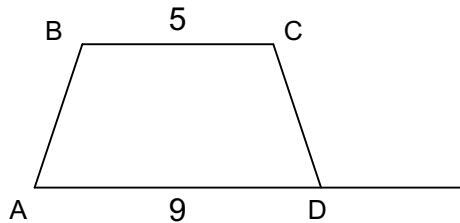


Ofek Quantitative Test 1

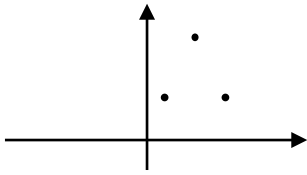
For more **FREE** prep materials visit ofekgmat.com



1. Point D is between points A and E (not shown). The area of triangle ABE is equal to the area of trapezoid ABCD. What is the length of line segment AE?
 - a. 5
 - b. 8
 - c. 9
 - d. 14
 - e. 22

2. If n is the product of all integers from 1 to 10 inclusive, which of the following must be a factor of n ?
 - i. 15
 - ii. 77
 - iii. 210
 - a. Only i
 - b. i and ii
 - c. i and iii
 - d. ii and iii
 - e. All three

3. S_n is the sum of all the numbers in a certain sequence between a_1 and a_n inclusive. If $S_n = n(n+1)$ for all n , what is the value of the third term in the sequence?
- a. 1
 - b. 4
 - c. 6
 - d. 8
 - e. n
4. In a group there are 22 Men with an average of \$38 and 26 women. If the average of the entire group is \$35, which of the following is closest to the average of these 26 women?
- a. 31.5
 - b. 32
 - c. 32.5
 - d. 33
 - e. 34
5. If $k \neq 0$, is $\frac{st}{k} < 0$?
- i. $k^2 < st$
 - ii. $k > s+t$



6. How many different parallelograms can be created by adding a fourth point to the three points above?
- a. 1
 - b. 2
 - c. 3
 - d. 4
 - e. An infinite number
7. How many different 4-digit codes can be created if all digits are different and 0 cannot appear in the leftmost digit?
- a. 3,024
 - b. 4,216
 - c. 4,536
 - d. 9,000
 - e. 10,000
8. There are n people, each gets at least one pencil, did 2 people get the same number of pencils?
- i. each person got less than n pencils
 - ii. there are $n(n-1)$ pencils total

9. $\left(\frac{1}{\sqrt{3}-\sqrt{2}}\right)^2 = ?$

- a. $\sqrt{3} - \sqrt{2}$
- b. 1
- c. $5 - 2\sqrt{6}$
- d. $\sqrt{3} + \sqrt{2}$
- e. $\sqrt{5} + 2\sqrt{6}$

10. How many 0's are there between the decimal point and the first nonzero digit of $(0.003)^3$?

- a. 3
- b. 4
- c. 6
- d. 7
- e. 9

11. Is $kw > 0$?

- i. $k - w = 10$
- ii. $k^2 = w^2$

12. The distance between points P and Q is 250km. 2 trains, A and B, are riding from P to Q and from Q to P, respectively, exiting at the same time. Was their meeting point closer to point P than to point Q?

- i. until they met train A averaged a speed of 70 km/h
- ii. the average speed of B for the entire trip was 55 km/h

13. Department A earned 35% more than department B last year, are the earnings of department A this year higher than department B's last year earnings?

- i. B earned \$1,002,035 last year
- ii. A earned this year 35% less than what it earned last year

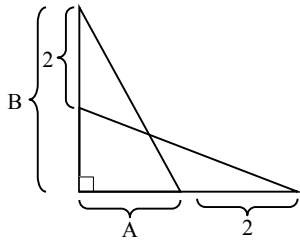
14. From a total of 40 units of a certain product, 20 were sold for \$80 each, 50% of the rest are sold with a 40% discount, and the remainder was sold for an additional 25% discount on the discounted price.

