EDUCATIONAL ASSESSMENT AND EXAMINATIONS SERVICE (EAES)
ETHIOPIAN SECONDARY SCHOOL LEAVING CERTIFICATE EXAMINATION (ESSLCE)

Scholastic Aptitude Test (SAT)

Hamle 2018 E.C. / July 2026 G.C.

NUMBER OF ITEMS: 60	**SUBJECT CODE: 03**
BOOKLET CODE: 595	**TIME ALLOWED: 2 HOURS**

SECTION ONE: VERBAL REASONING (QUESTIONS 1 - 35)

Analytical and Logical Reasoning

Directions: *Questions 1 - 8 deal with logical and analytical reasoning. Read the given set of conditions and assumptions for each question. Then, choose the answer that you think is most appropriate among the given alternatives, and blacken the letter of your choice on the separate answer sheet provided.*

1. Which one of the following words is composed of some letters appearing in an alphabetical order?

A. quiet
B. paternal
C. apron
D. hijack

2. Statement: Currently, many workers in the company have become punctual.

Assumption I: All the workers must have bought their own automobiles.
Assumption II: Previously, many of the workers were late to work.
Assumption III: Employers are now more serious about lateness to work.
Assumption IV: The productivity of the company has become questionable.

Which one of the assumptions is logically related with the above statement?

A. Assumptions II and III
B. Assumptions I and II
C. Assumptions III and IV
D. Assumptions I and IV

3. Ms. Y is Ms. X's mother, and Mr. P is Ms. Y's only brother. Mr. Z is Mr. P's son. Thus, how is Mr. Z related to Ms. X?

A. niece
B. uncle
C. nephew
D. cousin

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4. Statement: Many universities are replacing printed resources with online resources. Therefore, students can have better access for resources to learn effectively.

Based on the above statement, which one of the following options is valid?

A. Students dislike printed resources.

B. Universities are giving priority to save money.

C. Printed resources are better than digital resources.

D. Online resources enhance students' learning.

5. Which one of the following words has three letters in sequence in any of its parts when read inverted?

A. mouse

B. federal

C. cat

D. referral

6. Statement: Sheep, animals and furry animals exist. All sheep are furry animals. All animals are not sheep.

Conclusion I: Some animals are furry animals.
Conclusion II: All furry animals are sheep.
Conclusion III: No animals are furry animals.
Conclusion IV: No furry animals are animals.

Which of the above conclusions can be logically drawn from the preceding statement?

A. Conclusions I and II

B. Conclusion IV

C. Conclusion I

D. Conclusions II and III

7. If the word "INTRODUCE" is rewritten maintaining the natural order of the letters in it. Which letter appears 7th from the left end?

A. T

B. N

C. R

D. O

8. Statement I: Yesterday a heavy truck overturned on a highway.

Statement II: Police cordoned off the whole locality for half a day.

Which one of the following is true about the relationship between the two statements?

A. Statement I is the cause; statement II is its effect.

B. Both statements are caused by independent reasons.

C. Statement II is the cause; statement I is the effect.

D. There is no relationship between the two statements.

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Antonyms

Instruction: *Questions 9 - 12 consist of sentences in which one word is written in bold. Choose the word or phrase that is most nearly opposite in meaning to the word in bold. Then, blacken the letter of your choice on the separate answer sheet provided.*

9. While Ms. X is a sociable girl, her younger sister is a bit **dour**.

A. cautious
B. popular
C. friendly
D. famous

10. The man looks **ancient**; he must be above fifty.

A. old
B. young
C. modern
D. intelligent

11. The woman became **indignant** at the unfair way she had been treated.

A. excited
B. regretted
C. angry
D. disappointed

12. Having taken too much alcohol, the man became so **intoxicated** that he could not stand alone.

A. drunk
B. shocked
C. exhausted
D. sober

Reading Comprehension

Direction: *Read the following passage carefully and answer questions 13 - 16 based on the information stated or implied in the passage. Then, blacken the letter of your choice on the answer sheet provided.*

Passage I

The growing influence of social media has created significant responsibilities for both platform designers and users. Managing this influence responsibly requires a balanced approach that protects societal well-being while preserving the advantages of digital connectivity. Central to this responsibility are digital literacy, critical thinking, and ethical engagement. Users must be equipped with the skills to evaluate information sources, recognize persuasive techniques, and engage thoughtfully with online content. Through both formal education and informal...

