Corvinus University - Quantitative Reasoning Practice Test
Worked solutions

Question 1

10 pensioners gather around a big bowl of cookies to chat. How many of them took only 1 cookie?

Statement (1): Half of them took at least 1 cookie.
Statement (2): Half of them did not take any cookies, while 1/5 of the rest took 2 cookies or more.

- ☐ 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.

Solution

Statement(1) – insufficient. We can't answer the question with the information provided.
Statement (2) – sufficient. We learned that 5 of the pensioners took 0 cookies, 5 took 1 or more cookies and 1/5 (1 pensioner) took 2 cookies or more. Therefore, we can affirm that 4 pensioners took only 1 cookie.
The correct answer is B.

Question 2

Are a and b consecutive integers?

Statement (1): $a + b = 13$.
Statement (2): $a - b = 1$.

- ☐ 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.

Solution

Statement (1) – insufficient. With this information alone, we cannot know the value of a and b.
Statement (2) – insufficient. With this information alone, it is not possible to guarantee that a and b are integers. For example: if a = 1.5 and b = 0.5, then a - b = 1, but a and b are not consecutive integers

However, if we combine the two statements, it is possible to arrive at the value of a and b. Adding the two equations, we have (a + b) + (a - b) = 13 + 1 => 2a = 14 => a = 7 => b = 6. Therefore, a and b are consecutive integers.
The correct answer is C.

Question 3

If a and b are integers and 4a + 3b is odd, which of the following must be odd?

☐ b
☐ a
☐ ab
☐ a + b
☐ ab + a

Solution

Let's examine the terms of the formula. A number multiplied by an even number (4a) will always give an even number. In case of 3b, if b was an even number, 3b would also be an even number. Therefore, since 4a + 3b is odd, b must be odd.
From the information given, a can either be even or odd, so all solutions having a as a term will not necessarily give an odd result.
The correct answer is A.

Question 4

Is x > y?

Statement (1): x and y are both positive integers.
Statement (2): x/y > 1.

☐ 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.

Solution

Statement (1) – insufficient. It is not possible to answer the question with this information alone.
Statement (2) – insufficient. Let's try to plug in some examples. If x and y are positive, and x/y is greater than 1, then the number in the numerator must be greater than the one in the denominator. But if both numbers are negative, and the absolute value of the numerator is greater than that of the denominator (eg. -4/-2 = 2), we also get a good solution for statement (2), but in this case x is not greater than y. Therefore, this statement is insufficient alone to answer the question.
Statements (1) and (2) combined: if we restrict the solutions on the basis of statement (1) to positive integers, then we have only one good solution.
The correct answer is C.

Question 5

Middleton is between Startington and Finishton. What is the distance between Middleton and Finishton?

Statement (1): Riding a bike from Startington to Middleton at an average rate of 35 km/h takes 30 minutes longer than at an average rate of 55 km/h.
Statement (2): Walking at a constant speed from Middleton to Finishton takes twice as much time as walking from Startington to Middleton.

☐ 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.

Solution

Statement (1) − insufficient. With the information provided, we can determine the distance X from Startington to Middleton: X/35 = X/55 + 0.5 => X = 48.125 km. However, we have no information on the distance between Middleton and Finishton, so this statement alone doesn't answer the question.

Statement (2) − insufficient. We get to know that the distance between Middleton to Finishton is twice the distance between Startington to Middleton. Riding, walking or flying at a constant speed between them gives the same result. We still need more information to answer the question.

Statement (1) and (2) combined − sufficient. The distance between Middleton and Finishton is 2x = 96.25 km.

The correct answer is C.

Question 6

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

Statement (1): The average of 3, x, y is 5.
Statement (2): The average of $(x + \pi)$ and $(y - \pi)$ equals the average of x and y.

- ☐ 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.

Solution

Statement (1) − sufficient. (x + y + 3)/3 = 5 => x + y = 12. Average between x and y = 6.
Statement (2) − insufficient. $x + y + \pi - \pi = x + y = (x + y)/2 = (x + y)/2$.
The correct answer is A.

