 members. During the second week,  $5x$  new members are brought in ( $x$  new members for every existing member). During the third week, the previous week's new members ( $5x$ ) each bring in  $x$  new members:  $(5x)x = 5x^2$  new members. If we continue this pattern to the twelfth week, we will see that  $5x^{11}$  new members join the club that week. Since  $y$  is the number of new members joining during week 12,  $y = 5x^{11}$ .

If  $y = 5x^{11}$ , we can set each of the answer choices equal to  $5x^{11}$  and see which one yields an integer value (since  $y$  is a specific number of people, it must be an integer value). The only choice to yield an integer value is (D):

$$5x^{11} = 3^{11}5^{12}$$

$$\frac{5x^{11}}{5} = \frac{3^{11}5^{12}}{5}$$

$$x^{11} = 3^{11}5^{11}$$

$$\sqrt[11]{x^{11}} = \sqrt[11]{3^{11}5^{11}}$$

$$x = (3)(5)$$

Therefore  $x = 15$ .

Since choice (D) is the only one to yield an integer value, it is the correct answer.

**Answer 6 (D)**

The key to this problem is to recognize that in order for any integer to be divisible by 5, it must end in 0 or 5. Since we are adding a string of powers of 9, the question becomes "Does the sum of these powers of 9 end in 0 or 5?" If we knew the units digits of each power of nine, we'd be able to figure out the units digit of their sum.

9 raised to an even exponent will result in a number whose units digit is 1 (e.g.,  $9^2 = 81$ ,  $9^4 = 6561$ , etc.). If 9 raised to an even exponent always gives 1 as the units digit, then 9 raised to an odd exponent will therefore result in a number whose units digit is 9 (think about this:  $9^2 = 81$ , so  $9^3$  will be  $81 \times 9$  and the units digit will be  $1 \times 9$ ).

Since our exponents in this case are  $x$ ,  $x+1$ ,  $x+2$ ,  $x+3$ ,  $x+4$ , and  $x+5$ , we need to know whether  $x$  is an integer in order to be sure the pattern holds. (NEVER assume that an unknown is an integer unless expressly informed). If  $x$  is in fact an integer, we will have 6 consecutive integers, of which 3 will necessarily be even and 3 odd. The 3 even exponents will result in 1's and the 3 odd exponents will result in 9's. Since the three 1's can be paired with the three 9's (for a sum of 30), the units digit of  $y$  will be 0 and  $y$  will thus be divisible by 5. But we don't know whether  $x$  is an integer. For that, we need to check the statements.

Statement (1) tells us that 5 is a factor of  $x$ , which means that  $x$  must be an integer. Sufficient.

Statement (2) tells us that  $x$  is an integer. Sufficient.

The correct answer is D: EACH statement ALONE is sufficient to answer the question.

**Answer 7 (E).**

They tell us the range of the set  $\{150, 90, 125, 110, 170, 155, x, 100, 140\}$  is 95. Since the present range without is 80,  $x$  has to be either the highest or the lowest number in the set. If  $x$  is the lowest number, it would be  $170-95=75$ , but that's not an option. Therefore  $x$  has to be the highest number.  $90+95=185$ .

**Answer 8 (C).**

Plug in for number of tasks to be completed before the job is done; let the job involve making 24 widgets. Thus, Frances makes 2 per hour, and Joan makes 3 per hour. Frances works for 6 hours, so she makes 12 widgets. Joan needs 4 hours to make the other 12 widgets; if she starts at 4 p.m. she will finish at 8 p.m.

**Answer 9 (E).**

This is a Yes/No data sufficiency question. The only way the statements will provide definitive information is if they lead to a definite YES answer or if they lead to a definite NO answer. (A "Maybe" answer means that the statements are not sufficient.

Statement (1) alone only provides us information about when A and C cannot meet. It does not provide any information about when each of the pilots ARE able to meet. While we know that A and C cannot meet together, it is possible that some combination of three pilots would be able to meet together (such as ABD or CBE). Statement (1) alone therefore does not provide enough information to be able to definitively answer this question YES or NO.