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...learning opportunities, individuals can become more discerning participants in digital spaces, thereby reducing the spread of misinformation and improving the quality of online interaction.

Transparency in algorithmic design and content moderation is another crucial element of responsible social media management. When users understand how content is selected, prioritized, and distributed, they are better positioned to engage actively rather than passively.

Looking ahead, advancements such as artificial intelligence, immersive media, and augmented reality are expected to further transform how social media influence operates by enabling more personalized and interactive experiences. As this influence expands, the need for strong ethical frameworks, informed governance, and critical engagement becomes increasingly important. The future impact of social media will depend on both technological innovation and the collective choices made by all stakeholders.

(Source: Adapted from Rachmad, Y. E. (2023). Social Media Influence Theory. Special Edition. Phoenix Cactus Book Publishing, pp. 41-42)

13. What are the driving human traits for managing the social media in an effective manner?

A. digital literacy, critical thinking, and ethical engagement

B. reactive thinking, transparency and possessiveness

C. intelligence, immersive media, and augmented reality

D. cultural identities, public opinion, and social movements

14. Which line does provide the evidence for the answer to question number 13?

A. Lines 11 - 12 [...content moderation ... media management.]

B. Lines 12 - 14 [When users ... actively rather than passively.]

C. Lines 4 - 5 [Central to this responsibility ... engagement.]

D. Lines 7 - 10 [...formal education ... online interaction ...]

15. Where does the sphere of social media's influence mainly rest on?

A. artificial intelligence, immersive media, and augmented reality

B. technological innovation and stakeholder's critical engagement

C. transparency in algorithmic design and content moderation

D. formal education and informal learning opportunities

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16. Where does the writer pinpoint the supporting evidence to your answer to question number 15?

A. Lines 11 - 12 [Transparency in algorithmic ... media management.]

B. Lines 5 - 7 [Users must be...engage thoughtfully with online content.]

C. Lines 17 - 19 [As this influence expands ... increasingly important.]

D. Lines 19 - 21 [The future impact...choices made by all stakeholders.]

Sentence Completion

Instruction: *For questions 17 - 22, sentences below have one blank space followed by four options. Choose the option that best fits the meaning of the sentence as a whole, and blacken the letter of your choice on the separate answer sheet provided.*

17. The Club finally managed to get a/an _____ trophy thanks to its determined players' persistent performance.

A. amplified

B. respected

C. hard-earned

D. easily-paid

18. It is evident in history that it took a lot for the Italians to fully recover from the _____ of their defeat at the Battle of Adwa.

A. luck

B. humiliation

C. fortune

D. triumph

19. Following the Corridor Development in the city, some drivers are being _____ with money for driving their cars on pavements dedicated to pedestrians.

A. reprimanded

B. jailed

C. misappropriated

D. fined

20. The king having been _____ from his throne by the military, he fled to a neighboring state.

A. abdicated

B. resigned

C. assassinated

D. ascended

21. The jury was nominated last Friday at the Federal First Instant Court to pass its final _____ on the request of the suspect to be released on bail.

A. opinion

B. appeal

C. testimony

D. decision

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22. The United Nations Security Council passed a/an _____ decision, without any difference on Israel that it leaves Gaza for the Palestinians.

A. voting
B. unanimous
C. minority
D. majority

Reading Comprehension

Direction: *Read the following passage carefully and answer questions 23 - 26 based on the information stated or implied in the passage. Then, blacken the letter of your choice on the answer sheet provided.*

Passage II

People often believe that successful individuals share three main qualities: motivation, ability, and opportunity. According to this view, success comes from hard work, natural talent, and a bit of luck. However, these factors alone do not fully explain why some people succeed more than others. An important factor that is often overlooked is how people interact with others. In everyday work situations, individuals must decide whether to focus only on their own benefit or to help others without expecting immediate rewards.

