

Solutions for Rumack's Preparation Workbook: 4.1

1. Underline the action word that identifies the operation, and rewrite the phrase as a mathematical expression. The action word is "more than". The answer is (B) $N + 1$.

2. Underline the key action words "less than" and "times". Check to see if there is a specific order indicated. Compare the operations identified, and list the order in which the calculations should be completed. Since multiplication comes before addition, "two times a number" is applied first, and then one is subtracted from the product. The answer is (B) $2N - 1$.

3. Underline the key action words "times" and "increased by". Multiplication comes before addition, so the answer is (A) $3N + 2$.

4. Underline the key action words "triple" and "difference". Determine the order in which the calculations should be completed. Find the difference first, and then triple it. The difference between a number and 7 is $N - 7$. Triple the difference is triple $N - 7$ or $3(N - 7) = 3 \times N + 3 \times (-7) = 3N + (-21) = 3N - 21$. The answer is (C).

5. Underline the key action words "sum", "double" and "three less than". Determine the order in which the calculations should be completed. First, "double a number" is $2 \times N = 2N$. Next, "three less than a number" is $N - 3$. Lastly, find the sum of $2N$ and $N - 3$. $2N + (N - 3) = 2N + N - 3 = 3N - 3$. The answer is (A).

6. Underline the key action words "product", "double" and "one more than". Determine the order in which the calculations should be completed. First, "double a number" is $2 \times N = 2N$. Next, "one more than the number" is $N + 1$. Last, find the product of $2N$ and $N + 1$. $2N \times (N + 1) = 2N \times N + 2N \times 1 = 2 \times N \times N + 2 \times N \times 1 = 2N^2 + 2N$.

7. Underline the key action words "added", "sum" and "doubled". Determine the order in which the calculations should be completed. First, "three is added to a number" translates to $N + 3$. Next, "and then the sum is doubled" indicates that the second step is to multiply $N + 3$ by 2. The expression for this step is $2 \times (N + 3) = 2(N + 3)$. Finally, "five is then taken away" from $2(N + 3)$. $2(N + 3) - 5 = 2 \times N + 2 \times 3 - 5 = 2N + 6 - 5 = 2N + 1$. The answer is (D).

8. Underline the key action words "sum", "double" and "square". Determine the order in which the calculations should be completed. First, "double a number" is $2 \times N = 2N$. Next, "the square of the number" is $N \times N = N^2$. The sum of $2N$ and N^2 is $2N + N^2$. The answer is (C).

9. Underline the key action words "square" and "triple". Determine the order in which the calculations should be completed. First, triple a number is $3 \times N = 3N$. Next, "the square of" $3N$ is $3N \times 3N = 3 \times N \times 3 \times N = 3 \times 3 \times N \times N = 9N^2$. The answer is (A).

10. Underline the key action words "difference between", "cube" and "cubed". Determine the order in which the calculations should be completed. First, the "double a number" is $2 \times N = 2N$. Next, the cube of $2N$ is $(2N)^3 = 2N \times 2N \times 2N = 2 \times N \times 2 \times N \times 2 \times N = 2 \times 2 \times 2 \times N \times N \times N = 8N^3$. The number cubed is N^3 , so the difference between $8N^3$ and N^3 is $8N^3 - N^3$. The answer is (A).

11. Underline the key action words “plus” and “minus”. Determine the order in which the calculations should be completed. In this case, add 12 to 5 and then subtract 8, since addition and subtraction are done in the order that they occur. $12 + 5 - 8 = 9$. The answer is (E) None of the above.
12. Underline the key action words “divided by” and “plus”. Determine the order in which the calculations should be completed. Division occurs before addition, so first, divide 20 by 4. $20 \div 4 = 5$. Next, add 9 to 5. $5 + 9 = 14$. The answer is (D).
13. Underline the key action words “half” and “sum”. Determine the order in which the calculations should be completed. First, find the sum of two, four and eight. $2 + 4 + 8 = 14$. Next, multiply 14 by half. $14 \times \frac{1}{2} = \frac{14}{1} \times \frac{1}{2} = \frac{14}{2} = 7$. The answer is (D).
14. Underline the key action words “add” and “square”. Determine the order in which the calculations should be completed. First, add five and seven. $5 + 7 = 12$. Next, square 12. $12^2 = 12 \times 12 = 144$. The answer is (B).
15. Underline the key action words “double”, “plus” and “tripled”. Determine the order in which the calculations should be completed. First, “double eighteen” translates to multiplying 18 by 2: $2 \times 18 = 36$. Next, “three tripled” means multiply 3 by 3: $3 \times 3 = 9$. Last, add 36 and 9. $36 + 9 = 45$. The answer is (C).
16. Underline the key action words “add”, “times” and “plus”. Determine the order in which the calculations should be completed. First, find the product of 2 and 3. $2 \times 3 = 6$. Then add 4 to $6.4 + 6 = 10$. Finally, add 1 to 10 to get 11. The answer is (D).
17. Underline the key action words “plus”, “minus” and “plus”. The calculations can be completed in the order that they occur from left to right, since the operations are either addition or subtraction. $5 + 7 - 4 + 8 = 12 - 4 + 8 = 8 + 8 = 16$.
18. Underline the key action words “half of” and “plus”. Multiply first, then add. “Half of forty-four” means $\frac{1}{2} \times 44 = \frac{1}{2} \times \frac{44}{1} = \frac{44}{2} = 22$. Next, add twelve quarters to 22. $\frac{12}{4} + 22 = 3 + 22 = 25$. The answer is (C).
19. Underline the key action words, “minus” and “times”. Multiply first, then subtract. $5 \times 3 = 15$. Subtract 15 from 79. $79 - 15 = 64$. The answer is (C).
20. Underline the key action words “minus”, “plus” and “times”. Use order of operations to determine which calculations to do first. Multiply first, and then add and subtract in the order that they occur. $30 \times 2 = 60$. Subtract next since it comes before addition. $80 - 40 = 40$. Last, add 40 to 60. $40 + 60 = 100$. The answer is (B).
21. Underline the key action words “of” and “plus”. Multiply first, then add. “One fourth of two hundred twenty” translates to $\frac{1}{4} \times 220 = 55$. Next, find the sum of 44 and 55. $44 + 55 = 99$.
22. Underline the key action words “triple”, “sum”, “squared” and “squared”. First, calculate two squared. $2^2 = 2 \times 2 = 4$. Next, four squared is $4^2 = 4 \times 4 = 16$. The sum of 4 and 16 is 20. Triple the sum is $3 \times 20 = 60$. The answer is (C).

23. Underline the key action word “subtract”. $\frac{24}{3} - 5 = 8 - 5 = 3$. The answer is (D).

24. Underline the key action words “multiply”, “sum” and “difference”. Find the sum first, then the difference, and finally, find the product of the sum and difference. $14 + 17 = 31$. $18 - 7 = 11$. $31 \times 11 = 341$. The answer is (A).

25. Underline the key action words “square”, “plus”, “half” and “square”. First, find half of four. $\frac{1}{2} \times 4 = \frac{1}{2} \times \frac{4}{1} = \frac{4}{2} = 2$. Next, add 3 to 2. $3 + 2 = 5$. Square 5 to get 25. Lastly, square 25. $25 \times 25 = 625$. The answer is (A).