Question 7

What is the sum of all the possible values of positive integer y such that the remainder of $\frac{21}{y}$ is 1?

- [ ] 9
- [ ] 11
- [ ] 25
- [ ] 31
- [ ] 41

Solution

We must find the integers that give a remainder of 1 when 21 is divided by them. These integers are the factors of 20, with the exception of 1: 20, 10, 5, 4 and 2, the sum of which is 41.
The correct answer is E.

Question 8

The supply department of a factory distributed disposable safety gloves and work t-shirts among its workers. Each worker got the same number of pairs of gloves and the same number of t-shirts. How many workers are there in the factory?

Statement (1): There were 2,500 pairs of gloves and 1,000 t-shirts distributed.
Statement (2): The total number of items received by each worker was less than 30.

- [ ] 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.

Solution

In order to distribute the items evenly, we have to find the greatest common divisor of the number of gloves and the number of t-shirts.
This does not require much math, it is obviously 500. So if there are 500 workers, they get 5 pairs of gloves and 2 t-shirts each. But lower common divisors (100, 50, 20, etc.) also give a good solution on the basis of statement (1), and having more than one solution is insufficient to answer the question (eg. in case of 100 workers, they get 25 gloves and 10 t-shirts each).
But statement (2), which is insufficient alone, reduces the possible number of solutions to only one. We saw that in the case of the second highest possible number of workers (100), they get 35 items each, and they can only get less than 30 items (namely 7) each if there are 500 workers. So statements (1) and (2) together give a sufficient solution.

The correct answer is C.

Question 9

$25^{3/2} + 64^{2/3} = ?$

- ☐ 12
- ☐ 15
- ☐ 64
- ☐ 125
- ☐ 141

<u>Solution</u>

$25^{3/2} = (\sqrt{25})^3 = 5^3 = 125$
$64^{2/3} = (\sqrt[3]{64})^2 = 4^2 = 16$
$125 + 16 = 141$
The correct answer is E.

Question 10

Convert 75 Fahrenheit (F°) degrees to Celsius (C°) degrees using the following formula:
$C = \frac{5(F-32)}{9}$. Round to the nearest tenth.

- ☐ 24.3°
- ☐ 24°
- ☐ 23.8°
- ☐ 23.5°
- ☐ 21.1°

<u>Solution</u>

$C = \frac{5(75-32)}{9} = \frac{5(43)}{9} = 23.8$
The correct solution is C.

Question 11

Find the solution set for the following equation: $7x + |x| = 48$.

- [ ] $x = 6$ or $x = 8$
- [ ] $x = 6$
- [ ] $x = 48$
- [ ] $x = -6$ or $x = 8$
- [ ] $x = -8$

Solution

If $x \geq 0$, in which case $|x| = x$, we have: $7x + x = 48 \Rightarrow x=6$.
If $x < 0$, in which case $|x| = -x$, we have: $7x + (-x) = 48 \Rightarrow x = 8$. This is impossible, as x should be lower than 0.
Therefore, the only solution is $x = 6$.
The correct answer is B.

Question 12

For what value of C does this equation have exactly one solution?

$2x^2 - x + C = 0$

- [ ] 1/16
- [ ] 1/8
- [ ] 1/4
- [ ] 1/2
- [ ] 1

Solution

A quadratic equation has one solution when the discriminant is zero. From an algebra standpoint, this means that $b^2 - 4ac = 0$.
Let's plug in $a = 2$ and $b = -1$, as provided in the question, and solve for C.
$(-1)^2 - 4 \times 2 \times C = 0$
$C = 1/8$
The correct answer is B.

Question 13

Otto has been assigned to define a value for x and a value for y in the expression $x \times 10^y$ in order to produce a number in scientific notation. Did Otto succeed?

Statement (1): He defined -4,5 as the value for x.
Statement (2): He defined -7 as the value for y.

☐ 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.

