

FAST-NU FLP/Mock

Exam

Section	No. of Questions	Weightage	Time Allocated (Mins)	Negative Marking
Advance Math	50	50	50	Yes
Basic Math	20	20	20	Yes
English	30	10	30	Yes
IQ and Analytical Skills	20	20	20	Yes
Total	120	100	120	—

Section-1: English

Q1) Diffuse most nearly means

a) incomprehensible b) scatter c) unplug d) difficult

Q2) Select the word or phrase that best completes the sentence: When the building was completed, all the workers were paid _____.

a) through b) over c) off d) away e) out

Q3) Rattlesnakes do not bite humans out of a malicious nature, (and they will attack if they feel threatened.)

- a) but still they will attack at feeling threatened.
- b) and they will attack if they feel threatened.
- c) yet they will attack if they feel threatened.
- d) however they will attack at feeling threatened.
- e) because they will attack, however only if they feel threatened.

Q4) He was excluded _____ the team.

- a) by b) for c) on d) from

Q5) They make these tools of plastic. The passive voice of this sentence is: These tools _____ of plastic.

- a) made b) were being made c) are made d) were made

Q6) Select the word or phrase that best completes the sentence: Although the developmental sequence of the reproductive cycle in insects is similar for many species, the timing can _____ greatly in regard to the beginning and duration of each stage.

- a) vary b) accelerate c) endure d) proceed e) coincide

Q7) Replace the text within parenthesis with the correct option from a to e. A healthy economy can be measured not only by the growth of business but (it has a) psychological effect on people.

- a) it has a b) also by the c) as well in the d) also the e) in the way of having a

Q8) In physical education classes, children learn to _____ in a healthy way.

- a) compete b) competition

Q9) Select the correct sentence from the following:

- a) In 1989, the space probe Voyager 2 was flying by the planet Neptune.
- b) In 1989, the space probe Voyager 2 flew by the planet Neptune.
- c) In 1989, the space probe Voyager 2 fly by the planet Neptune.
- d) In 1989, the space probe Voyager 2 having flown by the planet Neptune.
- e) None of these

Q10) advance : retreat :: curtail : _____

- a) prolong b) damage c) discard d) consume

Q11) Select the Antonym of the word: Valid

- a) Sound b) Illogical c) Empty d) Noisy

Q12) Select the Antonym of the word: Subsequent

- a) Definitive b) Previous c) Following d) Related

Q13) Select the pair of words or phrases that best expresses a relationship similar to that expressed in the capitalized pair: BINOMIAL : NAME ::

- a) entreat : gift b) normal : mean c) octagon : eight d) centennial : year e) benediction : church

Q14) Which is a synonym for Ruse?

- a) modern b) fact c) hoax d) orthodox e) leader

Q15) Select the word or phrase that best completes the sentence: Some officers have _____ their previous statements denying any involvement on their part with the contra aid network.

- a) justified b) protracted c) repeated d) supported e) recanted

Q16) Select the pair of words or phrases that best expresses a relationship similar to that expressed in the capitalized pair: WARM : TORRID ::

a) calm:removed b) timid:brave c) tepid:caring d) cool:gelid e) casual:costly

Q17) conceal : obscure :: procrastinate : _____

a) pretend b) delay c) anticipate d) relinquish

Q18) Select the Antonym of the word: Fortify

a) component b) pacify c) increase d) defy e) weaken

Q19) Eccentric is most similar to

a) frugal b) selective c) normal d) peculiar

Q20) She's so _____, I can't remember the last time she did a day's work! a) hardworking b) conscientious c) idle d) diligent

Q21) Fiasco is most similar to

a) disaster b) happenstance c) ceremony d) festival

Q22) Replace the text within parenthesis with the correct option from a to e. Trees are able to collect large amounts of water from fog - (in some area as much as thirty inches annually).

- a) in some places collecting about thirty inches per year annually.
- b) which in some areas amounts to thirty inches collected annually.
- c) in some area as much as thirty inches annually.
- d) in some areas having thirty inches per year.
- e) collecting the equal of thirty inches annually in some places.

Q23) Select the preposition that best completes the sentence: It is difficult to collaborate ----- an illiterate person.

a) from b) on c) of d) with e) for

Q24) Select the correct sentence from the following:

- a) None of these
- b) If two pieces of rope are of different thickness the weaver's knot can be used to join them.
- c) Two of pieces of rope are of different thickness the weaver's knot can be used to join them.
- d) Two such pieces of rope are of different thickness the weaver's knot can be used to join them.
- e) What two pieces of rope are of different thickness the weaver's knot can be used to join them.

Q25) Replace the text within parenthesis with the correct option from a to e. (As patients, the medical directors of the clinic believe that you) are entitled to know the reason for the increase in fees.

- a) The belief of the clinic's medical directors about patients is that you
- b) As patients, the medical directors of the clinic believe that you
- c) The medical directors of the clinic believe that as patients, you
- d) You, as patients, are believed by the clinical medical directors, and you
- e) The medical directors of the clinic, who believe that you, as patients

Q26) When they entered the room, the light _____ quite dazzling.

