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1. C

Explanation: Statement (1) is insufficient. The remainder of $\frac{m}{n}$ is equal to the quotient (an integer) plus the remainder divided by n. We know that 12 is the integer part, so:

$\frac{m}{n} = 12 + \frac{r}{n}$

We know that $\frac{r}{n} = \frac{64}{100} = \frac{32}{50} = \frac{16}{25}$

That doesn't tell us the value of r, though, it just gives us a ratio.

Statement (2) is also insufficient: there are 49 possible remainders that are less than 50.

Taken together, the statements are sufficient. A remainder must be a positive integer, and since n is an integer and the ratio of $\frac{r}{n} = \frac{16}{25}$ tells us that n must be a multiple of 25. There is only one multiple of 25 less than 50, so $n = 25$, which means that $r = 16$. Choice (C) is correct.

2. C

Explanation: Each of the statements are insufficient on their own; we're looking for something concerning an expression with two variables, and each statement concerns only one of the variables.

Taken together, the statements are sufficient. If x^2 is divisible by 6, it is also divisible by all the factors of 6, including 3. The same reasoning applies to y^2. Since both x^2 and y^2 are divisible by 3, the difference between them is also divisible by 3, so the remainder is 0. Choice (C) is correct.

3. B

Explanation: Statement (1) is insufficient. We can represent the statement algebraically as follows:

$z = 7i + odd$, where i is an integer. If i is even, $7i$ is even, and z is odd. If i is odd, $7i$ is odd and z is even.

Statement (2) is sufficient. Here's what it looks like algebraically:

$z = 8i + odd$

$8i$ will always be even, so z is always odd. Choice (B) is correct.

4. D

Explanation: The key concept here is that, if x, y, and z are consecutive integers, both the sum of the integers and the product of the integers will be divisible by 3. To see why, represent the integers in terms of one variable:

$a, a+1, a+2$

The sum of these is:

$a + (a+1) + (a+2) = 3a + 3 = 3(a+1)$

Since a is an integer, $a+1$ is an integer, so the sum is 3 times an integer, or a multiple of 3.

An easier way to see that the product is a multiple of 3 is to recognize that every third number is a multiple of 3. So whichever three consecutive numbers you choose, one of them will be a multiple of 3. Multiply that number by two other integers, and you still have a multiple of 3.

So, each statement can be evaluated in a similar manner. If $x+y+z$ has a remainder of 2 when divided by 3, it is not a multiple of 3, so the three integers are not consecutive. If xyz has a remainder of 1, it is also not divisible by 3, which means the numbers aren't consecutive. Choice (D) is correct.

5. E

Explanation: Given the information in the question, the value of a could be 8, 13, 18, etc.–3 greater than any multiple of 5.

Statement (1) is insufficient. a could be 7, 13, 19, 25, etc. There's one overlap so far between that list and the initial lists of possible a's–it could be 13. However, it could be 43 as well. To find that number quickly, realize that the patterns of multiples of 5 and 6 "restart" every 30 integers (30, because that's the least common multiple of 5 and 6). So a could be 13 greater than any multiple of 30.

Statement (2) is also insufficient. The logic in (1) suggests that, whatever the possible values of a, there will be more than 1. In this case, a again could be 13, and since the LCM of 5 and 4 is 20, the process will restart every 20 integers. So a could be 13 greater than any multiple of 20, meaning that a might be 13, 33, 53, etc.

Taken together, the statements are still insufficient. We've seen that a could be 13, and it could also be 13 greater than the LCM of the three numbers, which is 60, or any multiple thereof. So while a must be of the form $60i+13$, that doesn't give us a single value. Choice (E) is correct.