What was the total revenue from the sales of these 40 units?

- a. 1680
- b. 2440
- c. 3660
- d. 4240
- e. 6800

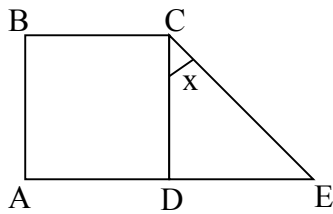
15. $2x^2 - 4x + a = 0$ has only one solution, what is the value of a?

- a. (-2)
- b. 0
- c. 2
- d. 4
- e. 6



16. A ladder is leaned against a wall in two different ways, as can be seen above. If the ladder is M meters long, what is the value of B in terms of A ?

- a. A
- b. $A+2$
- c. A^2
- d. $4A$
- e. $A-2$



17. In the shape shown above, angle $ADE=180^\circ$. What is the ratio of the area of triangle CDE to the area of $ABCD$?

- i. $ABCD$ is a square
- ii. $X=45^\circ$

18. In a set of 10 numbers, a_n is defined for $n \geq 3$ as the sum of all the numbers preceding a_n , minus 1. (for example $a_3 = a_2 + a_1 - 1$). If the first two numbers are odd, how many numbers in the set are even?

- a. 2
- b. 3
- c. 5
- d. 6
- e. 7

19. A set of numbers is defined for $n \geq 3$ as follows: $a_n = a_{n-1} - a_{n-2}$. If the first term in the set is equal to 3, and the second term is equal to 5, what is the sum of the first 100 terms in the set?

- A. 7
- B. 126
- C. 548
- D. 1249
- E. 3654

20. Janet gets a basic monthly salary of \$360 plus 1% of her total sales during that month. Melody gets no basic salary, but as compensation she gets 1.5% of her monthly sales. During a certain month Janet worked 50 hours, and had a total sales of \$40,000, and Melody worked for 60 hours and had a total sales of 50,000\$. What is the difference between Janet's hourly wage and Melody's hourly wage?

- A. \$2.7
- B. \$3.2
- C. \$3.6
- D. \$4.5
- E. \$5.4

21. One of the numbers -1, 0, 1 is placed in each of the 25 boxes shown above. Is the sum of the numbers in the boxes negative?

- i. Each column has only one negative number
- ii. Each row has only one negative number

22. Is $a + b \geq 1$?

- i. $a^2 + b^2 \geq 1$
- ii. $a^2 - b^2 \geq 1$

23. M and K are integers, and K is a factor of M. Is $\frac{M}{K}$ even?

- i. MK is even
- ii. M+K is odd

24. Of the following arithmetic set: 4, 7, 10, 13... which term has a value of 124?

- A. 23
- B. 28
- C. 31
- D. 35
- E. 41

25. If $-1 \leq y \leq 0$ and $0 \leq x \leq 1$, which of the following must be greater than 1?

- i. $xy+2$
- ii. $x-y+2$
- iii. $\frac{x}{y} +4$

- A. I only
- B. II only
- C. I and II
- D. II and III
- E. I, II and III

26. If $\sqrt{0.000025} + \sqrt{0.25} = \sqrt{x + 0.000025}$, what is the value of x ?

- a. 0.00255
- b. 0.0255
- c. 0.25
- d. 0.255
- e. 2.5

27. Of the employees in a certain company 15% are temporary workers with an academic degree. If 40% of the employees have an academic degree, what percent of the employees with an academic degree are temporary workers?

- a. 15
- b. 30
- c. 35
- d. 37.5
- e. 62.5

28. $\frac{\sqrt{8} - \sqrt{2}}{\sqrt{2}} = ?$

- a. 1
- b. $\sqrt{2}$
- c. 2
- d. $2\sqrt{2}$
- e. 4

29. To a certain square 20% were added to the length of one pair of opposite sides, so that the area of the rectangle created was 1500. What is the difference between the area of the rectangle and the area of the original square?