- a) was b) is c) were d) are

Q27) Select the correct sentence from the following:

- a) None of these
- b) For the development of film at home requires only three types of chemicals, several pieces of simple equipment and running water.
- c) When film is developed at home requires only three types of chemicals, several pieces of simple equipment and running water.
- d) In developing film at home requires only three types of chemicals, several pieces of simple equipment, and running water.
- e) To develop film at home requires only three types of chemicals, several pieces of simple equipment, and running water.

Q28) He wouldn't have been late for the exam if he _____ earlier.

- a) hadn't left b) had left c) leave d) left

Q29) Would you like (us to keep an eye at your house when you are) on holidays?

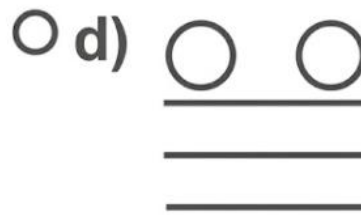
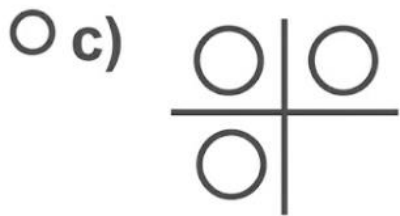
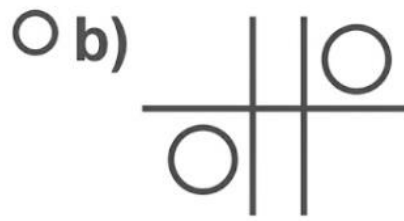
- a) us to keep an eye of your house when you are
b) us to keep an eye on your house when you are
c) us to keep an eye at your house when you are
d) us to keep an eye off your house when you are
e) us to keep an eye out your house when you are

Q30) Select the Antonym of the word: Chat

- a) deceive b) conserve c) surprise d) utterance e) silence

Section-2: IQ & Analytical Skills

Q1) Which is the odd one out?



Q2) Identify the odd one

a) Walk b) Distance c) Ride d) Fly e) Drive

Q3) A is as much older than B as he is younger than C. If C is twice as old as B and their total age is 54 years, find A's age in years.

a) 16 b) 18 c) 20 d) 24

Q4) The senate candidate expressed outrage that few judges have any background in technology, yet they try to resolve cases involving high tech companies. He stated that not one federal judge has a degree or any experience in computer technology. A promising response to this concern, arguing that things are not as bad as they might seem, could involve which of the following claims?

- a) There is very little opportunity for, and indeed little need for, technical expertise in the judicial branch. There is therefore almost no way for a technical specialist to rise through the ranks to a top-level position in government.
- b) There is a lack of people who are qualified in both technical and legal areas of expertise.
- c) Computer scientists, by and large, have little interest in politics and public policy. It would be difficult to find scientists with the degree of commitment required for a serious contribution to the judicial system.
- d) The rewards of a life as a judge, in terms of both money and prestige, are not high enough to attract top-flight technical experts to this area.
- e) Most of the public policy questions in this area are really about the morality and the value of scientific and technological developments. They do not require much technical understanding beyond that of a layperson.

Q5) The crux of creativity resides in the ability to manufacture variations on a theme. If we look at the history of science, for instance, we see that every idea is built upon a thousand related ideas. Careful analysis leads us to understand that what we choose to call a new theme or a new discovery is itself always and without exception some sort of variation, on a deep level, of previous themes. If all of the statements in the passage are true, each of the following must also be true EXCEPT:

- a) No scientific idea is entirely independent of all other ideas.
- b) Careful analysis of a specific variation can reveal previous themes of which it is a variation.
- c) All great scientific discoverers have been able to manufacture a variation on a theme.
- d) A lack of ability to manufacture a variation on a previous theme connotes a lack of creativity.

e) Some new scientific discoveries do not represent, on a deep level, a variation on previous themes.

Q6) According to the National Agricultural Aviation Society (NAAS), without the use of crop protection products to control insects, weeds, and diseases, crop yields per acre will drop by more than 50 percent. The first aerial application of insecticide occurred in 1921, and it was a huge success. By contrast, in today's economy all aircraft that are classified as aerial applicators do more than just apply insecticide; today, they also spread seed and apply fertilizer. From the information given above it CANNOT be validly concluded that

- a) in today's economy, if an aerial applicator is used, then it will be able to spread seed and to apply fertilizer
- b) in today's economy, any aircraft that cannot be used to apply fertilizer cannot be classified as an aerial applicator
- c) in 1921, if an aircraft was used for the application of insecticide, then it was not also used to spread seed
- d) according to the NAAS, if crop yields per acre never drop by more than 50 percent, then crop protection products have been used to control insects, weeds, and diseases
- e) according to the NAAS, if crop yields per acre drop by more than 50 percent, then crop protection products have not been used to control insects, weeds, and diseases.

Q7) Pointing to a boy, a woman said, "He is the son of my husband's only daughter." How is the woman related to the boy?