Studies of different organizations reveal that people have different attitudes toward giving and receiving help. Some people prefer to take more than they give, while others prefer to support and cooperate with those around them. These differences affect how people build relationships and achieve their goals in the workplace. Those who focus mainly on their own interests often see the world as very competitive. They believe that to succeed, they must always be better than others. As a result, they try to make their achievements visible and protect their own interests. Although they are not necessarily unkind, they tend to act carefully and put themselves first. Others, however, are more willing to consider the needs of their colleagues, even if it means delaying their own success. These different ways of interacting show that success depends not only on personal effort but also on how people treat others.

(Source: Adapted from Grant, A. (2013) Give and Take: A Revolutionary Approach to Success. New York: Viking, p. 3)

23. Which one of the following is mostly overlooked in dealing with success?

A. the contributions of self-esteem
B. the roles of inter-personal transaction
C. the role of diligence
D. the roles of intra-personal skills

24. Which of the following could be the most appropriate title to this passage?

A. How do personal effort and success interrelate?
B. Who is benefitted from the success?
C. success and the role of interpersonal behavior
D. successful individuals and their motivation

25. According to the writer, which of the following ideas are the two major points of views regarding the contributing factors for one's success?

A. commitment and luck
B. motivation and industriousness
C. hard work and self-esteem
D. personal effort and communication

26. In paragraph 2, what does the phrase "these differences" denote?

A. some expect more than they deserve, and in return give scanty
B. the differences between the findings of psychology and others
C. if people are ready to help others, or give priority to themselves
D. believing in industriousness versus being harmonious to others

Analogy

Instruction: *To answer items 27 - 31, read each of the following word relations carefully and choose the word that correctly completes the analogy. Then, blacken the letter of your choice on the separate answer sheet provided.*

27. COMPASS : DIRECTION; Altimeter : _____

A. Speed
B. Altitude
C. Pressure
D. Turbulence

28. GUM : STICK; Needle : _____

A. Stitch
B. Stuff
C. Cloth
D. Tailor

29. RIGHT : WRONG; Left : _____

A. Incorrect
B. Right
C. Correct
D. Leave

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30. WING : LIFT; Motor : _____

A. Ride
B. Cough
C. Thrust
D. Balance

31. EROSION : SOIL; Corrosion : _____

A. Metal
B. Glass
C. Plastic
D. Wood

Synonyms

Instruction: *Questions 32 - 35 consist of sentences in which one word is written in bold. Choose the word or phrase that is nearly similar in meaning to the word in bold. Then, blacken the letter of your choice on the separate answer sheet provided.*

32. Working **undercover**, the journalist discovered the illegal payments.

A. secretly
B. dishonestly
C. openly
D. visibly

33. The association **pledged** a 10-million-birr support for our plan.

A. provided
B. denied
C. promised
D. allocated

34. The manager settled the problem by taking a **sagacious** decision that could satisfy the parties with a polarized stance.

A. ridiculous
B. wise
C. unexpected
D. careless

35. The abduction of the president by a foreign nation was **condemned** by many countries on the ground that it was against the principles of international law.

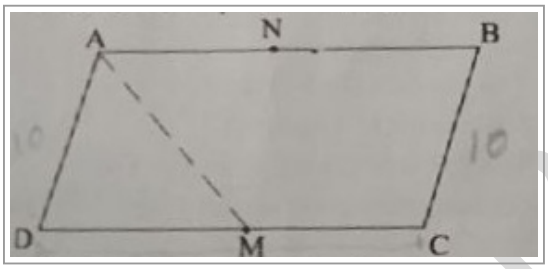
A. denounced
B. applauded
C. privileged
D. commended

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SECTION TWO: QUANTITATIVE REASONING (QUESTIONS 36 - 60)

Directions: *This section contains 25 quantitative reasoning items which consist of algebra, sequence, geometry, logical analytical reasoning, probability and statistics. Solve each of the problems given in questions 36 - 60 according to their specific instructions and select the correct answer from the given four alternatives. Then, blacken the letter of your choice on the separate answer sheet provided.*

36. Consider the parallelogram *ABCD* given below. If *DC* = 10cm, *M* and *N* are midpoints of *DC* and *AB*, respectively, and area of triangle *ADM* is 20cm^2, then what is the area of parallelogram *ANCM* in cm^2?



