

Total marks: 44

- "Fomenting" means instigating, stirring up, or provoking trouble or violence, which makes "instigating" the most accurate synonym.

- Rain, Snow, and Wind are all weather phenomena, whereas Sky is the place where these phenomena occur and does not belong to the same category.

- The premises state that crows are black (which directly validates conclusion 2) and that all black birds are loud. Since all crows are black birds, all crows must be loud (validating conclusion 4).

- Since some answers are writers, then some writers are answers (1). Since all writers are poets, those writers who are answers are also poets, meaning some poets are answers (4).

5. Statements: Some envelopes are gums. Some gums are seals. Some seals are adhesives. (1)
Conclusion 1. Some envelopes are seals. 2. Some gums are adhesives. 3. Some adhesives are seals. 4. Some adhesives are gums
- A. Only 4
B. Only 2
C. Only 1
D. ✓ Only 3

Answer: D

The premise states that 'Some seals are adhesives,' which directly implies the converse relation that 'Some adhesives are seals' (Conclusion 3).

6. *healthy lives. Our first step might be to consider ways to increase curriculum time devoted to physical education. In addition, schools need to thoughtfully analyze the design and delivery of school physical education programs to ensure that they are engaging, developmentally appropriate, inclusive and instructionally powerful. Adapted from Test Prep Review: A resource from Mometrix* (1)
According to this passage, regular physical activity is needed to
- A. ✓ **improve ones' physical as well as mental health.**
B. improve ones' cognitive skills.
C. lose weight.
D. control one's blood pressure.

Answer: A

The full passage outlines that regular physical activity is vital because of its comprehensive benefits in improving both physical and mental health.

7. Which continuation is right? (1)
I don't trust social medias. _____
- A. Never can I and never I will
B. Never I have and never I will
C. I have never and I will never
D. ✓ **I never have and I never will**

Answer: D

"I never have and I never will" is the correct elliptical construction in English to express that one has never done something in the past and has no intention of doing it in the future.

8. If I were in your position, I _____ (1)
- A. Would have done such silly things.
B. ✓ **would never do such silly things.**
C. Will never have done such silly things.
D. Would never have done such silly things.

Answer: B

This is a second conditional sentence expressing a hypothetical present/future scenario; thus, the template "If I were... I would [verb]" requires "would never do."

9. She contracted COVID 19 easily because she was obese and had other preexisting diseases. The doctor said (1)
that if she _____ obese, her chances of getting the disease would have been slim.
- A. were not
B. were
C. Had been
D. ✓ **had not been**

Answer: D

This is a third conditional sentence referring to a past hypothetical scenario; the conditional clause must use the past perfect tense ("had not been").

10. I: Haven't you seen this film? _____ (1)

- A. Yes, have I
B. Yes, I haven't
C. No, I have
D. ✓ **Yes, I have**

Answer: D

In English, a negative question is answered affirmatively ("Yes, I have") if the speaker indeed has done the action, matching the factual status of the event.

11. EAGLE is to BIRD as ROSE is to _____ (1)

- A. ✓ **FLOWER**
B. ANIMAL
C. BEAUTIFUL
D. GENTLEMAN

Answer: A

An eagle is a specific type of bird, just as a rose is a specific type of flower.

12. CAR is to TRANSPORTATION as GAME is to _____ (1)

- A. FOOTBALL
B. MANIPULATION
C. INFORMATION
D. ✓ **ENTERTAINMENT**

Answer: D

A car is a primary means of transportation, while a game is a primary means of entertainment.

13. SPEED is to FAST as TEMPERATURE is to _____ (1)

- A. CLIMATE
B. ✓ **WARM**
C. ICE
D. THERMOMETER

Answer: B

Speed is a dimension of motion, and "fast" represents a high level of it; similarly, temperature is a thermal dimension, and "warm" represents a high level of it.

14. FAST is to RUNNING as SLOW is to _____ (1)

- A. ✓ **WALKING**
B. SPEED
C. LAZY
D. PACE

Answer: A

Fast is the typical descriptor for the speed of running, while slow is the typical descriptor for the speed of walking.