Solution

A number in scientific notation takes the form $x \times 10^y$, where $1 \le |x| \le 10$ and y is an integer. Statement (1) alone proves that Otto defined a correct number for x, since $1 \le |-4.5|$ (absolute value of x) = $4.5 \le 10$.
Statement (2) alone proves that he defined a correct number for y, since -7 is an integer. But each statement alone is insufficient, since each of them doesn't make it clear whether the other number is valid. The two statements together, however, prove that Otto used correct numbers in both places, thereby writing a number in scientific notation.
The correct answer is C.

Question 14

$$\frac{1}{4+\frac{2}{5}} = ?$$

☐ 5/22
☐ 3/8
☐ 1
☐ 8/5
☐ 22/5

Solution

First let's find a common denominator for the expression in the denominator.

4 + (2/5)= (20/5) + (2/5) = 22/5.
To simplify the original expression, we have to multiply the numerator and the reciprocal of the denominator, which is 1 x (5/22).
The correct answer is A.

Question 15

25% of my friends like TV series, and 10% of them are vegan. How many friends do I have?

Statement (1): I have 60 friends who neither like TV series, nor are vegans.
Statement (2): 5% of my friends are vegans who like TV series.

- ☐ 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.

Solution

Let's use F for friends, T for TV series, V for vegan, B for both, N for neither.
F = T + V − B + N. From the question, we know that T = 0.25F and V = 0.1F.
F = 0.25F + 0.1F − B − N
Statement (1) is insufficient alone, since the information provided does not allow us to fully answer the question: N = 60.
Statement (2) −is also insufficient alone, since the information provided does not allow us to fully answer the question: B = 0.05F.
However, with both statements we can solve for F.
F = 0.25F + 0.1F − 0.05F − 60 => 0.3F = 60 => F = 200
The correct answer is C.

Question 16

Susan bought a new car for $35,000 and 3 years later she sold it for $21,000. What was the percentage decrease in the price of the car?

- ☐ 66.7%
- ☐ 40%

- ☐ 33.33%
- ☐ 27.5%
- ☐ 20%

Solution

To get the answer, just divide the difference between the original (purchase) price and the sale price by the original price.
So we have (35,000 - 21,000) / 35,000 = 0.40 = 40%.
The correct answer is B.

Question 17

What is 24% of x?

Statement (1): 7/8 of x is 105.
Statement (2): 6% of x is 7.2.

- ☐ 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.

Solution

Statement (1) is sufficient: $\frac{7}{8}x = 105 \Rightarrow x = \frac{105 \times 8}{7} = 120$.

Statement (2) is sufficient: $x = \frac{7.2}{0.06} = 120$.

The correct answer is D.

Question 18

In a parallelogram, one of the angles is 50 degrees greater than the other. What is the measure of the smaller angle?

- ☐ 65º
- ☐ 70º

- [ ] 75º
- [ ] 80º
- [ ] 85º

Solution

The sum of the two different angles of a parallelogram is 180. Therefore, x + (x + 50) = 180 = > x = 65.
The correct answer is A.

Question 19

The minute hand of the Big Ben clock is 4.3 meters long. Now it's 6:30 PM.
How far has the tip of the minute hand moved since noon?

- [ ] 172 m
- [ ] 175.6 m
- [ ] 177.7 m
- [ ] 202.1 m
- [ ] 207 m

Solution

Six and a half hours have passed since noon, which means that the minute hand made 6.5 revolutions.
The distance taken by the tip of the minute hand equals the perimeter of the circle with the same radius as the length of the minute hand, 4.3 meters.
The formula for the perimeter of a circle is 2πr, and π is approximately 3.14. Therefore, we have:
Distance of one revolution = perimeter of the circle = $2 \times 4.3 \times \pi = 2 \times 4.3 \times 3.14 = 27.01$ meters.
Total distance since noon = $6.5 \times 27.01 = 175.6$ meters.
The correct answer is B.

Question 20

What is the area of the triangle below?

Statement (1): The base length is 4.
Statement (2): The hypotenuse length is 5.

☐ 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.