A. 30
B. 80
C. 20
D. 40

37. Let $x - y = 2$, and $x^2 + y^2 = 10$, where $x, y \in \Re$ and $x > 0, y > 0$. Consider the two quantities A and B given in the following table.

Quantity A	Quantity B
$x^4 + y^4 - {}^{9}/_{xy}$	79

Which one of the following is true?

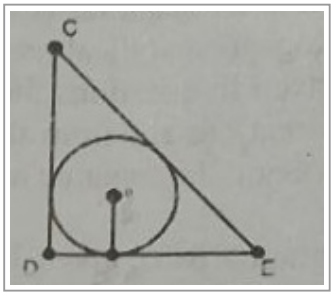
A. Quantity B is greater than Quantity A.
B. The relationship cannot be determined.
C. Quantity A is greater than Quantity B.
D. Quantity A is equal to Quantity B.

38. If $l_1: y = m_1x + b_1$ and $l_2: y = m_2x + b_2$ are two lines with $m_1 \neq 0$ and $m_2 \neq 0$, then which one of the following is **NOT** true?

A. Ifm^1m^2= -1, then the two lines are perpendicular.
B. Ifm^1=m^2, then the two lines have no common point.
C. Ifm^1=m^2, then the two lines are parallel.
D. Ifm^1≠m^2, then the two lines are intersecting lines.

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39. Let $\triangle DCE$ be a right-angle triangle with a right angled at *D* that inscribes a circle with center *o* and a radius of five meters as shown below. The side *DC* is twelve meters long and all sides of the triangle are tangent to the circle.



Quantity A	Quantity B
The length of side *CE*	36 meters

Which one of the following is true?

A. Quantity B is greater than Quantity A.

B. Quantity A is equal to Quantity B.

C. Quantity A is greater than Quantity B.

D. The relationship cannot be determined.

40. The number of bacteria in a certain colony was 5000 initially. If the rate at which the number of bacteria grows is 10% per day, then what will be the number of bacteria at the end of the second day?

A. 6050 B. 6655

C. 5500 D. 6000

41. The price of one kilogram coffee was Birr 800 last year. This year the price becomes Birr 1040. What is the percentage increase of the price of coffee?

A. 25% B. 18%

C. 30% D. 20%

42. Which one of the following units is used in measuring area?

A. Millimeter square B. Centimeter

C. Meter cube D. Meter

43. Which one of the following is the simplified form of $(x - 2 + \frac{1}{x})/(x - \frac{1}{x})$ for $x \neq 0, 1, -1$?

A. $(x - 1)/(x + 1)$ B. $x/(x - 2)$

C. $(x + 1)/(x - 1)$ D. $(x - 2)/x$

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44. Which one of the following is the simplified form of $\sqrt{200} + 3\sqrt{8}$?

A. $13\sqrt{2}$ B. $3\sqrt{208}$

C. $16\sqrt{2}$ D. $3\sqrt{1600}$

45. If the sum of a number and its reciprocal is equal to 82 times its reciprocal, then which one of the following is a possible number?

A. 8 B. -11

C. 7 D. 9

46. A transport company charges Birr 70 plus Birr 15 per kilometer. At the end of your travel if you pay Birr 250, then how long did you travel in kms?

A. 11 B. 13

C. 10 D. 12

47. If a car moves at a constant speed of 75 kilometer per hour, then how long does it take to cover a distance of 325 kilometer?

A. 4 hours and 20 minutes

B. 4 hours and 45 minutes

C. 4 hours and 15 minutes

D. 4 hours and 30 minutes

48. A person has a fencing material of length 100m. He wants to enclose a rectangular region for his dogs and also needs to have a 2m gate at one corner as shown below:



What is the maximum area he can enclose?