15. CANDLE: WAX (1)

- A. ✓ **PAPER: PULP**
B. BAMBOO: FURNITURE
C. TREE: LEAVES
D. BRANCH: WOOD

Answer: A

A candle is manufactured from wax (raw material), just as paper is manufactured from pulp (raw material).

16. CHEF: FOOD (1)

- A. BRICK: CARPENTER
B. ✓ **SCULPTOR: STONE**
C. BRUSH: WALL
D. PAINT: PAINTER

Answer: B

A chef works professionally to shape and create food, just as a sculptor works professionally to shape and carve stone.

17. BOARD: TRAIN

(1)

A. ✓ MOUNT: HORSE

B. BICYCLE: DRIVE

C. WALK: SHOE

D. CHAIR: SIT

Answer: A

The relationship is verb:noun, where the verb describes boarding or getting on the noun. One boards a train, and one mounts a horse.

18. The man vehemently denied all the charges of killing that were brought against him.

(1)

A. devoutly

B. carelessly

C. hysterically

D. ✓ forcefully

Answer: D

The word 'vehemently' means passionately, intensely, or with great force; thus, 'forcefully' is the closest synonym.

19. Which word means the same as "counterfeit?"

(1)

A. copy

B. match

C. robbery

D. ✓ fake

Answer: D

To be 'counterfeit' means to be made in imitation of something else with intent to deceive; 'fake' is a direct synonym.

20. He inherited a large amount of fortune from his parents. So, he lives a very lavish lifestyle.

(1)

A. spartan

B. humble

C. stingy

D. ✓ extravagant

Answer: D

'Lavish' means using or giving in great amounts, or expensive and luxurious, which is synonymous with 'extravagant'.

21. For Questions 36-40 Use The Following Information.

(1)

The following table gives the expenditure (in millions of Birr) of a certain company per year over five years. | year | Items of the Expenditure | | | | | :--- | :--- | :--- | :--- | :--- | :--- | | Salary | Fuel & Transport | Bonuses | Interest on Loans | Taxes | | 2008 | 288 | 98 | 3.1 | 23.4 | 83 | | 2009 | 342 | 112 | 2.52 | 32.5 | 108 | | 2010 | 324 | 101 | 3.84 | 41.2 | 74 | | 2011 | 336 | 133 | 3.68 | 36.4 | 88 | | 2012 | 422 | 142 | 3.96 | 49.4 | 98 |

What is the average amount of interest on loans per year that the company has to pay during the five year period?

[Figure: A table with columns: 'year', and under 'Items of the Expenditure': 'Salary', 'Fuel & Transport', 'Bonuses', 'Interest on Loans', and 'Taxes'. Values are: - 2008: Salary = 288, Fuel & Transport = 98, Bonuses = 3.1, Interest on Loans = 23.4, Taxes = 83 - 2009: Salary = 342, Fuel & Transport = 112, Bonuses = 2.52, Interest on Loans = 32.5, Taxes = 108 - 2010: Salary = 324, Fuel & Transport = 101, Bonuses = 3.84, Interest on Loans = 41.2, Taxes = 74 - 2011: Salary = 336, Fuel & Transport = 133, Bonuses = 3.68, Interest on Loans = 36.4, Taxes = 88 - 2012: Salary = 422, Fuel & Transport = 142, Bonuses = 3.96, Interest on Loans = 49.4, Taxes = 98]

A. ✓ 36.58

B. 34.18

C. 33.72

D. 33.43

Answer: A

The interest on loans for the five years is 23.4, 32.5, 41.2, 36.4, and 49.4. The average is $(23.4 + 32.5 + 41.2 + 36.4 + 49.4) / 5 = 182.9 / 5 = 36.58$ million Birr.