- a) Mother b) Grandmother c) Aunt d) Sister

Q8) 1, 2, 6, 15, 31, ?

- a) 44 b) 56 c) 58 d) 49

Q9) One morning, George Petersen of Petersen's Garage watches as a 1995 Da Volo station wagon is towed onto his lot. Because he knows that nearly 90% of the 1995 Da Volo station wagons brought to his garage for work in the past were brought in because of malfunctioning power windows, he reasons that there is an almost 9 to 1 chance that the car he saw this morning has also been brought in to correct its faulty power windows. Which one of the following employs flawed reasoning most similar to that employed by George Petersen?

- a) Only one out of 50 applications for bypassing zoning regulations and establishing a new business in the Gedford residential district is accepted. Since only 12 such applications were made last month, there is virtually no chance that any of them will be accepted
- b) Nearly 95% of last year's Borough High School graduating class went on to some type of further schooling. Since only a little more than 5% of that graduating class took longer than the usual four years to graduate, it is probable that everyone who did graduate within four years went on to further schooling.
- c) 90% of those who attempt to get into Myrmidon Military Academy are turned down. Since the previous 10 candidates to the academy were not accepted, Vladimir's application will almost certainly be approved.
- d) Mayor Lieberman was reelected by a majority of almost 75%. Since Janine Davis voted in that mayoral election, the chances are almost 3 to 1 that she voted for Mayor Lieberman.
- e) Each week nine out of 10 best-selling paperback books at The Reader's Nook are works of fiction. Since Nash's history of World War II was among the ten best-selling paperback books at The Reader's Nook this week, the chances are 9 to 1 that it is a work of fiction

Q10) Pointing to a girl, Hamza said, “She is the daughter of the only son of my grandfather.” Who is the girl?

a) Sister b) Daughter c) Cousin d) Niece

Q11) If P is the mother of Q, Q is the brother of R, and R is the daughter of S, then how is S related to Q?

a) Father b) Mother c) Brother d) Uncle

Q12) The ratio of the ages of A and B is 5 : 3. Eight years ago, the ratio was 3 : 1. Find the difference between their present ages.

a) 2 b) 4 c) 6 d) 8 e) 10

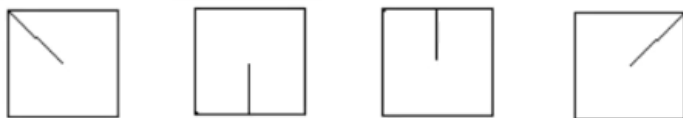
Q13) Which number comes next in the given series 1 2 3 5 8 ?

a) 11 b) 13 c) 8 d) 5

Q14) Find a letter which when added to each of the four words TICK, HEAT, BUST, FIST produces entirely new meaningful words.

a) A b) S c) Y d) E e) R

Q15) Which figure comes next?



a)

b)

c)

d)

Q16) 7, 8, 11, 16, 23, ?

a) 30 b) 32 c) 39 d) 28

Q17) If BOAT is to 1234 , then BAT is to ?

- a) 131 b) 221 c) 112 d) 134 e) 124

Q18) If MLC = ONE BME = DOG then RUM = ?

- a) BAT b) DOC c) CAT d) TWO e) EYE

Q19) As any economist knows, healthy people pose less of an economic burden to society than unhealthy people. Not surprisingly, then, every dollar our state government spends on prenatal care for undocumented immigrants will save taxpayers of this state three dollars. Which of the following, if true, would best explain why the statistics cited above are not surprising?

- a) Babies born in this state to undocumented immigrant parents are entitled to infant care benefits from the state.
- b) State benefits for prenatal care serve to promote undocumented immigration.
- c) Pregnant women who do not receive prenatal care are more likely to experience health problems than other pregnant women.
- d) Babies whose mothers did not receive prenatal care are just as healthy as other babies.
- e) The state's taxpayers pay for prenatal care of all immigrants.

Q20) Is it wrong for doctors to lie about their patients' illnesses? Aren't doctors just like any other people we hire to do a job for us? Surely, we would not tolerate not being told the truth about the condition of our automobile from the mechanic we hired to fix it, or the condition of our roof from the carpenter we employed to repair it. Just as these workers would be guilty of violating their good faith contracts with us if they were to do this, doctors who lie to their patients about their illnesses violate these contracts as well, and this is clearly wrong. The conclusion of the argument is best expressed by which of the following?

- a)** Doctors are just hired workers like mechanics and carpenters.
- b)** Doctors often lie to their patients about their illnesses.
- c)** Doctors, like mechanics and carpenters, enter into good faith contracts with us when we hire them.
- d)** It is wrong for doctors to lie about their patients' illnesses.
- e)** Doctors who lie to their patients about their illnesses violate their good faith contracts with their patients.