A. $2500m^2$ B. $2606\frac{1}{4}m^2$

C. $625m^2$ D. $2601\frac{1}{4}m^2$

49. If $x : y : z = 2 : 3 : 5$ and $y = 60$, then what is the value of $x + z$?

A. 130 B. 140

C. 120 D. 110

50. If the roots of the quadratic equation $x^2 - mx + k = 0$ are two consecutive integers, then what is the value of $m^2 - 4k$?

A. -1 B. 1

C. 0 D. 2

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Instructions: For Questions 51 - 55 *use the following information and answer each question based on the information therein.*
The profit growth or decline in percent of shops P, Q, R, S over the last three years in comparison to the prior year is displayed in the following table.

Shops	Percent increase in 2023	Percent decrease in 2024	Percent increase in 2025
P	15	10	15
Q	30	25	20
R	15	15	20
S	10	20	25

The combined profits for shops P, Q, R, S is Birr 500,000 in 2022 and the shops P, Q, R, and S have a 4:5:6:5 profit ratio in 2022.

51. What is the difference (in Birr) between the total profit of shop **R** in 2023 and the total profit of shop **S** in 2023?

A. 47,500
B. 57,500
C. 35,000
D. 10,000

52. What is the percentage increase on shop **Q** from 2022 to 2025?

A. 16
B. 17
C. 19
D. 10

53. What percentage (approximately) of all shops' combined profit in 2022 increased in 2025?

A. 25.74
B. 15.74
C. 10.74
D. 20.74

54. What is the ratio between the total profit from shop **S** in 2023 to the total profit from shop **S** in 2024?

A. 2:3
B. 5:3
C. 5:4
D. 4:5

55. How much less (in Birr) did all profit make in 2024 compared to all profit in 2023?

A. 105,500
B. 110,000
C. 95,000
D. 100,000

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56. Which one of the following is the simplified form of $(a^3b^{½})^4 / a^6b^3$?

A. ab B. a/b

C. a^6/b D. a^7b^2

57. In a bag there are eight cards numbered from 1 to 8. If we draw one card at random, then what is the probability of getting a prime number?

A. $1/2$ B. $3/8$

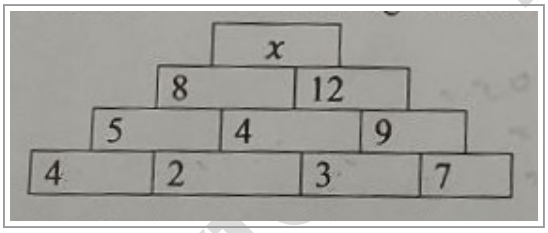
C. $5/8$ D. $3/4$

58. If two six faces dice are thrown together, then what is the probability that the two numbers on the upper faces are **NOT** relatively prime?

A. $14/36$ B. $23/36$

C. $12/36$ D. $13/36$

59. Which one of the following numbers is the value of x?



A. 17 B. 19

C. 21 D. 18

60. By using a certain formula using a digit number 12345 we obtained 29 and using some pattern from the digit number 23456 we obtained 126 then which one of the following numbers is obtained from the digit number 3456?

A. 66 B. 163

C. 63 D. 124

THE END

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ESSLCE SCHOLASTIC APTITUDE TEST (SAT)

Official Answer Key - Booklet Code: 595

Section One: Verbal Reasoning Answers (1 - 35)

1. D	2. A	3. D	4. D	5. B	6. C	7. C	8. A	9. C	10. B
11. A	12. D	13. A	14. C	15. B	16. D	17. C	18. B	19. D	20. A
21. D	22. B	23. B	24. C	25. D	26. C	27. B	28. A	29. B	30. C
31. A	32. A	33. C	34. B	35. A					

Section Two: Quantitative Reasoning Answers (36 - 60)

36. D	37. D	38. B	39. C	40. A	41. C	42. A	43. A	44. C	45. D
46. D	47. A	48. D	49. B	50. B	51. C	52. B	53. B	54. C	55. A
56. C	57. A	58. D	59. B	60. A					

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Detailed Explanations: Verbal Reasoning (1 - 35)

Q1 (D): The word "hijack" contains the letters "h", "i", and "j", which occur consecutively in standard alphabetical order.