22. For Questions 36–40 Use The Following Information.

(1)

The following table gives the expenditure (in millions of Birr) of a certain company per year over five years. | year | Items of the Expenditure | | | | | :--- | :--- | :--- | :--- | :--- | :--- | | Salary | Fuel & Transport | Bonuses | Interest on Loans | Taxes | | 2008 | 288 | 98 | 3.1 | 23.4 | 83 | | 2009 | 342 | 112 | 2.52 | 32.5 | 108 | | 2010 | 324 | 101 | 3.84 | 41.2 | 74 | | 2011 | 336 | 133 | 3.68 | 36.4 | 88 | | 2012 | 422 | 142 | 3.96 | 49.4 | 98 |

What percent of the total amount of salary was paid as bonus by the company during the given period?

[Figure: A table with columns: 'year', and under 'Items of the Expenditure': 'Salary', 'Fuel & Transport', 'Bonuses', 'Interest on Loans', and 'Taxes'. Values are: - 2008: Salary = 288, Fuel & Transport = 98, Bonuses = 3.1, Interest on Loans = 23.4, Taxes = 83 - 2009: Salary = 342, Fuel & Transport = 112, Bonuses = 2.52, Interest on Loans = 32.5, Taxes = 108 - 2010: Salary = 324, Fuel & Transport = 101, Bonuses = 3.84, Interest on Loans = 41.2, Taxes = 74 - 2011: Salary = 336, Fuel & Transport = 133, Bonuses = 3.68, Interest on Loans = 36.4, Taxes = 88 - 2012: Salary = 422, Fuel & Transport = 142, Bonuses = 3.96, Interest on Loans = 49.4, Taxes = 98]

A. 1.25%

B. ✓ 1.0%

C. 0.5%

D. 0.1%

Answer: B

The total salary is $288 + 342 + 324 + 336 + 422 = 1712$ million Birr, and the total bonus is $3.1 + 2.52 + 3.84 + 3.68 + 3.96 = 17.10$ million Birr. The percentage is $(17.10 / 1712) * 100\% \approx 1.0\%$.

23. For Questions 36–40 Use The Following Information.

(1)

The following table gives the expenditure (in millions of Birr) of a certain company per year over five years. | year | Items of the Expenditure | | | | | :--- | :--- | :--- | :--- | :--- | :--- | | Salary | Fuel & Transport | Bonuses | Interest on Loans | Taxes | | 2008 | 288 | 98 | 3.1 | 23.4 | 83 | | 2009 | 342 | 112 | 2.52 | 32.5 | 108 | | 2010 | 324 | 101 | 3.84 | 41.2 | 74 | | 2011 | 336 | 133 | 3.68 | 36.4 | 88 | | 2012 | 422 | 142 | 3.96 | 49.4 | 98 |

In which year did the company have the highest expenditure?

[Figure: A table with columns: 'year', and under 'Items of the Expenditure': 'Salary', 'Fuel & Transport', 'Bonuses', 'Interest on Loans', and 'Taxes'. Values are: - 2008: Salary = 288, Fuel & Transport = 98, Bonuses = 3.1, Interest on Loans = 23.4, Taxes = 83 - 2009: Salary = 342, Fuel & Transport = 112, Bonuses = 2.52, Interest on Loans = 32.5, Taxes = 108 - 2010: Salary = 324, Fuel & Transport = 101, Bonuses = 3.84, Interest on Loans = 41.2, Taxes = 74 - 2011: Salary = 336, Fuel & Transport = 133, Bonuses = 3.68, Interest on Loans = 36.4, Taxes = 88 - 2012: Salary = 422, Fuel & Transport = 142, Bonuses = 3.96, Interest on Loans = 49.4, Taxes = 98]

A. 2010

B. ✓ 2012

C. 2009

D. 2008

Answer: B

Summing the rows, the total expenditure for each year is: 2008 = 495.5; 2009 = 597.02; 2010 = 544.04; 2011 = 597.08; 2012 = 715.36. Thus, 2012 has the highest expenditure.

24. For Questions 36–40 Use The Following Information.

(1)

The following table gives the expenditure (in millions of Birr) of a certain company per year over five years. | year | Items of the Expenditure | | | | | :--- | :--- | :--- | :--- | :--- | :--- | | Salary | Fuel & Transport | Bonuses | Interest on Loans | Taxes | | 2008 | 288 | 98 | 3.1 | 23.4 | 83 | | 2009 | 342 | 112 | 2.52 | 32.5 | 108 | | 2010 | 324 | 101 | 3.84 | 41.2 | 74 | | 2011 | 336 | 133 | 3.68 | 36.4 | 88 | | 2012 | 422 | 142 | 3.96 | 49.4 | 98 |

What is the total expenditure of the company in the year 2012?