Section-3: Basic Math

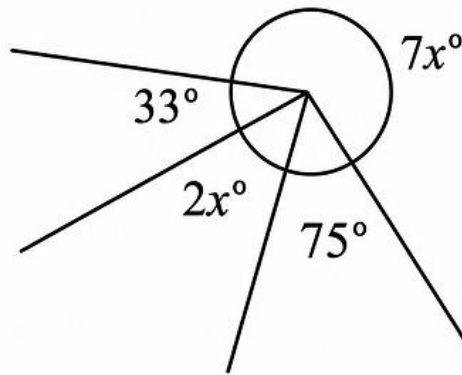
Q1) The average of two numbers is M , and one number is N . The other number is:

- a) $2N$ b) $M-N$ c) $2M-N$ d) $2M$

Q2) Two circles touch externally. The sum of their areas is 130π sq cm and the distance between their centres is 14 cm. The radius of the smaller circle is :

- a) 5 cm b) 4 cm c) 3 cm d) 2 cm

Q3) Find x



- a) 28 b) 152 c) 60 d) 27

Q4) The average (arithmetic mean) score of the two forwards on a basketball team was 21 pts. The average scores of the remaining three players was 11 . What was the average score of all 5 players on the team?

- a) 15.5 b) 14.5 c) 5 d) 15 e) 16

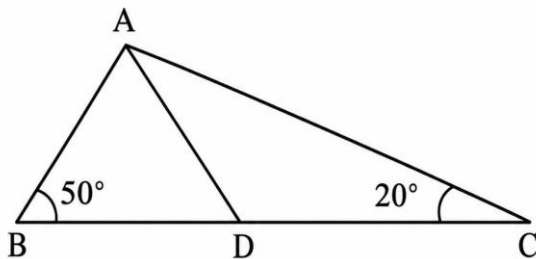
Q5) Q) If an airplane starts at point R and travels 14 miles directly north to S, then 48 miles directly east to T, what is the straight line distance (in miles) from T to R?

- a) 50 b) 25 c) 60 d) 35**

Q6) Two trains 114 meters and 116 meters in length are running towards each other on the parallel lines at a speed of 58 km/hour and 60 km/hour respectively. How long will it take to cross, each other after they meet?

- a) 11 seconds b) 10 seconds c) 8 seconds d) 9 seconds**

Q7) Given that $\angle ABD = 50^\circ$, $\angle ACB = 20^\circ$ and $AB = AD$ in the figure, the measure of the angle CAD is



Q8) The average (arithmetic mean) score of the two forwards on a basketball team was 21 pts. The average scores of the remaining three players was 11. What was the average score of all 5 players on the team?

- a) 15.5 b) 14.5 c) 5 d) 15 e) 16**

Q9) A sells a horse to B at a profit of 5% and B sells it to C at a profit of 10%. If C pays Rs. 231 for it, what did it cost to A?

- a) Rs. 200 b) Rs. 250 c) Rs. 150 d) Rs. 100**

Q10) A girl starts running with the speed of x meters per second where x is equal to number of seconds in a minute. How much distance she covers in 3 minutes.

- a) 180 meters b) 18 meters c) 1080 meters d) 3 meters e) 10800 meters**

Q11) Income of A is 25% less than B. How much percent B's income would be more than that of A?

- a) $33\frac{1}{2}\%$ b) 33% c) 30% d) 35%

Q12) Out of a total electorates of 25480 of a city, 11570 are women. Find the ratio between the number of men voters to the number of women voters:

- a) 207: 90 b) 107: 89 c) 108: 89 d) 208: 90

Q13) Solve the equation $8^{\frac{2}{3}} = (24x)^{\frac{1}{2}}$.

- a) 1/6 b) 2/3 c) 3 d) 1/2

Q14) If the 5th number is taken out of a data set, the average gets reduced to 80 from 90. What is the 5th number?

- a) 150 b) 140 c) 170 d) 130 e) 160

Q15) Given that $m = \sqrt{n}$, $n = \sqrt{q}$, $q = \sqrt{p}$ then $p = ?$:

- a) m^2 b) m^4 c) m^8 d) m^{16} e) m^{32}

Q16) How many days are there in W weeks and W days?

- a) 7 b) 8w c) 7w d) 14w

Q17) If a family of 9 persons spends Rs. 4800 in 8 months, how much will be spent by a family of 24 persons in 16 months.

- a) Rs. 25,600 b) Rs. 26,000 c) Rs. 25,000 d) Rs. 26,600

Q18) An arc AB of length of 5 cm is marked on a circle of radius 3 cm. area of sector bounded by this arc and radii from A and B is

- a) 7.5 cm^2 b) 7.5 m^2 c) 75 cm^2 d) 75 m^2

Q19) A rectangular bin 4 feet long, 3 feet wide and 2 feet high is solidly packed with bricks whose dimensions are 8 inches , 4 inches and 2 inches. The number of bricks in the bin is

- a) 648 b) 54 c) 640 d) 1298 e) 5**

Q20) What will be 80% of a number whose 200% is 90?