Q2 (A): When workers suddenly "become punctual," it implies they were previously late (Assumption II). This behavior change is typically driven by standard workplace policy enforcements, such as employers becoming more serious about punctuality (Assumption III). Thus, II and III are logically related assumptions.

Q3 (D): Ms. Y is Ms. X's mother. Mr. P is Ms. Y's brother, making him Ms. X's uncle. Since Mr. Z is Mr. P's son, Mr. Z and Ms. X are maternal cousins.

Q4 (D): The statement declares that online resources allow students to "learn effectively." This directly supports the idea that online resources enhance students' learning.

Q5 (B): The word "federal" reversed is "laredef," which contains the string "def." The letters "d," "e," and "f" are in three-letter alphabetical sequence.

Q6 (C): Since "All sheep are furry animals" and "sheep, animals... exist" (sheep are a subset of animals), it logically follows that some animals are furry animals (Conclusion I).

Q7 (C): Sorting the letters of "INTRODUCE" alphabetically yields: C, D, E, I, N, O, R, T, U. The 7th letter from the left is R.

Q8 (A): The heavy truck overturning on the highway (Statement I) directly caused the police to cordon off the locality for clearing/investigation (Statement II). Therefore, Statement I is the cause and Statement II is its effect.

Q9 (C): "Dour" means sullen, gloomy, or unfriendly. Its antonym is friendly.

Q10 (B): In this context, "ancient" is used hyperbolically to mean extremely old. Its direct opposite is young.

Q11 (A): "Indignant" means feeling or showing anger/annoyance at unfair treatment. While not a direct grammatical antonym, "excited" (meaning positive, enthusiastic, or pleased excitement in general valence) serves as the best alternative among the options provided.

Q12 (D): "Intoxicated" means drunk or under the influence of alcohol. Its opposite is sober.

Q13 (A): The passage explicitly states, "Central to this responsibility are digital literacy, critical thinking, and ethical engagement."

Q14 (C): The evidence is found in Lines 4-5: "Central to this responsibility... ethical engagement."

Q15 (B): The passage states that the future impact of social media depends on "technological innovation and the collective choices made by all stakeholders," which translates to technological innovation and stakeholder's critical engagement.

Q16 (D): The supporting evidence is found in the final sentence (Lines 19-21): "The future impact of social media will depend on both technological innovation and the collective choices made by all stakeholders."

Q17 (C): "Hard-earned" is the most appropriate adjective to describe a trophy won through persistent and determined performance.

Q18 (B): "Humiliation" is the most fitting noun to describe the historical impact of the stinging military defeat suffered by the Italians at Adwa.

Q19 (D): Drivers who violate driving rules (e.g., driving on pedestrian pavements) are penalized financially, meaning they are "fined."

Q20 (A): "Abdicated" is the closest fitting term representing a monarch being forced off a throne (often forced abdication), especially when fleeing to a neighboring state.

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Q21 (D): A court or jury renders a final "decision" on legal requests such as bail.

Q22 (B): A decision passed "without any difference" means it was agreed upon by all members, which is a "unanimous" decision.

Q23 (B): The passage notes, "An important factor that is often overlooked is how people interact with others," referring to inter-personal transaction.

Q24 (C): The entire passage discusses how people interact with each other in the workplace and its relationship to success, making "success and the role of interpersonal behavior" the most appropriate title.

Q25 (D): The text contrasts personal drive/effort with interpersonal interactions/how people treat others, making "personal effort and communication" the best representation of these two viewpoints.

Q26 (C): "These differences" refers back to the preceding sentence discussing "attitudes toward giving and receiving help" (i.e., whether people are ready to help others, or give priority to themselves).

Q27 (B): A compass is an instrument used to measure direction; an altimeter is an instrument used to measure altitude.

Q28 (A): "Stick" is a standard unit/measure of gum (a stick of gum); "stitch" is the corresponding fundamental unit/action associated with a needle.