- a. 100
- b. 150
- c. 200
- d. 250
- e. 400

	Group 1	Group 2	Group 3
Judge 1	3	3	7
Judge 2	4	3	6
Judge 3	8	10	8
Judge 4	7	10	6
Judge 5	3	6	7
Judge 6	5	4	8

30. In the table above, the scores by 6 judges of 3 groups that competed in a certain contest are shown. Which of the following arranges the standard deviation of the scores of the three groups from the least to the highest?

- a. Group 1, Group 2, Group 3
- b. Group 3, Group 2, Group 1
- c. Group 2, Group 1, Group 3
- d. Group 3, Group 1, Group 2
- e. Group 2, Group 3, Group 1

31. If $A > B > 0$, which of the following must be true?

- i. $A - B > 0$
- ii. $A^2 * B - A * B^2 > 0$
- iii. $A^3 - A * B^2 > 0$

- A. Only i
- B. Only iii
- C. i+ii
- D. ii+iii
- E. All three

32. If $A = 0.23k7$, what is the value of k ?

- i. When rounded to the thousandth digit, $A = 0.234$
- ii. When rounded to the hundredth digit, $A = 0.23$

33. In the isosceles triangle PQR, angle PQR = 80° . Which of the following could be the value of angle PRQ?
- a. 80°
 - b. 60°
 - c. 40°
 - d. 30°
 - e. 10°
34. In 2003, the oil production in country B was 130 million tons, and in 2004 the production was 2.6 billion (10^9) tons. What was the percent increase in production from 2003 to 2004?
- a. 19%
 - b. 20%
 - c. 190%
 - d. 1900%
 - e. 2000%
35. Is the average of numbers A, B and C equal to $3C$?
- i. The mean of A and B is $4C$
 - ii. $A-3C=5C-B$
36. P is a factor of 48 and Q is a factor of 27. Which of the following cannot be a value of P^2-Q^2 ?
- a. 27
 - b. 20
 - c. 7
 - d. 3
 - e. 0

37. The price of a car was reduced to $\frac{1}{8}$ of its original price, and then reduced to 25% of the second price. What is the ratio between the third price and the second price?

- a. 1:4
- b. 4:1
- c. 1:16
- d. 8:1
- e. 1:32

End of test 1

Answers- Test 1

- 1. D**-> 14. Both the trapezoid and the triangle have the same height and their areas are

equal, so, $\frac{(5+9) \times \text{height}}{2} = \frac{AE \times \text{height}}{2} \rightarrow 5+9 = AE \rightarrow AE=14$

- 2. C** -> i and iii.

The prime factors of n are $2 \times 3 \times (2 \times 2) \times 5 \times (3 \times 2) \times 7 \times (2 \times 2 \times 2) \times (3 \times 3) \times (5 \times 2)$, any number that is a product of some of these numbers, and no other number besides them, will be a factor of n. (1). 15 (3×5) \rightarrow It is a factor of n. (2). 77 (7×11) \rightarrow 11 is not a factor of n, thus, 77 is not a factor of n. (3). 210 ($3 \times 7 \times 5 \times 2$) \rightarrow It is a factor of n.

- 3. C** -> 6. The series is 2 ($S_1=1 \times 2$), 4 ($S_2=A_1+A_2=2 \times 3 \rightarrow A_2=6-A_1=4$),

6 ($S_3=A_1+A_2+A_3=3 \times 4 \rightarrow A_3=12-A_2-A_1=6$), 8 ($S_4=A_1+A_2+A_3+A_4=4 \times 5 \rightarrow A_4=20-12=8$), 10, 12, 14...