- a) 72 b) 54 c) 144 d) 36**

Section-4: Advance Math

Q1) State one algebraic property of the real numbers that justify the statement: $(a + 2b)c = (2b + a)c$

- a) Associative law for multiplication**
b) Commutative law for multiplication
c) Commutative law for addition
d) Closure law for multiplication
e) Distributive law of multiplication over addition

Q2) For $f(x) = \sqrt{x^2 - 4}$, where x and $f(x)$ are real numbers, the domain of $f(x) =$ _____

- a) $[-\infty, -2] \cup [2, +\infty]$ b) $[-\infty, -2) \cup [2, +\infty)$ c) $(-\infty, -2] \cup [2, +\infty)$**
d) $[-\infty, -2) \cup (2, +\infty]$ e) $(-\infty, -2) \cup (2, +\infty)$

Q3) Direction cosines of the vector $\underline{a} = [3, 7, -4]$ are

- a) $\frac{3}{\sqrt{74}}, \frac{7}{\sqrt{74}}, \frac{4}{\sqrt{74}}$ b) $\frac{-3}{\sqrt{74}}, \frac{7}{\sqrt{74}}, \frac{-4}{\sqrt{74}}$ c) $\frac{-3}{\sqrt{74}}, \frac{-7}{\sqrt{74}}, \frac{4}{\sqrt{74}}$**
d) $\frac{3}{\sqrt{74}}, \frac{7}{\sqrt{74}}, \frac{-4}{\sqrt{74}}$ e) $\frac{-3}{\sqrt{74}}, \frac{-7}{\sqrt{74}}, \frac{-4}{\sqrt{74}}$

Q4) The equation of the tangent to the hyperbola $3x^2 - 4y^2 = 12$ at point $(4, -3)$ is

- a) $x - y = -1$ b) $-x - y = 1$ c) $x + y = -1$**
d) $x - y = 1$ e) $x + y = 1$

Q5) The following trigonometric expression is equivalent to?

$$\frac{\cos^2 \theta - \sin^2 \theta}{1 - \tan^2 \theta}$$

- a) $\sin^2 \theta$ b) $\csc^2 \theta$ c) $\cot^2 \theta$ d) $\tan^2 \theta$ e) $\cos^2 \theta$**

Q6) If $y = 3t^2 + 2t + 1$ and $x = 3t^2 + 9$, then $\frac{dy}{dx} = ?$

- a) $4t + 1$ b) $3t - 1$ c) $1 + \frac{1}{3t}$ d) $1 - \frac{1}{3t^2}$ e) $1 - \frac{1}{3t}$**

Q7) The domain of the function $y = \cos x$ is

- a) $-\frac{\pi}{2} < x < \pi$ b) $-\frac{\pi}{2} < x < \frac{\pi}{2}$ c) $0 < x < \pi$ d) $-\pi < x < \pi$ e) $-\infty < x < \infty$**

Q8) The angle between the horizontal ray through an observer's eye and a ray from the observer's eye to a highest point is called

- a) Angle of depression b) Angle of elevation c) Horizontal angle**
d) Vertical angle e) right angle

Q9) If $S = \{(1,1), (1,3), (1,5), (3,1), (3,3), (3,5), (5,1), (5,3), (5,5)\}$, then write $r = \{(x, y) \mid x > y\}$

- a) None of these b) $r = \{(3, -3), (5,5), (1,1)\}$ c) $r = \{(3,3), (5,5), (1,1)\}$**
d) $r = \{(3,1), (5,1), (5,3)\}$ e) $r = \{(1,5), (1,3), (5,5)\}$

Q10) $(r + 1)^{\text{th}}$ term in the expansion of $(a + x)^n$ is

- a) $\binom{n+1}{r} a^{n-r} x^r$ b) $\binom{n}{r+1} a^{n-(r+1)} x^{r+1}$ c) $\binom{n}{r-1} a^{n-(r-1)} x^{r-1}$ d) $\binom{n}{r} a^{n-r} x^r$**

Q11) $\int \sqrt{\csc^2 3x - \cot^2 3x} dx = \underline{\hspace{2cm}}$

a) $\frac{1}{3} \ln |\cos 3x - \cot 3x| + \frac{1}{3} \ln \sin 3x + c$ b) $\frac{1}{3}x + c$ c) $3x + c$

d) $\frac{2}{3} (\csc^2 3x - \cot^2 3x)^{3/2} + c$ e) $x + c$

Q12) $\lim_{x \rightarrow 4} \frac{x^2 - 16}{x - 4} = ?$

a) 18 b) 9 c) 4 d) 8

Q13) Let $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ be the equation of a hyperbola, then a circle with radius $= \sqrt{a^2 + b^2}$ and centre at one focus may intersect the hyperbola in _____ points.

a) 4 b) 3 c) 2 d) 1 e) 0

Q14) Without solving the sum and product of the roots $7x^2 + 6x - 5 = 0$

a) $S = \frac{6}{7}, P = \frac{-2}{3}$ b) $S = \frac{-6}{7}, P = \frac{-5}{7}$ c) None of these

d) $S = \frac{5}{7}, P = \frac{-2}{3}$ e) $S = \frac{6}{7}, P = \frac{2}{3}$

Q15) The value of

a) $\begin{bmatrix} \sin \theta & 0 \\ 0 & \cos \theta \end{bmatrix}$ b) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 2 & 0 \\ 0 & \sin(\pi/2) \end{bmatrix}$ d) $\begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix}$ e) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