Solution

To find a triangle's area, we use the formula area = 1/2 × base × height.
The Pythagorean theorem says that the sum of the squares on the legs of a right triangle is equal to the square on the hypotenuse (the side opposite the right angle) — or, in familiar algebraic notation, $a^2 + b^2 = c^2$.
$4^2 + b^2 = 5^2$ => $16 + b^2 = 25$ => $b^2 = p$ => $b = 3$
Now we can calculate the area of the triangle, which is A = ab/2 = A = (4×3)/2 => A=6.
The statements alone are not sufficient to answer the question, but together they are.
The correct answer is C.

Question 21

If a and b are integers, is $a^4 \leq 16b^2$?

Statement (1): 0 < a < 2.
Statement (2): 1 < b < 16.

☐ 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.

Solution

Statement (1) – insufficient. From statement 1, we know that a = 1 (the only integer between 0 and 2). But it is not possible to know the value of b, nor to answer the question. For 14 Statement (2) – insufficient. It tells us that b can be 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, or 15. But it doesn't tell us anything about the value of a, so it is not enough to answer the question. If we combine statements (1) and (2), however, we can affirm that $a^4 \leq 16b^2$, since a^4 will be lower than any possible value of b.
The correct answer is C.

Question 22

What is the average weight of my 15 friends if 5 of them weigh 120 kg each, 6 of them weigh 105 kg each, and 4 of them weigh 95 kg each?

☐ 102.6 kg
☐ 105 kg
☐ 107.3 kg
☐ 108 kg
☐ 112.4 kg

Solution

$$\frac{(5\times120)+(6\times105)+(4\times95)}{15} = \frac{600+630+380}{15} = \frac{1610}{15} = 107.3$$

The correct answer is C.

Question 23

A line has a point (4, 2) and slope 2. What is the equation of the line?

☐ y = 2x + 4
☐ y = x - 6
☐ y = 2x - 6
☐ y = 2x + 6
☐ y = 2x - 4

Solution

The point slope formula is used to represent a straight line using its slope and a point on the line. That means the equation of a line whose slope is 'm' and which passes through a point (x1,y1) is found using the point slope formula.
The equation of the point slope formula is: y - y1 = m(x - x1), where (x, y) is a random point on the line and m is the slope of the line.

Applying the point-slope formula:
y - 2 = 2(x - 4)
y - 2 = 2x - 8
y = 2x - 6
The correct answer is C.

Question 24

How many integers can complete the inequality 27 < 3x - 15 < 39?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5

Solution

27 < 3x - 15 < 39
42 < 3x < 54
14 < x < 18
There are 3 possible integers between 14 and 18: 15, 16 and 17.
The correct answer is C.

Question 25

How many integers exist in the first 500 natural numbers such that they leave a remainder of 3 when divided by 5 AND a remainder of 4 when divided by 7?

☐ 11
☐ 12
☐ 13
☑ 14
☐ 15

Solution

The natural numbers that leave a remainder of 3 when divided by 5 form the following arithmetic progression (P1): 3, 8, 13, 18, 23, 28 ...
The natural numbers that leave a remainder of 4 when divided by 7 form the following arithmetic progression (P2): 4, 11, 18, 25, 32 …
The first number that is part of both progressions is 18.
We also have to observe that the common difference of P1 is 5 and that of P2 is 7. Their least common divisor is 35, which means that every 35th term after 18 will be present in both progressions. Therefore, the terms that are common to both progressions can be expressed as 35k + 18.
Within the set of the first 500 natural numbers, k can be 0 to 13.
With the inclusion of 18, there will be 14 such integers.
The correct answer is D.

Question 26

In a factory, we know that 8 out of 100 products are faulty. What is the probability that we randomly pick 5 non-faulty products if we replace the chosen product after each pick?

☐ 0.61
☐ 0.653
☑ 0.659
☐ 2/3
☐ 0.7

Solution

We have to find the ratio of the favorable outcomes and the total number of outcomes.

Favorable: 92C5 = $\frac{92\times91\times90\times89\times88}{5\times4\times3\times2\times1}$ = 49,177,128

Total: 100C5 = $\frac{100\times99\times98\times97\times96}{5\times4\times3\times2\times1}$ = 75,287,520

Probability: $\frac{49,177,128}{75,287,520}$ = 0.653

So the correct answer is C.