Statement (2) alone provides us with specific information about when B and E can meet. However we are not provided with information as to whether one of the other pilots -- A, C or D -- will be able to join them for the meeting. Thus, statement (2) alone is not sufficient to answer this question

In analyzing statements (1) and (2) together, it is helpful to list the 10 possible ways that 3 of the pilots could meet:

1. ABC
2. ABD
3. ABE
4. ACD
5. ACE
6. ADE
7. BCD
8. BCE
9. BDE
10. CDE

Statements (1) and (2) taken together preclude pilots A or C from meeting with pilots B and E. This is due to the fact that pilots B and E can only meet for two straight hours from 10:30 PM to 12:30 AM starting on either Monday, Tuesday, Wednesday, or Thursday night while pilots A and C can never meet during the AM hours of any weekday (leaving the 12:00 AM to 12:30 AM slot impossible). This eliminates 8 of the

10 possibilities (1, 2, 3, 5, 6 because A can't meet with B or E and 7, 8, 10 because C can't meet with B or E.)

In addition, since pilot A cannot meet with pilot C, possibility 4 is also eliminated.

Thus, the only possibility that remains is #9: BDE. The question stem states that D is able to meet at any time that B cannot. It may be tempting to use this information to conclude that B and D are not able to meet together. However, while we know for sure that D is able to meet at any time that B cannot, this does not preclude the possibility that D is ALSO able to meet at times when B can meet. Given that we don't know whether or not D can meet at the same time that B and E can meet - we do not have enough information to evaluate whether pilots B, D, and E will be able to meet together.

Therefore, the correct answer is E: Statements (1) and (2) TOGETHER are NOT sufficient.

**Answer 10 (A).**

If we express the numerators as powers of 2, then we would get  $1/2^{12} + 2/2^{13} + 2^2/2^{14} + 2^3/2^{15}$  which is equal to  $1/2^{12} + 1/2^{12} + 1/2^{12} + 1/2^{12}$  which equals  $4/2^{12}$ . This can be further reduced to  $2^2/2^{12} = 1/2^{10}$ .

**Answer 11(C)**

When a whole number is divided by 5, the remainder depends on the units digit of that number.

Thus, we need to determine the units digit of the number  $1^1 + 2^2 + 3^3 + \dots + 10^{10}$ . To do so, we need to first determine the units digit of each of the individual terms in the expression as follows:

Term	Last (Units) Digit
$1^1$	1
$2^2$	4
$3^3$	7
$4^4$	6
$5^5$	5
$6^6$	6
$7^7$	3
$8^8$	6
$9^9$	9
$10^{10}$	0

To determine the units digit of the expression itself, we must find the sum of all the units digits of each of the individual terms:

$$1 + 4 + 7 + 6 + 5 + 6 + 3 + 6 + 9 = 47$$

Thus, 7 is the units digit of the number  $1^1+2^2+3^3+\dots+10^{10}$ . When an integer that ends in 7 is divided by 5, the remainder is 2. (Test this out on any integer ending in 7.)

Thus, the correct answer is C.

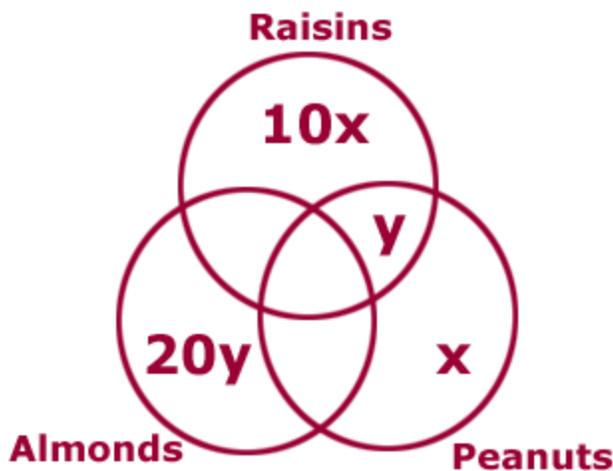
**Answer 12 (E).**

Look for the pattern:  $9^1=9$ .  $9^2=81$ .  $9^3=729$ . Multiply that by another 9. You'll get another no ending in 1. And so forth and so on. So the bottom line is that whenever 9 is raised to an odd power, the units digit is 9. When it's raised to an even power, the units digit is 1. When you divide a number by 10, its remainder will always be its units digit. No matter what value you plug in for n, we're always going to be raising 9 to an odd power, so the units digit and the remainder will both be 9.