[Figure: A table with columns: 'year', and under 'Items of the Expenditure': 'Salary', 'Fuel & Transport', 'Bonuses', 'Interest on Loans', and 'Taxes'. Values are: - 2008: Salary = 288, Fuel & Transport = 98, Bonuses = 3.1, Interest on Loans = 23.4, Taxes = 83 - 2009: Salary = 342, Fuel & Transport = 112, Bonuses = 2.52, Interest on Loans = 32.5, Taxes = 108 - 2010: Salary = 324, Fuel & Transport = 101, Bonuses = 3.84, Interest on Loans = 41.2, Taxes = 74 - 2011: Salary = 336, Fuel & Transport = 133, Bonuses = 3.68, Interest on Loans = 36.4, Taxes = 88 - 2012: Salary = 422, Fuel & Transport = 142, Bonuses = 3.96, Interest on Loans = 49.4, Taxes = 98]

A. 456.36

B. 586

C. ✓ 715.36

D. 1710 ≈

Answer: C

The total expenditure in 2012 is the sum of all item expenditures in that row: 422 (Salary) + 142 (Fuel & Transport) + 3.96 (Bonuses) + 49.4 (Interest on Loans) + 98 (Taxes) = 715.36 million Birr.

25. For what item or purpose was the company's expenditure the least during the given period?

(1)

A. Taxes

B. Transport and Fuel

C. ✓ Bonus

D. Salary

Answer: C

By comparing the sums of expenditures for each column over the five-year period, Bonuses has the lowest sum (17.10 million Birr), making it the least expenditure item.

26. If $x = 50\%$ of 30 and $y = 30\%$ of 15, then which of the following is true?

(1)

A. The product between x and y cannot be determined.

B. ✓ y is less than x .

C. x and y are equal.

D. x is less than y .

Answer: B

Since $x = 0.50 \times 30 = 15$ and $y = 0.30 \times 15 = 4.5$, we can clearly see that y is less than x .

27. Student X and student Y have 2000 Birr. If $\frac{4}{15}$ of X's share is equal to $\frac{2}{5}$ of Y's share, how much Amount does Y have?

(1)

A. 1200 Birr

B. 1100 Birr

C. ✓ 800 Birr

D. 1500 Birr

Answer: C

We are given $X + Y = 2000$ and $\frac{4}{15}X = \frac{2}{5}Y$. Simplifying the ratio gives $X = \frac{3}{2}Y$; substituting this into the sum gives $\frac{3}{2}Y + Y = 2000$, which yields $Y = 800$ Birr.

28. What is the simplified form of $(2x + 3)(x + 6) - (2x - 5)(x + 10)$?

(1)

A. 72

B. ✓ 68

C. 16

D. 32

Answer: B

Expanding the terms, we get $(2x^2 + 15x + 18) - (2x^2 + 15x - 50)$. Simplifying this expression yields $18 - (-50) = 68$.

29. If the square of a number increased by two times the number is equal to six times number increased by twelve, which one of the following is the possible value of the number? (1)
- A. -4
B. -6
C. 4
D. ✓ 6

Answer: D

The given relation translates to the quadratic equation $n^2 + 2n = 6n + 12$, which simplifies to $n^2 - 4n - 12 = 0$. Factoring this yields $(n - 6)(n + 2) = 0$, so the positive possible value is 6.

30. The monthly telephone bill of Getachew was Birr 400 and it increases by 10% after 12 months, and another 20% increase is applied six months later. What is the price of getachew's telephone bill after 18 months? (1)
- A. 489 Birr
B. 430 Birr
C. 520 Birr
D. ✓ 528 Birr

Answer: D

After 12 months, the bill increases by 10% to $400 * 1.10 = 440$ Birr. Six months later, another 20% increase on 440 yields $440 * 1.20 = 528$ Birr.

