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# Aptitude, 2017 EC, entrance exam, version 1

Grade 12 · Aptitude · 2017 E.C.

MARKING KEY — CONFIDENTIAL

**Time allowed:** 120 minutes | **Questions:** 57 | **Total marks:** 57

**1.** BAD-TEMPERED : ANGRY :: FLABBERGASTED : ? (1)

**A.** Pleased
**B.** Agitated
**C.** ✓ **Astonished**
**D.** Annoyed

**Answer:** C
The first pair joins a description of a person to the plain feeling behind it: someone bad-tempered is angry. Flabbergasted describes a person struck by shock, so the plain feeling is astonished. Annoyed is tempting because it belongs to the same family as angry, but annoyance is mild irritation and has nothing to do with shock.

**2.** DOG : BARK :: LION : ? (1)

**A.** ✓ **Roar**
**B.** Bleet
**C.** Scream
**D.** Snort

**Answer:** A
The pair matches an animal with the sound it makes. A dog barks, and the sound a lion makes is a roar. Bleet is tempting if you read fast, but that is the cry of a sheep or a goat, not a lion.

**3.** COBBLER : LEATHER :: CARPENTER : ? (1)

**A.** Furniture
**B.** ✓ **Wood**
**C.** Hammer
**D.** Chair

**Answer:** B
A cobbler is a craftsman and leather is the raw material he shapes, so the second word is what the worker starts with. A carpenter starts with wood. Furniture is tempting, but furniture is what the carpenter hands over at the end, not the material in his hands.

**4.** DISRUPTIVE (1)

**A.** Orderly
**B.** ✓ **Troublesome**
**C.** Peaceful
**D.** Helpful

**Answer:** B
This item asks for the word closest in meaning. Disruptive describes something that breaks up order and causes trouble, and troublesome carries that same sense. Orderly is tempting because it is a clean opposite, but so is peaceful, and a question cannot have two answers. That is the sign that the item wants a synonym, not an antonym.

**5.** TIMID (1)

**A.** Honest
**B.** Selfish
**C.** Confident
**D.** ✓ **Fearful**

**Answer:** D
Timid describes a person who holds back because they are easily frightened, so fearful says the same thing. Confident is tempting because it is the exact opposite of timid, but this block of the paper asks for the closest meaning, and the option that matches is fearful.

**6.** EXACERBATE (1)

**A.** ✓ **Aggravate**
**B.** Alleviate
**C.** Improve
**D.** Calm

**Answer:** A
To exacerbate a problem is to make it worse. Aggravate means the same: to worsen a condition or a situation. Alleviate is tempting because it also belongs to the language of problems, but to alleviate is to ease something, which is the reverse of what exacerbate does.

**7.** DESTITUTE (1)

**A.** Prostitute
**B.** ✓ **Wealthy**
**C.** Healthy
**D.** Generous

**Answer:** B
This item asks for the opposite. Destitute means having nothing at all, living in extreme poverty, so the opposite is wealthy. Prostitute is tempting because it rhymes with destitute and the eye grabs it, but a similar spelling is not a related meaning.

**8.** PERMISSION (1)

**A.** Authorization
**B.** Allowance
**C.** ✓ **Objection**
**D.** Consent

**Answer:** C
Permission is an agreement that lets someone go ahead. Authorization, allowance and consent all say that in different words, so the one that stands apart is objection, which is a refusal. Consent is tempting if you read the item as asking for the closest word, but then three of the four options would be correct at the same time, which cannot happen.

**9.** BRAVE (1)

**A.** ✓ **Cowardly**
**B.** Bold
**C.** Robust
**D.** Daring

**Answer:** A
Brave means facing danger without giving in to fear, so the opposite is cowardly. Bold is tempting because it sits so close to brave in force, but bold repeats the meaning instead of reversing it, and the same is true of daring.