**Answer 13 (D)**

This problem involves 3 overlapping sets. To visualize a 3 set problem, it is best to draw a Venn Diagram.

We can begin filling in our Venn Diagram utilizing the following 2 facts: (1) The number of bags that contain only raisins is 10 times the number of bags that contain only peanuts. (2) The number of bags that contain only almonds is 20 times the number of bags that contain only raisins and peanuts.



Next, we are told that the number of bags that contain only peanuts (which we have represented as  $x$ ) is one-fifth the number of bags that contain only almonds (which we have represented as  $20y$ ).

This yields the following equation:  $x = (1/5) 20y$  which simplifies to  $x = 4y$ . We can use this information to revise our Venn Diagram by substituting any  $x$  in our original diagram with  $4y$  as in the figure.

**Answer 14(C).**

In order for one number to be the reciprocal of another number, their product must equal 1. Thus, this question can be rephrased as follows:

What is the probability that  $\frac{u}{v} \times \frac{x}{y} = \frac{w}{z}$  ?

This can be simplified as follows:

What is the probability that  $\frac{ux}{vy} = wz$  ?

What is the probability that  $\frac{ux}{vy} = wz$  ?

Finally: What is the probability that  $ux = vywz$  ?

Statement (1) tells us that  $vywz$  is an integer, since it is the product of integers. However, this gives no information about  $u$  and  $x$  and is therefore not sufficient to answer the question.

Statement (2) tells us that  $ux$  is NOT an integer. This is because the median of an even number of consecutive integers is NOT an integer. (For example, the median of 4 consecutive integers - 9, 10, 11, 12 - equals 10.5.) However, this gives us no information about  $vywz$  and is therefore not sufficient to answer the question.

Taking both statements together, we know that  $vywz$  IS an integer and that  $ux$  is NOT an integer. Therefore  $vywz$  CANNOT be equal to  $ux$ . The probability that the fractions are reciprocals is zero.

The correct answer is C: Statements (1) and (2) TAKEN TOGETHER are sufficient to answer the question, but NEITHER statement ALONE is sufficient.

**Answer 15 (C).**

If  $n$  is greater than 5.3 then the smallest  $n!$  can be  $6!$ . Since  $6! = 6*5*4*3*2*1$ , it is definitely divisible by 12, because any  $n!$  bigger than 6 will include both a 6 and a 2, thus making it a multiple of 12. Also,  $n!$  does not have to be divisible by anything greater than 6, so 7, 11 and 13 are eliminated as are any multiples of those numbers, like 14.

**Answer 16 (C).**

The question here is to find out the population of the village. Statement (1) tells us that  $\frac{7}{11}$  of the village comprises of married people. So if the population of the village is  $x$ , the no of married population is  $\frac{7x}{11}$ . but this is absolutely not enough to get the total population. So we have BCE. Now statement (2) tells that 200 widows comprise 10% of the singles population. So the singles population is clearly 2000. so both the statements (1) and (2) ALONE are not sufficient to answer the question. So now we combine both of them. We get singles + widows + married = total population. Adding both statements we get  $2000+200+\frac{7x}{11}=x$  which gives us the total population of 6050 people. Therefore the answer is (C).

**Answer 17(C).**

The question stem gives  $A+B+C=137$ . Now we look at the statement (1). It says  $A+C=91$  which leads us to value of  $B=46$ . But it ALONE is not enough to get us the value of  $C$ . Looking at statement (2) we get  $B+C=104$  which leads us to value of  $A=33$ . This also ALONE is not enough to get value of  $C$ . But both statements taken together will definitely lead us to get the value of  $C$  from the question stem as 58. Therefore answer is (C).