Q16) If $n! = (n-1)!$, then $n =$ _____

a) 2 b) 1 c) n d) -1 e) 0

Q17) The solution of $\frac{1-x}{3} < 2$ is

a) $x > 5$ b) $x > -5$ c) $-5 < x < 5$ d) $x < -5$ e) $x < 5$

Q18) If b is a constant, then $\int b f(x) dx = ?$

a) $4b \frac{f(x)}{4} + c$ b) None of these c) $\frac{b^2}{2} \int f(x) + c$

d) $\frac{bf'(x)}{f(x)} + c$ e) $b \int f(x) dx + c$

Q19) Calculate the area of region bounded by $y = 4x^2$, $y = 4$ & $x = 0$ in the first quadrat.

- a) 16 b) 8 c) 4 d) $8/3$ e) $-8/3$

Q20) The square of modulus of $\frac{7}{4} + \frac{5}{6}i$ is where $i = \sqrt{-1}$

- a) $3\frac{15}{65}$ b) $65\frac{1}{5}$ c) $3\frac{109}{144}$ d) $5\frac{80}{341}$ e) $3\frac{34}{144}$

Q21) If in a ΔABC , $a = 5$, $b = 3$, $c = 4$, then $\alpha =$ _____, where a, b, c are sides of the ΔABC opposite to angles α, β & γ respectively.

- a) 60° b) 0° c) 45° d) 30° e) 90°

Q22) If $A = \begin{bmatrix} 2 & 2 & 2 & 2 \\ 1 & 1 & 1 & 1 \\ 4 & 4 & 4 & -4 \\ 6 & 9 & 6 & 9 \end{bmatrix}$, then

- a) $|A| = 1$ b) $|A| = 9$ c) $|A| = 19$ d) $|A| = 4$ e) $|A| = 0$

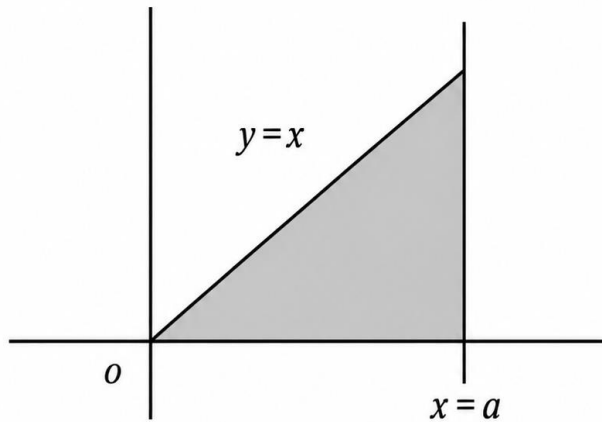
Q23) If the set $\{a, b, c\}$ forms a group under $*$, then using the given Cayley table:

*	a	b	c
a	c	a	b
b	a	b	c
c	b	c	a

Inverse of 'a' is:

- a) a b) c c) Does not exist d) b e) 1

Q24) Find the area of the shaded region in the given figure:



- a) 0 b) $\frac{x^2}{2}$ c) $\frac{a^2}{2}$ d) $-\frac{a^2}{2}$

Q25) The n th term of the G.P. where $a = -3, r = 2, n = 8$

- a) -384 b) 384 c) 279936 d) 29736 e) 54325

Q26) The equation of the line with slope -3 and passing through the point (2,1) is

- a) $x + 3y + 7 = 0$ b) $3x + y - 7 = 0$ c) $x + y = 0$
d) $x + 7y - 14 = 0$ e) $2x + 5y = 18$

Q27) The equation of the normal to the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$ at the point whose ordinate is 3 is _____

- a) $y = 3$ b) $x = 0$ c) $2x + 3y = 9$ d) $3x - 2y + 6 = 0$ e) $3x - 2y - 6 = 0$

Q28) For a vector $\vec{v} = 2\hat{i} - \hat{j} + 7\hat{k}$, the coordinates of the terminal point are _____

- a) $(-2, 1, -7)$ b) $(2, -1, 7)$ c) (a_1, a_2, a_3) d) $(0, 0, 0)$ e) $(\hat{i}, \hat{j}, \hat{k})$

Q29) If $y = \frac{e^x}{x^2}$, $\frac{dy}{dx} = ?$

- a) $\frac{x^2 e^x - e^x \cdot (2x)}{x^4}$ b) $\frac{1}{x^2} e^x + \frac{2}{x^3} e^x$ c) $\frac{2x(e^x + 1)}{e^{2x}}$ d) $\frac{e^x}{x^2} \cdot (2x)$ e) None of these**

Q30) If $2 \cos^2 \frac{\alpha}{2} - 1 = \frac{1}{2}$ and $0 \leq \alpha \leq 90^\circ$, then $\alpha =$ _____

- a) 90° b) 30° c) 0° d) 45° e) 60°**

Q31) A die is rolled what is the probability that it shows greater than or equal to 5?

