GMAT QUANTITATIVE DATA SUFFICIENCY

PRACTICE QUESTIONS & ANSWER KEY (SET 1)

Q1

A certain 4-liter solution of vinegar and water consists of x liters of vinegar and y liters of water. How many liters of vinegar does the solution contain?

(1) $\frac{x}{4} = \frac{3}{8}$
(2) $\frac{y}{4} = \frac{5}{8}$

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 1

Answer with Explanation

(1) This proportion can be solved for x to determine the liters of vinegar in the solution; SUFFICIENT.
(2) This proportion can be solved for y to determine the liters of water in the solution. Then, substituting this value of y in the equation $x + y = 4$, which can be formulated from the given information, will give the value of x; SUFFICIENT.

The correct answer is D; each statement alone is sufficient.

Q 2

If r and s are positive integers, is $\frac{r}{s}$ an integer?

(1) Every factor of s is also a factor of r.

(2) Every prime factor of s is also a prime factor of r.

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.

- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 2

Answer with Explanation

If r and s are positive integers, is $\frac{r}{s}$ an integer?

(1) Every factor of s is also a factor of r.

(2) Every prime factor of s is also a prime factor of r.

Arithmetic | Properties of numbers

(1) The integer s is by definition a factor of itself. From this, every factor of s is also a factor of r. Therefore, $\frac{r}{s}$ must be an integer; SUFFICIENT.

(2) From this, by example, if $r = 18$ and $s = 6$, then 6 has the prime factors 2 and 3, each of which is also a factor of 18, and $\frac{r}{s} = \frac{18}{6}$, which is an integer. However, if $r = 18$ and $s = 8$, then r has the prime factors 2 and 3, and s has a prime factor 2, which satisfies this condition. Even though in this case the prime factor of s is a prime factor of

Arithmetic | Properties of numbers

1. The integer s is by definition a factor of itself. From this, every factor of s is also a factor of r. Therefore, $\frac{r}{s}$ must be an integer; SUFFICIENT.

2. From this, by example, if $r = 18$ and $s = 6$, then 6 has the prime factors 2 and 3, each of which is also a factor of 18, and $\frac{r}{s} = \frac{18}{6}$, which is an integer. However, if $r = 18$ and $s = 8$, then r has the prime factors 2 and 3, and s has a prime factor 2, which satisfies this condition. Even though in this case the prime factor of s is a prime factor of r, $\frac{r}{s} = \frac{18}{8}$, which is not an integer; NOT sufficient.

The correct answer is A; statement 1 alone is sufficient.

Q 3

If both x and y are nonzero numbers, what is the value of $\frac{y}{x}$?

(1) $x = 6$

(2) $y^2 = x^2$

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 3

(Answer with Explanation

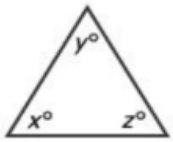
1. This states only the value of x, with the value of y not determined and no means for it to be determined; NOT sufficient.

2. Although the squares of x and y are equal, their square roots are not necessarily equal. For example, y could be a negative number and x could be a positive number, and when squared, their squares would still be equal. Therefore, the value of $\frac{y}{x}$ could be either -1 or 1; NOT sufficient.

The two statements together are not sufficient since y could be either 6 or -6, which implies that $\frac{y}{x}$ could be either 1 or -1.

The correct answer is E; both statements together are still not sufficient.

Q 4



Is the triangle above equilateral?

(1) $x = y$.

(2) $z = 60$.

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.

- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer with Explanation

The sum of the angles of any triangle is $180°$. For a triangle to be equilateral, it must be true that all the angles of the triangle are equal. In this case, $x = y = z = 60°$ must be true.

(1) Although x and y are equal, they are not necessarily equal to $60°$. They could, for example, be $40°$ and $40°$; NOT sufficient.

(2) If $z = 60°$, $x + y$ must be $120°$. However, x and y are not necessarily $60°$ and $60°$. They could be unequal, for example, $80°$ and $40°$; NOT sufficient.