**Answer 18(D).**

We take the first statement and analyze it. Taking examples of 12 and 21 we get difference of 9 that is divisible by 9. Again 13 and 31 gives difference of 18 divisible by 9. And so and so forth. So statement (1) ALONE is enough to answer the stem question. So we have AD. Statement (2) gives us the divisibility rule of a number divisible by 9. So it clearly answers the question asked in stem. So both statements ALONE are enough to answer the question making (D) the right answer.

**Answer 19(E).**

The statement (1) here tells us that the winning candidate gets 54% of the total votes. But this clearly is not enough to get the total vote count. So BDE. Statement (2) gives the margin of victory but that too is not enough to answer the question involved. Even when both the statements are taken together it leads us to nowhere. So some more data is required to solve this problem clearly making (E) the right choice.

**Answer 20(A).**

If we expand the question stem we get  $\frac{y}{x}(x^2 + 2x + 1)$  which can be reduced as  $xy + 2y + \frac{y}{x}$ . Now look at the statement (1). It tells that  $xy > 0$ . If this is the case then surely the whole equation becomes greater than  $2y$ , which answers the question. So AD. Now

statement (2) gives us another equation that cannot help us solve the question asked in the stem. So answer is (A).

**Answer 21(E).**

This is slightly tricky question. When square root of a number is involved the dividing range becomes  $0 < x < 1$  or  $x > 1$  since square root of a negative number is not included in GMAT. So if a number is  $> 1$  then the question stem is true. And if the number is between  $0 < x < 1$  then the question stem is false. Statement (1) gives us the range as  $x > 0$  which takes care of both our range. So nothing can be determined from this. So BCE. Statement (2) tells us that  $x < 2$  which again covers both our range. So the answer is (E).

**Answer 22(C).**

To answer this question lets see the fact statements. Statement (1) says that  $x$  is +ve. This ALONE is not enough to answer the stem question as  $x$  could be  $< 1/5$  and still be positive. So BCE. Statement (2) can be transformed to the question stem but it could be only true if  $x$  is positive. So clearly both the statements together will lead us to the answer and hence (C).

**Answer 23(E).**

This question appears to be simple but it involves careful look at the question. The stem question asks us for a relation. Statement (1) gives us the relation between  $a$  and  $b$  and also the range of  $x$ . But the important point is that it has not given the range of  $a$  and  $b$  whether they are positive or negative. Statement (2) also has the same problem as the range for  $a$  and  $b$  are missing. So clearly answer is (E).

**Answer 24(B).**

The total number of digits is 187. The total number of single digit page numbers is 9(from 1 to 9). So subtracting this from 187 we get 178. After page number 9 we have 2 digit page numbers. So dividing this by 2 we get 89. So the total number of pages in the book are  $89 + 9 = 98$ .

**Answer 25(E).**

Remember that at least one is a clue, and when u see phrase, u need to find the probability of getting everything except what u want (in other words, the probability of getting any other color except blue), and then subtract that from 1. The formula for this would be  $1 - (\text{the probability of getting the other colors})$ .  $1 - (10/18 * 9/17) = 1 - 5/17 = 12/17$ .

**Answer 26(D).**

We don't need to go about solving this question as per the REAL MATH way. We use our technique. Whenever we see variables in the answer choice we just plug in!! Plug in  $x=3$ , and the fraction becomes  $-7$ (target answer). Bingo!

**Answer 27(D).**

This question requires deep thinking in the sense that you have to look for the examples to refute the statements. We will take one by one. If product of two prime numbers when divided by 10 gives us an integer we can remove all answers containing (i). So we take 5 and 2. When multiplied and then divided by 10 we get an integer 1. So (i) is true. Get rid of A. We move to (ii). Lets take 0. This when divided by 10 gives 0, which again is an integer. So (ii) is also true. So get rid of B and C. Now we just need to verify D as it is the obvious choice. Any odd integer when divided by 10 would always leave decimal and never an integer. So D cannot be true. Hence it is the answer.

**Answer 28(B).**

Here's another smart Question. It appears to be daunting but it's not that tough. We start with 1 at units place. When multiplied 3 times and then divided by 2 we get 1.5. So it is ruled out. Next we try with 2. When we multiply by 3 we get 6 which when divided by 2 gives us 3. Bingo!! We get the first number 32. Similarly by trying out different numbers at unit place we get other 2 numbers as 64 and 96 (which are also multiples of 32 for hint). So we get a total of 3 numbers between 10 and 99.