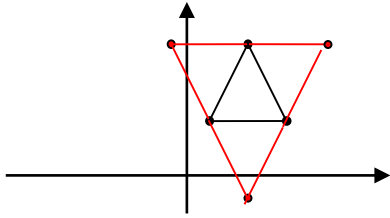
- 4. C**-> 32.5. The average of the women should be a little more than 32. Since there are more women, the total average has to be closer to their average score (answers A and B can be eliminated). The easiest calculation will be using the definition of the average: "The sum of differences from the average is equal to 0": Let X be the difference between the total average and the average of the women:

$$22 \times (38-35) - 26X = 0 \rightarrow 66 = 26X \rightarrow X = \frac{66}{26} = 2 \frac{14}{26} = 2 \frac{7}{13} \rightarrow \text{The average of the}$$

women is $35 - 2 \frac{7}{13} = 32 \frac{6}{13} \rightarrow$ The best answer is 32.5

- 5. E.** We are asked whether k and st have different signs. We know $k^2 > 0$, thus, using statement 1, if $k^2 < st$, then $st > 0 \rightarrow$ Not sufficient. From 2 we don't get any useful information regarding the signs. Using both statements is still insufficient (e.g. $s = (-4)$ $t = (-5)$ $k = (-3)$ or 3) \rightarrow The best answer is E

6. C->3. There are 3 possible parallelograms:



7. C ->4536. $9 \cdot 9 \cdot 8 \cdot 7 = 81 \cdot 56 = 81 \cdot 50 + 6 \cdot 80 + 6 \cdot 1 = 4050 + 480 + 6 = 4536$

8. A. The easiest way is to plug in a small number. Let's say $n=5 \rightarrow$ there are 5 people. Using statement 1 each person got less than 5 pencils; can there be a situation where each one got a different number? Let's say the first person got 1 pencil, the second got 2, the third got 3, the fourth got 4, and the fifth? He can get neither 0 nor 5+, thus, there must be at least two people who got the same number \Rightarrow Sufficient. Using statement 2 we know that the number of pencils is $5 \cdot 4 = 20$. There are 5 people and 20 pencils, but we cannot decide; for example: 1, 2, 3, 4, 10. OR 2, 2, 2, 7, 7 \Rightarrow Insufficient.

9. E- $\rightarrow \sqrt{5} + 2\sqrt{6}$. If you remember that $\sqrt{2} \approx 1.41$ and that $\sqrt{3} \approx 1.73$ then you can easily estimate that the answer should be a bit more than 9. Another way to do it is as follows: $\left(\frac{1}{\sqrt{3}-\sqrt{2}}\right)^2 = \frac{1}{3-2\sqrt{6}+2} = \frac{1}{5-2\sqrt{6}} \cdot \frac{5+2\sqrt{6}}{5+2\sqrt{6}} = \frac{5+2\sqrt{6}}{5^2-(2\sqrt{6})^2} = \frac{5+2\sqrt{6}}{25-24} = 5 + 2\sqrt{6}$

10. D- $\rightarrow 7$. $(0.003)^3 = \left(\frac{3}{1000}\right)^3 = \frac{27}{1,000,000,000} = 0.000000027 \rightarrow 7$ zeros

11. C. Statement 1 is insufficient, for example; $k=20$ $w=10$ OR $k=5$ $w=-5$. Using statement 2 we know that their absolute values are equal, but it is still insufficient since it can either be the same number or a number with a different sign, for example; $k=5$ $w=5$ OR $k=5$ $w=-5$. Using both statements we know that they are not the same number ($k-w=10$), thus, they must be opposite numbers (one positive and one negative).

12. E. We need to know which train was faster until the meeting point. If statement 2 would have given us the average speed of B until the meeting point, we could have answered the question (If it was faster than 70 km/h or slower than 70 km/h).