Taking (1) and (2) together, $z = 60°$ means that $x + y = 120°$, and $x = y$ is then sufficient to show that $x = y = z = 60°$.

The correct answer is C; both statements together are sufficient.

Q 5

Is $x < 0$?

(1) $-2x > 0$
(2) $x^3 < 0$

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 5

Answer with Explanation

Is $x < 0$?

(1) $-2x > 0$

(2) $x^3 < 0$

Algebra | Inequalities

(1) A negative number times a positive number is negative, whereas a negative number times a negative number is positive. Thus, since -2 times x is positive, x must be a negative number; SUFFICIENT.

(2) The cube of a positive number is positive, and the cube of a negative number is negative; SUFFICIENT.

The correct answer is D; each statement alone is sufficient.

Q 6

Does the integer k have a factor ρ such that $1 < \rho < k$?

(1) $k > 4!$

(2) $13! + 2 \leq k \leq 13! + 13$

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 6

Answer with Explanation

Note that, if n is any integer greater than 1, then $n!$ (that is, "n factorial") is defined as the product of all the integers from 1 to n, that is, (1)(2)(3)(4)...(n). Also note that k will have a factor ρ between 1 and k if and only if k is NOT a prime number.

(1) Since $k > 4!$, then $k > 24$, because $4! = (1)(2)(3)(4) = 24$. However, k may or may not be a prime number. For example, if $k = 27$, then the factor ρ could be 3 or 9, but if $k = 29$, which is a prime number, then k would not have any factors between 1 and 29; NOT sufficient.

(2) From this it can be concluded that k could be any of twelve integers: $13! + 2$, $13! + 3$, $13! + 4$, ... $13! + 13$, where $13!$ is the product of the integers from 1 to 13. Note that 2 is a factor of $13! + 2$, since it is a factor of both $13!$ and 2. Similarly, 3 is a factor of $13! + 3$; 4 is a factor of $13! + 4$; and so on for all the values of k. Thus, for each number k from $13! + 2$ to $13! + 13$, there is a factor ρ such that $1 < \rho < k$; SUFFICIENT.

The correct answer is B; statement 2 alone is sufficient.

Q 7

A certain group of car dealerships agreed to donate x dollars to a Red Cross chapter for each car sold during a 30-day period. What was the total amount that was expected to be donated?

(1) A total of 500 cars were expected to be sold.

(2) 60 more cars were sold than expected, so that the total amount actually donated was $28,000.

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 7

Answer with Explanation

(1) It is known that 500 cars were expected to be sold, so $500x$ represents the total amount of the expected donation. However, x is unknown so $500x$ cannot be determined; NOT sufficient.

(2) Since $60x$ represents the extra amount donated beyond the expectation, the total amount that it was expected would be donated would be $28{,}000 minus$ 60x . $Again,$ x $ is unknown, so the total amount expected to be donated cannot be found; NOT sufficient.

If the information in (1) and (2) is used together, then 500x = \28,000 - 60x, from which the value of x can be determined. Thus, the total amount expected to be donated can also be determined (500x).

The correct answer is C; both statements together are sufficient.

Q 8

A bookstore that sells used books sells each of its paperback books for a certain price and each of its hardcover books for a certain price. If Joe, Maria, and Paul bought books in this store, how much did Maria pay for 1 paperback book and 1 hardcover book?

(1) Joe bought 2 paperback books and 3 hardcover books for $12.50. (2) Paul bought 4 paperback books and 6 hardcover books for $25.00.

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.

- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 8

Answer with Explanation

Let p be the price for each paperback book, and let h be the price for each hardcover book.

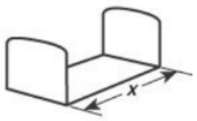
(1) From this, Joe's purchase can be expressed as 2p + 3h = \12.50 $. Without more information, this equation alone cannot determine the cost of 1 paperback and 1 hardcover book; NOT sufficient.

(2) This statement is equivalent to 4p + 6h = \25.00 $. If both sides of this equation are divided by 2, it gives exactly the same equation as in (1); NOT sufficient.