**10.** Which word is different? (Options: Distant, Instant, Immediate, Urgent) (1)

**A.** ✓ **Distant**
**B.** Instant
**C.** Immediate
**D.** Urgent

**Answer:** A
Instant, immediate and urgent all speak about time, and all of them push towards now or very soon. Distant speaks about being far away, in space or in time, so it is the one that does not belong. Urgent is tempting because it is not an exact synonym of instant, but urgency still places a thing in the near future, which keeps it inside the group.

**11.** Which word is different? (Options: Mercury, Venus, Earth, Mars) (1)

**A.** Mercury
**B.** Venus
**C.** ✓ **Earth**
**D.** Mars

**Answer:** C
Mercury, Venus and Mars take their names from Roman gods. Earth does not: its name comes from an old word for the ground, and it is also the only one of the four known to carry life. Mercury is tempting as the odd one because it is the smallest and the closest to the Sun, but every planet is smallest or closest by some measure, so that does not separate one from three.

**12.** Which word is different? (Options: Contented, Joyful, Cheerful, Miserable) (1)

**A.** Contented
**B.** Joyful
**C.** Cheerful
**D.** ✓ **Miserable**

> **Answer:** D
> Contented, joyful and cheerful all describe a happy state of mind. Miserable describes deep unhappiness, so it is the word that does not fit with the others. Contented is tempting because it is quieter than joyful and cheerful, but quiet happiness is still happiness.

**13.** The movie was so suspenseful that we thought the _____ must have had a dramatic vision for the plot. (1)

**A.** producer
**B.** ✓ **screenwriter**
**C.** actor
**D.** cameraman

> **Answer:** B
> The sentence praises the vision behind the plot, and the plot is the story itself. The person who writes the story is the screenwriter, so that is whose vision shaped it. Producer is tempting because a producer leads the whole project, but a producer handles money and organisation rather than the story on the page.

**14.** Canine massage is a veterinary technique for calming dogs that are extremely _____. (1)

**A.** incompetent
**B.** controlled
**C.** ✓ **agitated**
**D.** restrained

> **Answer:** C
> Massage is given here to calm the dogs down, so the blank has to describe dogs that need calming. Agitated means restless and worked up, which is the state that calming treats. Restrained is tempting because it also fits an animal being handled, but a restrained dog is already being held still, so there would be nothing left to calm.

**15.** The student's essay was full of _____ ideas, making it difficult to follow and understand. (1)

**A.** biased
**B.** concise
**C.** ✓ **muddled**
**D.** factual

> **Answer:** C
> The second half of the sentence says the essay was hard to follow and understand, so the blank names a fault in clarity. Muddled ideas are mixed up and out of order, which is exactly why a reader loses the thread. Biased is tempting because it is also a criticism, but a biased essay can be perfectly clear to read while still being unfair.

**16.** Her _____ nature made her an excellent listener, as she always took the time to understand the concerns of others. (1)

**A.** ✓ **empathetic**
**B.** dramatic
**C.** apathetic
**D.** optimistic

> **Answer:** A
> The sentence says she always took the time to understand other people's concerns. Empathetic names that ability to feel what another person is feeling, and it is what makes someone a good listener. Apathetic is tempting because it looks almost the same on the page, but apathetic means not caring at all, which contradicts the rest of the sentence.

**17.** Correct sentence: No sooner the teacher arrived did the students start their presentation. (1)

**A.** No sooner the teacher arrived did the students start their presentation.

**B.** No sooner did the teacher arrive than the students start their presentation.

**C.** ✓ **No sooner did the teacher arrive than the students started their presentation.**

**D.** No sooner did the teacher arrived than the students started their presentation.

> **Answer:** C
> When a sentence opens with "no sooner", the subject and the verb swap places, so it becomes "did the teacher arrive", with the bare form after "did". The partner word is "than", not "when", and the second clause takes the past simple, so it is "the students started". Option B is tempting because it gets the inversion and the "than" right, but it leaves the second verb as "start" instead of "started".