13. B. Statement 1 is insufficient. From the data in the question we know that department A earned 35% more than department B during last year; $A=1.35B$, Using statement 2 we know that $A_{\text{new}}=0.65A$. We have the relation between A and B, and the relation between A and A_{new} , thus, we can compare A_{new} and B ($B > A_{\text{new}}$)

14. B-> 2440.

$$20 \times 80 + 10 \times 80 \times \frac{60}{100} + \left(10 \times 80 \times \frac{60}{100}\right) \times \frac{75}{100} = 1600 + 480 + 480 \times \frac{75}{100} = 2080 + 360 = 2440$$

15. C-> 2. If it has only 1 solution, then $b^2 - 4ac = 0 \rightarrow (-4)^2 - 4 \cdot 2 \cdot a = 0 \rightarrow 16 - 8a = 0 \rightarrow a = 2$

16. B-> $A+2$

$$\begin{cases} (B)^2 + (A)^2 = M^2 \\ (A+2)^2 + (B-2)^2 = M^2 \end{cases} \Rightarrow 4A + 4 - 4B + 4 = 0 \Rightarrow B - A = 2 \Rightarrow B = A + 2$$

17. C. The ratio is 1:2. Angle CDE is equal to 90° . Using statement 2 we know the triangle is Isosceles right triangle, thus its area is $\frac{CD \times DE}{2} = \frac{CD^2}{2}$. The area of the

square is $CD \cdot AD = CD^2 \rightarrow$ the ratio is $\frac{\frac{CD^2}{2}}{CD^2} = \frac{1}{2}$

18. E-> 7. 1-Odd, 2-Odd, 3-Odd(Odd+Odd-1), 4-Even(Odd+Odd+Odd-1) 5-Even(3*Odd+Even-1) 6-Even(3*Odd+2*Even-1), 7-Even(3*Odd+3*Even-1), 8-Even(3*Odd+4*Even-1), etc. There are a total of 7 even numbers.

19. A-> 7. If we are asked to find the sum of the first 100 terms, there must be a pattern that repeats itself, which we have to find. Calculate the terms of the set, until finding the module: 3, 5, 2, -3, -5, -2, 3, 5, 2 etc. There is a module of 6, and the sum of each module is 0. In the first 100 terms the module appears 16 full times, and the first 4 terms of the 17th module. Therefore the sum is $(16 \times 0) + (3 + 5 + 2 - 3) = 7$

20. A-> \$2.7

$$\frac{360 + \frac{1}{100} \times 40,000}{50} - \frac{\frac{1.5}{100} \times 50,000}{60} = \frac{76}{5} - \frac{75}{6} = \frac{76 \times 6 - 75 \times 5}{30} = \frac{456 - 375}{30} = \frac{81}{30} = \frac{27}{10} = 2.7$$

21. E. From each of the statements we learn that there are only 5 negative numbers (-1), but we do not know whether there are more or less positive numbers (1).

22. E. The second statement is more "powerful", meaning, if statement 2 is true, then statement 1 must also be true. Thus, answers A and C should immediately be eliminated. The answer, which is E, can be easily found by plugging in different numbers, for example; a=10 b=8 OR a=(-10) b=(-8).

23. B. $\frac{M}{K}$ is even when M is even and K is odd, or when both numbers are even and M has "2" as a factor at least once more than K has. Statement 2 is sufficient since we can conclude that either M or K is even, and the other is odd, and since K is a factor of M, M must be the even integer.

24. E-> 41. $A_n = A_1 + (n-1)d \rightarrow 124 = 4 + (n-1)3 \rightarrow n=41$

25. B-> Only II.

- The minimum value of I is 1 (when x=1 and y=-1)
- The minimum value of II is 2 (when x=0 and y=0)
- The value of III can be a very small number, e.g. x=0.9, y=-0.1.