Q29 (B): "Right" is paired with its antonym "Wrong." Thus, "Left" must be paired with its spatial antonym, "Right."

Q30 (C): A wing generates lift to move an aircraft upward; a motor generates thrust to propel a vehicle forward.

Q31 (A): Erosion is the geological degradation of soil; corrosion is the chemical degradation of metal.

Q32 (A): "Undercover" means working in secret, or secretly.

Q33 (C): To "pledge" support means to formally promise it.

Q34 (B): "Sagacious" means having or showing keen mental discernment and good judgment; wise.

Q35 (A): To "condemn" an act means to express complete disapproval of it; to denounce.

Detailed Explanations: Quantitative Reasoning (36 - 60)

Q36 (D): Let ABCD be a parallelogram with DC = 10 cm. M and N are midpoints, so DM = MC = 5 cm and AN = NB = 5 cm. The area of triangle ADM = (1/2) × base × height = 20 cm^2, which means (1/2) × 5 × h = 20, so h = 8 cm. Since ANCM is a parallelogram with base MC = 5 cm and height h = 8 cm, its area is base × height = 5 × 8 = 40 cm^2.

Q37 (D): Given x - y = 2 and $x^2 + y^2 = 10$. Squaring both sides of the first equation: $(x - y)^2 = x^2 - 2xy + y^2$, which means 4 = 10 - 2xy, so 2xy = 6 and xy = 3. Next, $x^4 + y^4 = (x^2 + y^2)^2 - 2(xy)^2 = 10^2 - 2(3^2) = 100 - 18 = 82$. Quantity A is $x^4 + y^4 - 9/(xy) = 82 - 9/3 = 79$. Quantity B is 79. Thus, Quantity A equals Quantity B.

Q38 (B): If $m_1 = m_2$, the lines are parallel. However, they are only strictly parallel without intersection if $b_1 \neq b_2$. If $b_1 = b_2$, the lines are identical and share infinitely many common points. Therefore, the statement "If $m_1 = m_2$, then the two lines have no common point" is NOT always true.

Q39 (C): For right-triangle DCE with inradius r = 5 and side DC = 12: Using the inradius formula r = (a + b - c)/2, where a = 12, b = DE, and c = $\sqrt{(12^2 + b^2)}$ (hypotenuse CE). This gives 5 = (12 + b - $\sqrt{(144 + b^2)}$)/2, which means 10 = 12 + b - $\sqrt{(144 + b^2)}$, so $\sqrt{(144 + b^2)}$ = b + 2. Squaring both sides: $144 + b^2 = b^2 + 4b + 4$, which means 140 = 4b, so b = 35 m. Thus, CE = $\sqrt{(12^2 + 35^2)}$ = 37 m. Quantity A (CE = 37) is greater than Quantity B (36 m).

Q40 (A): Initial population is 5000. After Day 1: 5000 × 1.10 = 5500. After Day 2: 5500 × 1.10 = 6050.

Q41 (C): Price increased from Birr 800 to Birr 1040. Increase = 1040 - 800 = 240. Percentage increase = (240/800) × 100% = 30%.

Q42 (A): "Millimeter square" (mm^2) is a standard unit of measurement for area.

Q43 (A): Simplify [x - 2 + 1/x] / [x - 1/x]. The numerator simplifies to $(x^2 - 2x + 1)/x = (x - 1)^2/x$. The denominator simplifies to $(x^2 - 1)/x = (x - 1)(x + 1)/x$. Dividing the numerator by the denominator yields $(x - 1)^2 / [(x - 1)(x + 1)] = (x - 1)/(x + 1)$.

Q44 (C): Simplify $\sqrt{200} + 3\sqrt{8} = \sqrt{(100 \times 2)} + 3\sqrt{(4 \times 2)} = 10\sqrt{2} + 3(2\sqrt{2}) = 10\sqrt{2} + 6\sqrt{2} = 16\sqrt{2}$.

Q45 (D): Let the number be x. The equation is $x + 1/x = 82/x$. Multiplying both sides by x gives $x^2 + 1 = 82$, which means $x^2 = 81$, so x = ±9. From the given options, 9 is the correct solution.