**Answer 29(A).**

Lets try this question by trial and error. Lets try to get all answers starting with smallest value 44. It can be sum of 22 and 22. So (E) is ruled out. Now move to 99. It could be sum of 54 and 45. So (D) goes. Next 121 could be written as 56 + 65. So even (C) goes. Now try out 165. It could be the sum of 87 and 78. So after POE rest four (A) becomes the answer, as it cannot be written as sum of desired combination.

**Answer 30(B).**

We need to see the fact statements. Statement (1) says that the length of AC is less than the length of BC. This clearly leads us to nowhere. So BCE. Now the fact statement (2) tells us that the length of AB is one-fourth the circumference of the circle, which clearly leads us to know that it is not the diameter, it is just a chord. So the angle subtended is not equal to 90 deg. So the answer is (B).

**Answer 31 (B).**

The entire discussion of rounds is a red herring. The question is asking for possible combinations of the final 3, and it is possible for any of the original 8 contestants to have advanced to the final round, thus we need to pick 3 out of 8, and order doesn't matter.  
 $8 \times 7 \times 6 / 3 \times 2 \times 1 = 56$ .

**Answer 32(1).**

Let the maximum in marks in each of the three subjects be 100.

Therefore, the candidate scored an aggregate of 60% of  $3 \times 100 = 60\%$  of 300 marks = 180 marks.

Let the marks scored in the three subjects be  $4x$ ,  $5x$  and  $6x$ .

Then,  $4x + 5x + 6x = 180$

?  $15x = 180$  or  $x = 12$ .

Therefore, marks scored by the candidate in the three subjects are  $4 \times 12$ ,  $5 \times 12$  and  $6 \times 12$   
 $= 48, 60$  and  $72$ .

Hence, the candidate has score more than 60% in one subject.

**Answer 33 (2).**

If only one of the boxes has a green ball, it can be any of the 6 boxes. So, this can be achieved in 6 ways.

If two of the boxes have green balls and then there are 5 consecutive sets of 2 boxes. 12, 23, 34, 45, 56.

Similarly, if 3 of the boxes have green balls, there will be 4 options.

If 4 boxes have green balls, there will be 3 options.

If 5 boxes have green balls, then there will be 2 options.

If all 6 boxes have green balls, then there will be just 1 option.

Total number of options =  $6 + 5 + 4 + 3 + 2 + 1 = 21$

**Answer 34 (2).**

Let the number of apples be 100.

On the first day he sells 60% apples i.e., 60 apples. Remaining apples = 40.

He throws 15% of the remaining i.e., 15% of 40 = 6. Now he has  $40 - 6 = 34$  apples

The next day he throws 50% of the remaining 34 apples i.e., 17.

Therefore in all he throws  $6 + 17 = 23$  apples.

**Answer 35(D)**

Plug in  $p=10$ . This can be written as the product of 2 and 5. Their sum is 7. Twice of it is 14. Increasing the original numbers by 2 we get the two numbers as 4 and 7. The product of this is  $7 \times 4 = 28$ . So the difference between the product and the sum is  $28 - 14 = 14$ . This is our target answer. Plug in  $p=10$  back in all the answer choices and look for the answer as 14. (D) is the answer.

**Answer 36(A)**

Variables in the answer choices, plug in!! lets plug in  $p=-2$  and  $q=2$ . Now verify all the choices given. We get II false. So all the answers which contain II should go. So (B), (C) and (E) go. Since two answer choices remain we plug in once more. Put  $p=-2$  and  $q=3$ . Now we can see that III is false. So the answer is (A).

**Answer 37(E)**

Factor out the numerator  $(4*3)(2*11)(5*7)$ . Now this fraction when divided by  $p$  would get an integer only if  $p$  cancels out with some of the factors. So now lets try it with different answer choices. Except for the (E) all other choices can be cancelled out. So clearly (E) is the answer.