- a) $1/3$ b) 0 c) $1/2$ d) $1/4$ e) 1**

Q32) Let $x - \sqrt{x} = 0$, $x > 0$, then $X =$ _____

- a) -1 b) 1.41 c) 2 d) -2 e) 1**

Q33) $\sin 12\theta + \sin 10\theta = ?$

- a) $-\sin 11\theta \cos \theta$ b) $-2 \sin \theta \cos 11\theta$ c) $\sin 2\theta \cos 11\theta$
d) $2 \sin 11\theta \cos \theta$ e) $\sin 12\theta \cos \theta$**

Q34) If $f'(c)$ exists then $f(c)$ is a maximum or minimum value of f , only if $f'(c) =$ _____

- a) Negative b) 1 c) never equals zero d) 0 e) Positive**

Q35) $\frac{d}{dx} [\ln \cos x] = ?$

- a) $\tan x$ b) $-\tan x$ c) $\cot^2 x$ d) $\csc^2 x$ e) $\sec x$**

Q36) Find second derivative of $y = \tan x$

- a) $2 \sec^2 x \cdot \tan x$ b) $2 \sec^2 x$ c) $2 \cot x \csc^2 x$
d) $4 \sec x \cdot \tan x$ e) $2 \sec x \cdot \tan x$**

Q37) If $3\mathbf{i} + \mathbf{j} - \mathbf{k}$ and $\lambda\mathbf{i} - 4\mathbf{j} + 4\mathbf{k}$ are parallel vectors, the value of λ is

- a) 12 b) -4 c) -12 d) 4**

Q38) Find sum of three A.Ms. Between 2 and 10.

- a) 15 b) 6 c) 18 d) 12 e) 30

Q39) The y -intercept of the equation of normal to the ellipse

$3x^2 + 5y^2 = 57$ at point $(2,3)$ is

- a) -2 b) 4 c) 2 d) -1 e) 1

Q40) If $y = \log_{10} 10^x$, then $y' = ?$

- a) $1/x$ b) 1 c) $1/10$ d) $\ln 10$ e) $\frac{1}{10^x}$

Q41) Let x be negative integer lying between -2 and -4 and y be a positive integer lying between 2 and 4 then

- a) $5x < 5y$ b) $5x = 5y$ c) $-3y = -3x$ d) $5x > 5y$ e) $5x \geq 5y$

Q42) If the midpoint of a horizontal line segment with a length of 8 is $(3, -2)$, then the coordinates of its end points are:

- a) $(-1, -2)$ and $(7, -2)$ b) $(0, -2)$ and $(8, -2)$ c) $(3, 0)$ and $(3, 8)$
d) $(3, -6)$ and $(3, 2)$ e) $(1, -2)$ and $(9, -2)$

Q43) If $x = a^t$ and $y = t^a$, then $\frac{dy}{dx} = \underline{\hspace{2cm}}$

- a) $\frac{t^{a-1}}{(a^{t-1}) \ln a}$ b) $\frac{t^{a-1}}{a^t \ln a}$ c) $\frac{t^{a-1}}{a^{t-1}}$ d) $\frac{at^{a-1}}{a^t \ln a}$ e) $\frac{t^a}{a^{t-1} \ln a}$

Q44) What is middle term in H.P. whose 1st term and 3rd term are $1/5$ and $1/13$ respectively.

- a) 18 b) $1/9$ c) $1/8$ d) 9 e) 4

Q45) If you are given that each of two angles of a triangle is acute, what conclusion can you draw about the third?

- a) It is obtuse. b) It cannot exist since the triangle is impossible.
c) It is a right angle. d) It can have any measure between 0 and 180.
e) It is acute.

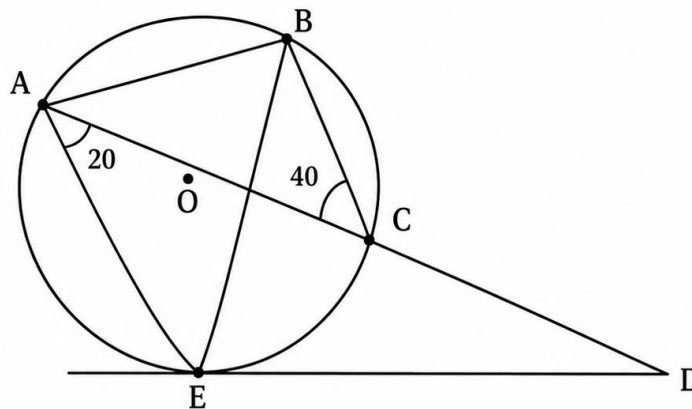
Q46) If $y = \frac{1}{4}x^x$, then $dy/dx = ?$

- a) $\frac{x}{4}$ b) $\frac{1}{4}(x^x)[\ln x + 1]$ c) $\frac{1}{4}$ d) $2/3$ e) $3/2$

Q47) $\lim_{x \rightarrow n} \frac{x-x^2}{x^4-n^2} = \underline{\hspace{2cm}}$ where n is a positive number.