26. D → 0.255

$$\sqrt{0.000025} + \sqrt{0.25} = \sqrt{x + 0.00025} \Rightarrow 0.00025 + 0.25 + 2\sqrt{0.000025}\sqrt{0.25} = x + 0.00025$$

$$x = 0.25 + 2\sqrt{0.000025}\sqrt{0.25} = 0.25 + 2\sqrt{\frac{25}{1,000,000}}\sqrt{\frac{25}{100}} = 0.25 + 2 \times \frac{5}{1000} \times \frac{5}{10} = 0.25 + 0.005 = 0.255$$

27. D → 37.5%. Let's assume that there are 100 employees in the company. Thus, there are 40 employees with an academic degree, out of which 15 are temporary. The percent of temporary employees out of the academic employees is:

$$\frac{15}{40} \times 100 = \frac{3}{8} \times 100 = 37.5\%$$

28. A → 1. $\frac{\sqrt{8} - \sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2 \times 4} - \sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2} - \sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{\sqrt{2}} = 1$

29. D → 250. $X \times 1.2X = 1500 \Rightarrow 1.2X^2 = 1500 \Rightarrow X^2 = \frac{1500}{1.2} \Rightarrow X^2 = 1250 \rightarrow$
 $1500 - 1250 = 250$

30. D → Group 3, Group 1, Group 2.

In order to calculate the Standard deviation, you should first find the average, and then find the sum of squares of the distances from the average.

Group 1: Average: 5 → Sum of Squares of deviations: $2^2 + 1^2 + 3^2 + 2^2 + 2^2 + 0^2 = 22$

Group 2: Average: 6 → Sum of Squares of deviations: $3^2 + 3^2 + 4^2 + 4^2 + 0^2 + 2^2 = 54$

Group 3: Average: 7 → Sum of Squares of deviations: $0^2 + 1^2 + 1^2 + 1^2 + 0^2 + 1^2 = 4$

So, the best answer is D.

31. E → All three.

I) $A > B \rightarrow A - B > 0$, correct. II) $A^2 \cdot B - A \cdot B^2 = AB \cdot (A - B) \rightarrow A - B > 0, AB > 0 \rightarrow A^2 \cdot B - A \cdot B^2 > 0$, correct. III) $A^3 - A \cdot B^2 = A \cdot (A^2 - B^2) \rightarrow A > B$, therefore $A^2 > B^2$ (it is true only because both A and B are positive) $\rightarrow A^2 - B^2 > 0 \rightarrow A^3 - A \cdot B^2 > 0$, correct.

32. A. From statement 1, $k = 3$. From statement 2, k can be any digit smaller than 5.

33. A $\rightarrow 80^\circ$. In an isosceles triangle, two of the angles are equal to each other.

Therefore, the three angles can be $80^\circ, 80^\circ$ and 20° , or $80^\circ, 50^\circ, 50^\circ$.

34. D $\rightarrow 1900\%$. 2.6 billion = $2600 \cdot 10^6$. 130 million = $130 \cdot 10^6 \rightarrow \frac{2600 - 130}{130} \cdot 100 = 1900\%$

35. D. From each of the statements, $A+B=8C \rightarrow A+B+C=9C \rightarrow$ the average is $\frac{9C}{3} = 3C$

36. B $\rightarrow 20$. $P^2 - Q^2 = (P-Q)(P+Q)$. $48 = 3 \cdot 2 \cdot 2 \cdot 2 \cdot 2$, $27 = 3 \cdot 3 \cdot 3 \rightarrow Q = 1, 3, 9$ or 27 . When $Q = P = 3$, the result is 0. When $P = 6$ and $Q = 3 \Rightarrow (6-3)(6+3) = 3 \cdot 9 = 27$. When $P = 4$, $Q = 3 \Rightarrow (4-3)(4+3) = 1 \cdot 7 = 7$. When $P = 2$ and $Q = 1 \Rightarrow (2-1)(2+1) = 3$.

The only answer left is 20.

37. A $\rightarrow 1:4$. Let the original price be $x \rightarrow$ the second price is $\frac{1}{8}x$, and the third price is

$\frac{1}{4} \cdot \frac{1}{8}x \rightarrow$ the ratio is $\frac{1}{4} : 1$ or $1:4$.