31. The sum of the ages of the father and his son is equal to sixty years. Six years ago the age of the father was five times the age of the son. What will be the age of the son six years from now? (1)
- A. 22 years
B. ✓ 20 years
C. 19 years
D. 23 years

Answer: B

Let F and S be the current ages. We have $F + S = 60$ and $F - 6 = 5(S - 6)$. Solving this system gives $S = 14$, so six years from now the son's age will be $14 + 6 = 20$ years.

32. What is the sum of the following infinite series $S = 2 - \frac{1}{3} + 1 - \frac{1}{9} + \frac{1}{2} - \frac{1}{27} + \frac{1}{4} - \frac{1}{81} + \dots$? (1)
- A. $\frac{41}{9}$
B. $\frac{9}{2}$
C. ✓ $\frac{7}{2}$
D. $\frac{32}{9}$

Answer: C

The series can be split into two infinite geometric series: $S_1 = 2 + 1 + 1/2 + \dots = 2 / (1 - 1/2) = 4$, and $S_2 = - (1/3 + 1/9 + 1/27 + \dots) = - (1/3) / (1 - 1/3) = -1/2$. The total sum is $4 - 1/2 = 7/2$.

33. The Triangular Number sequence T_n can be defined recursively as $T_1 = 1, T_n = T_{n-1} + n$ for $n > 1$. What is the eleventh term of the sequence? (1)
- A. 78
B. 55
C. ✓ 66
D. 45

Answer: C

The nth term of a triangular number sequence is given by $T_n = n(n + 1)/2$. For $n = 11$, $T_{11} = 11 * 12 / 2 = 66$.

34. The next term of the sequence 162,54,18,6,...equal to (1)
- A. $1/3$
B. 3
C. ✓ 2
D. 1

Answer: C

The sequence is geometric with a common ratio of $1/3$, since $54/162 = 18/54 = 6/18 = 1/3$. Therefore, the next term is $6 * (1/3) = 2$.

35. The first four terms of an arithmetic sequence are 39, 33, 27 and 21. What is the tenth term of the sequence? (1)
- A. -33
B. -27
C. -21
D. ✓ -15

Answer: D

The arithmetic sequence has a first term $a_1 = 39$ and a common difference $d = -6$. The tenth term is given by $a_{10} = 39 + (10 - 1)(-6) = 39 - 54 = -15$.

36. The sum of the first n terms of an arithmetic progression whose first term is $2n^2 + n$, then what is the tenth term of the sequence? (1)
- A. 38
B. 41
C. ✓ 39
D. 40

Answer: C

Assuming the sum of the first n terms is $S_n = 2n^2 + n$, the tenth term of the sequence is $a_{10} = S_{10} - S_9 = (2(10)^2 + 10) - (2(9)^2 + 9) = 210 - 171 = 39$.

37. What is the probability of getting exactly two tails when three coins are tossed at the same time? (1)
- A. $\frac{3}{4}$
B. ✓ $\frac{3}{8}$
C. $\frac{1}{4}$
D. $\frac{1}{8}$

Answer: B

When three coins are tossed, there are 8 equally likely outcomes. Exactly two tails occur in 3 outcomes (HTT, THT, TTH), giving a probability of $\frac{3}{8}$.

38. What is the probability that a number selected at random from the first 50 natural numbers is prime and odd number? (1)
- A. $\frac{8}{25}$
B. $\frac{3}{5}$
C. $\frac{3}{10}$
D. ✓ $\frac{7}{25}$

Answer: D

Among the first 50 natural numbers, there are 15 prime numbers. The only even prime is 2, leaving 14 odd prime numbers, so the probability is $\frac{14}{50} = \frac{7}{25}$.

39. If $3x + 7y = 80$ and $x - y = 10$, then what is the value of $x + y$? (1)
- A. 25
B. ✓ 20
C. 10
D. 15

Answer: B

We can solve the system of equations: from $x - y = 10$, we have $x = y + 10$. Substituting into $3x + 7y = 80$ gives $3(y + 10) + 7y = 80$, which yields $y = 5$ and $x = 15$, so $x + y = 20$.