- a) $\frac{1}{n^2}$ b) $\frac{1}{n^2+n}$ c) $-\frac{1}{n^2}$ d) $\frac{1}{2n^2}$ e) $-\frac{1}{n^2+n}$

Q48) DE is tangent to the circle with center O as shown in the figure. What is the angle ADE in degrees? All angles in the above figure are in degrees



All angles are in degrees

- a) 70 b) 30 c) 60 d) 40 e) 50

Q49) If $\sin^{-1} x - \cos^{-1} x = \pi/6$, then $x = ?$

- a) $\frac{2}{\sqrt{3}}$ b) $\sqrt{9}/2$ c) $\sqrt{3}/2$ d) None of these e) $-\frac{\sqrt{3}}{2}$

Q50) $\int \frac{x^2}{1-2x^3} dx = ?$

- a) $\frac{1}{6} \ln(1-2x^3) + c$ b) $-6x^2 \ln(1-2x^3) + c$ c) $3 \ln(1-2x^3) + c$
d) $6 \ln(1-2x^3) + c$ e) $-\frac{1}{6} \ln(1-2x^3) + c$

Must Attempt these Bonus Advance Math MCQs

Q1) Derivative of $y = \tan^{-1}\left(\frac{1}{x}\right)$, w.r.t. "x" is

- a) $(-1)/[x^2(1 + 1/x^2)]$ b) $(1)/(1 + 1/x^2)$ c) $(-x)/(x^2 + 1)$
d) $(2x)/(1 + 1/x^2)$

Q2) For equilateral $\triangle ABC$

$$r:R:r_1 = \dots \dots \dots$$

- a) 1:2:3 b) 2:3:1 c) 3:2:1 d) 3:1:2 e) 1:3:2

Q3) If α and β are roots of the equation $6x^2 + 5x + 1 = 0$, then $(\alpha - \beta)^2 = ?$

- a) $\frac{1}{36}$ b) $\frac{2}{7}$ c) $\frac{1}{4}$ d) $\frac{3}{5}$ e) $\frac{8}{9}$

Q4) If $*$ is a binary operation defined by $a * b = a + \frac{b}{2}$

And $\#$ is a binary operation defined by $a \# b = \sqrt{ab}$

For what values of a and b does $a * b = a \# b$?

- a) All real numbers b) zero only c) Only when $a = b$ d) No real numbers
e) 1 only

Q5) Four person enter a first class railway compartment in which there are six seats. In how many ways can they take their seats?

- a) 363 b) 361 c) 362 d) 360

Q6) $\int \frac{1+x}{x} dx = ?$

- a) $(\ln x) - x + c$ b) $x(1 + x)^{-1}$ c) $\frac{(1+x)^1}{1}$ d) $\ln x + c$ e) $(\ln x) + x + c$

Q7) The function $f(x) = (x - 2)^2(x - 1)$ has local extreme values at $x = ?$

- a) 2, 6/5 b) 2, 4/3 c) 3, 5 d) 13, -1/4 e) 1, 3/9

Q8) If "a", "b" and "c" vectors are not in cyclic order, then:

- a) Their scalar product is positive b) Scalar product is positive if $a = b$
c) Scalar product is negative d) $a \cdot b = 90$ e) Scalar product is equal to zero

Q9) If x be so small that its square and higher powers be neglected then

$$\frac{1+2x}{(1-3x)^2} = \underline{\hspace{2cm}}$$

- a) $1 + 3x$ b) $1 - 8x$ c) $1 + 6x$ d) $1 + 8x$

Q10) In a G.P the first term is 7, the last term is 448, & the sum is 889. Find the common ratio.

- a) 3 b) 2 c) 1 d) 4

Q11) The function f and g are defined as

$$f: x \rightarrow 3x + 4 \quad \text{and} \quad g: x \rightarrow \frac{1}{5}x$$

Find $[f(x)]^2 + [g^{-1}(x)]^2$

- a) $3x^2 + 3x + 16$ b) $x^2 + x + 34$ c) $34x^2 + 24x + 16$
d) $14x^2 + 38x + 16$ e) $x^2 + 24x + 16$

Q12) If $2 \cos \alpha = \cos(\alpha + \beta) + \cos(\alpha - \beta)$, where $\alpha \leq 90^\circ$ & $\beta \geq 0$, then $\beta =$

- a) 45° b) 60° c) 30° d) 90° e) 0°

Q13) $\int \sqrt[29]{3x+4} \, dx = ?$

- a) $\frac{29}{90}(3x + 4)^{\frac{30}{29}} + c$ b) $\frac{2}{3}(3x + 4)^{\frac{2}{30}} + c$ c) $\frac{90}{29}(3x + 4)^{\frac{4}{30}} + c$
d) $\frac{-3}{2}(3x + 4)^{\frac{21}{30}} + c$ e) $\frac{1}{29}(3x + 4)^{\frac{-28}{29}} + c$

Q14) $\tan 295^\circ = ?$

- a) $-\tan 25^\circ$ b) $-\cot 25^\circ$ c) $\cot 295^\circ$ d) $\cot 25^\circ$ e) $\tan 25^\circ$