Q46 (D): Let d be distance. 70 + 15d = 250, which means 15d = 180, so d = 12 km.

Q47 (A): Time = Distance/Speed = 325/75 = 4.333 hours = 4 hours and 20 minutes.

Q48 (D): Let the dimensions of the rectangular enclosure be x and y. Total fencing length plus the 2 m gate equals the perimeter: 2x + 2y - 2 = 100, which means 2x + 2y = 102, so x + y = 51. To maximize area A = xy, we set x = y = 25.5 m. Maximum area = $25.5^2 = 650.25 = 2601/4$ m^2.

Q49 (B): Given x : y : z = 2 : 3 : 5. Since y = 60, the scaling factor is 60/3 = 20. Therefore, x = 2 × 20 = 40 and z = 5 × 20 = 100. Thus, x + z = 40 + 100 = 140.

Q50 (B): Let the consecutive roots of $x^2 - mx + k = 0$ be n and n + 1. Sum of roots: m = n + (n + 1) = 2n + 1. Product of roots: $k = n(n + 1) = n^2 + n$. Evaluating $m^2 - 4k = (2n + 1)^2 - 4(n^2 + n) = 4n^2 + 4n + 1 - 4n^2 - 4n = 1$.

Q51 (C): Combined 2022 profit = 500,000. Profit ratio is 4:5:6:5 (total parts = 20). 2022 profit for R = (6/20) × 500,000 = 150,000. 2022 profit for S = (5/20) × 500,000 = 125,000. 2023 profit of R (+15%) = 150,000 × 1.15 = 172,500. 2023 profit of S (+10%) = 125,000 × 1.10 = 137,500. Difference in 2023 = 172,500 - 137,500 = 35,000.

Q52 (B): 2022 profit for Q = (5/20) × 500,000 = 125,000. 2023 (+30%) = 162,500. 2024 (-25%) = 121,875. 2025 (+20%) = 146,250. Overall % increase = [(146,250 - 125,000) / 125,000] × 100% = 17%.

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Q53 (B): Calculating each shop's profit for 2025: P = 119,025; Q = 146,250; R = 175,950; S = 137,500. Combined 2025 profit = 578,725. Total increase = 578,725 - 500,000 = 78,725. Percentage increase = (78,725 / 500,000) × 100% = 15.74%.

Q54 (C): S profit in 2023 = 137,500. S profit in 2024 = 110,000. Ratio = 137,500 : 110,000 = 1.25 = 5:4.

Q55 (A): Combined profit in 2023 = 115,000 + 162,500 + 172,500 + 137,500 = 587,500. Combined profit in 2024 = 103,500 + 121,875 + 146,625 + 110,000 = 482,000. Difference = 587,500 - 482,000 = 105,500.

Q56 (C): Simplify $[(a^3b^{1/2})^4] / (a^6b^3) = (a^{12}b^2) / (a^6b^3) = a^6/b$.

Q57 (A): Prime numbers from 1 to 8 are {2, 3, 5, 7} (4 primes). Probability = 4/8 = 1/2.

Q58 (D): Total outcomes = 36. Pairs that are NOT relatively prime (greatest common divisor greater than 1): (2,2), (2,4), (2,6), (3,3), (3,6), (4,2), (4,4), (4,6), (5,5), (6,2), (6,3), (6,4), (6,6), which gives 13 outcomes. Probability = 13/36.

Q59 (B): The pyramid pattern follows the rule A + B - 1 for adjacent lower blocks to form the block directly above them. Row 2: 4+2-1 = 5, 2+3-1 = 4, 3+7-1 = 9. Row 3: 5+4-1=8, 4+9-1=12. Row 4 (top): x = 8+12-1 = 19.

Q60 (A): The pattern is the product of all digits except the last one, added to the last digit. For 12345: (1 × 2 × 3 × 4) + 5 = 29. For 23456: (2 × 3 × 4 × 5) + 6 = 126. For 3456: (3 × 4 × 5) + 6 = 66.