40. Which of the following system of linear inequalities is represented by the graph given below? (1)

[Figure: A Cartesian coordinate plane showing three solid boundary lines and a shaded triangular region between them: 1. A line passing through $(-1, 0)$ and $(0, 1)$, corresponding to $y = x + 1$. 2. A line passing through $(1, 0)$ and $(0, 1)$, corresponding to $y = -x + 1$. 3. A horizontal line passing through $(0, -1)$, corresponding to $y = -1$. The region inside the triangle bounded above by the two intersecting lines meeting at $(0, 1)$ and bounded below by the line $y = -1$ is shaded.]

- A. $\begin{cases} y \leq x + 1 \\ y \leq x - 1 \\ y \geq -1 \end{cases}$
- B. ✓ $\begin{cases} y \leq x + 1 \\ y \leq -x + 1 \\ y \geq -1 \end{cases}$
- C. $\begin{cases} y \leq x + 1 \\ y \leq x - 1 \\ y \leq -1 \end{cases}$
- D. $\begin{cases} y \leq x + 1 \\ y \leq -x + 1 \\ y \leq -1 \end{cases}$

Answer: B

The boundary lines are $y = x + 1$, $y = -x + 1$, and $y = -1$. The shaded region is below the first two lines ($y \leq x + 1$ and $y \leq -x + 1$) and above the horizontal line ($y \geq -1$).

41. The square of the 7th term of an arithmetic progression with positive common difference is equal to the product of the 3rd and 17th terms, then what is the ratio of the first term to common difference? (1)

- A. 4:3
- B. 3:2
- C. 3:4
- D. ✓ 2:3

Answer: D

Using the formulas for the terms of an arithmetic progression, we get $(a + 6d)^2 = (a + 2d)(a + 16d)$. Expanding and simplifying yields $12ad + 36d^2 = 18ad + 32d^2$, which leads to $4d^2 = 6ad$, or $2d = 3a$, meaning the ratio $a:d$ is 2:3.

42. If $(1^2 + 2^2 + 3^2 + \dots + 10^2) = a$, then what is the value of $(2^2 + 4^2 + 6^2 + \dots + 20^2)$ in terms of a ? (1)

- A. $a+4$
- B. $a+2$
- C. ✓ $4a$
- D. $2a$

Answer: C

Factoring out 2^2 (which is 4) from each term of the second sum gives $2^2(1^2 + 2^2 + 3^2 + \dots + 10^2) = 4a$.

43. Consider the figure given below. (1)

It is given that $PQ = RQ$. Compare the following two quantities X and Y whose information are given below. |

Quantity X | Quantity Y | | :--- | :--- | | PS | SR |

[Figure: A triangle PQR with vertex Q at the top and a horizontal base PR at the bottom. A line segment is drawn from vertex Q to a point S on the segment PR, dividing the base into segments PS and SR, and dividing triangle PQR into two triangles, PQS and SQR.]

- A. ✓ The relation cannot be determined with the information provided.
- B. The two quantities are equal.
- C. Quantity Y is greater than quantity X.
- D. Quantity X is greater than quantity Y.

Answer: A

Since S is only specified as a point on the segment PR, its exact position is not restricted, meaning PS can be less than, equal to, or greater than SR.

44. If $y > 2$. Compare the following two quantities X and Y whose information are given below.

(1)

[Figure: A table with two columns and two rows:

Row 1 (Headers): 'Quantity X' | 'Quantity Y'

Row 2: ' $\frac{3y-2}{5}$ ' | 'y']

- A. The relation cannot be determined with the information provided.
- B. The two quantities are equal.
- C. ✓ **Quantity Y is greater than quantity X.**
- D. Quantity X is greater than quantity Y.

Answer: C

Comparing the two quantities, we test if $\frac{3y-2}{5} < y$, which simplifies to $3y - 2 < 5y \implies 2y > -2 \implies y > -1$. Since $y > 2$, this inequality is always true, meaning Quantity Y is always greater.

— END OF MARKING KEY —

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