Since (1) and (2) are the same equation that cannot be solved, taken together they cannot determine the cost of 1 of each type of book.

The correct answer is E; both statements together are still not sufficient.

Q 9



Will the first 10 volumes of a 20-volume encyclopedia fit upright in the bookrack shown above?

(1) $x = 50$ centimeters
(2) Twelve of the volumes have an average (arithmetic mean) thickness of 5 centimeters.

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 9

Answer with Explanation

(1) This establishes the length of the bookrack but does not give any information about the thickness of the volumes; NOT sufficient.
(2) This establishes the average thickness of 12 of the volumes, but does not give any information about the average thickness of the first 10 volumes; NOT sufficient.

By the same reasoning used in (2), (1) and (2) taken together are not sufficient to answer the question.

The correct answer is E; both statements together are still not sufficient.

Q 10

If n is a member of the set {33, 36, 38, 39, 41, 42}, what is the value of n?

(1) n is even.
(2) n is a multiple of 3.

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 10

Answer with Explanation

(1) This implies that n is 36, or 38, or 42. However, there is no further way to choose among these numbers as the single value of n; NOT sufficient.
(2) This implies that n could be 33, 36, 39, or 42. Again there is no further way to distinguish the value of n; NOT sufficient.

From (1) and (2) together, it can be determined that n could be either 36 or 42.

The correct answer is E; both statements together are still not sufficient.

Q 11

A sum of $200,000 from a certain estate was divided among a spouse and three children. How much of the estate did the youngest child receive?

(1) The spouse received $\frac{1}{2}$ of the sum from the estate, and the oldest child received $\frac{1}{4}$ of the remainder.

(2) Each of the two younger children received $12{,}500 more than the oldest child and 62{,}500$ less than the spouse.

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 11

Answer with Explanation

(1) The combined amount that the two youngest children together received can be determined, but not the specific amount that either one of them received; NOT sufficient.
(2) An equation can be set up expressing the relationships given in terms of x, with x being the amount that each of the two younger children received: $200{,}000 = x + x + (x - 12{,}500) + (x + 62{,}500)$. The amount that the youngest child received (x) can thus be determined; SUFFICIENT.

The correct answer is B; statement 2 alone is sufficient.

Q 12

3. $\square \triangle 6$

If $\square$ and $\triangle$ each represent single digits in the decimal above, what digit does $\square$ represent?

(1) When the decimal is rounded to the nearest tenth, 3.2 is the result.
(2) When the decimal is rounded to the nearest hundredth, 3.24 is the result.

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 12

Answer with Explanation

(1) Since the tenths digit is 2 in both 3.2 □ △ 6 and 3.2, the decimal must have been rounded down. Therefore, □ can represent 0, 1, 2, 3, or 4; NOT sufficient.

(2) If the value of △ is 5, 6, 7, 8, or 9, □ can represent 3, and the decimal must have been rounded up. If the value of △ is 0, 1, 2, 3, or 4, □ can represent 4, and the decimal must have been rounded down; NOT sufficient.

A variety of numbers, for example 3.2376 and 3.2416, could still satisfy both (1) and (2).

The correct answer is E; both statements together are still not sufficient.

Q 13

Does $2m - 3n = 0$?

(1) $m \neq 0$
(2) $6m = 9n$

- Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
- Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
- BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
- EACH statement ALONE is sufficient.
- Statements (1) and (2) TOGETHER are NOT sufficient.

Answer 13

Answer with Explanation

The question "Does $2m - 3n = 0$?" is equivalent to the simpler question, "Does $2m = 3n$?"

(1) This leaves an infinite range of possible values for m, and, since the value(s) for n are not addressed, there is no way to determine the relationship between m and n; NOT sufficient.

(2) Since $6m = 9n$ is equivalent to $3(2m) = 3(3n)$, it can therefore be determined that $2m = 3n$; SUFFICIENT.

The correct answer is B; statement 2 alone is sufficient.