**18.** Correct sentence: The instructor requested the pupils submit their project on time. (1)

**A.** ✓ **The instructor requested the pupils submit their project on time.**

**B.** The instructor requested that the pupils to submits their project on time.

**C.** The instructor requested that the pupils submitting their project on time.

**D.** The instructor requested that the pupils should submits their project on time.

> **Answer:** A
> After verbs of requesting, ordering and demanding, the clause that follows takes the base form of the verb. Grammar books call this the subjunctive: "requested that the pupils submit". The word "that" can be left out, which is why option A is correct as written. Option D is tempting because "should" is common in British usage, but even then it would have to be "should submit", never "should submits".

**19.** Correct sentence: Neither the director or the teachers are available for the meeting. (1)

**A.** Neither the director or the teachers are available for the meeting.

**B.** Neither the director or the teachers was available for the meeting.

**C.** Neither the director nor the teachers was available for the meeting.

**D.** ✓ **Neither the director nor the teachers were available for the meeting.**

> **Answer:** D
> The correct pair is "neither … nor"; "neither … or" is not English, which removes options A and B at once. When the two subjects differ in number, the verb agrees with the one standing nearer to it, and here that is "the teachers", which is plural, so the verb is "were". Option C is tempting because it fixes the "nor", but it then puts the singular "was" next to a plural subject.

**20.** *There are five friends (Alice, Bob, Charlie, David, and Emma) who are attending different events on different days of the week from Monday to Friday. The events are: Music Concert, Movie Night, Art Exhibition, Football Match and Book Reading. The following conditions apply: Bob attends the Football Match immediately before Emma's Book Reading. Alice attends the Art Exhibition immediately after the Music Concert. Charlie attends the Movie Night on Wednesday.* (1)

Given conditions: Five friends attend different events Monday to Friday. Bob attends Football Match immediately before Emma's Book Reading. Alice attends Art Exhibition immediately after Music Concert. Charlie attends Movie Night on Wednesday. Which of the following is the correct order of events for the week?

**A.** Music Concert, Book Reading, Art Exhibition, Football Match, Movie Night

**B.** ✓ **Football Match, Book Reading, Movie Night, Music Concert, Art Exhibition**

**C.** Football Match, Music Concert, Movie Night, Art Exhibition, Book Reading

**D.** Art Exhibition, Music Concert, Movie Night, Football Match, Book Reading

> **Answer:** B
> Each friend owns one event: Alice the Art Exhibition, Bob the Football Match, Charlie the Movie Night, Emma the Book Reading, which leaves the Music Concert for David. Charlie pins Wednesday, so the only pairs of neighbouring days left are Monday with Tuesday and Thursday with Friday, and you need two such pairs, one for Football then Book and one for Music then Art. Option B does that: Football Monday, Book Reading Tuesday, Movie Night Wednesday, Music Concert Thursday, Art Exhibition Friday. Option C is tempting because it also starts with the Football Match, but it puts the Book Reading on Friday, four days later instead of the next day.

**21.** *Conditions: Bob (Football) immediately before Emma (Book).* (1)

If Emma attends the Book Reading on Friday, on which day does Bob attend Football Match?

**A.** Monday

**B.** Tuesday

**C.** ✓ **Thursday**

**D.** Friday

> **Answer:** C
> The condition says Bob's Football Match falls on the day immediately before Emma's Book Reading. If the Book Reading is on Friday, then the Football Match is on the day before it, which is Thursday. Friday is tempting, but the two events are on separate days and Bob has to come first.

**22.** Four friends are sharing a box of chocolates. They decided that the friend who finished their homework first would get the extra piece. Moti finished his homework 3 minutes before Sena, who finished 10 minutes after Jalane. Tola finished 5 minutes before Sena. Who should get the extra piece? (1)

**A.** Moti

**B.** Sena

**C.** ✓ **Jalane**

**D.** Tola

> **Answer:** C
> Line every time up against Sena. Moti finished 3 minutes before Sena, Tola finished 5 minutes before Sena, and Sena finished 10 minutes after Jalane, which puts Jalane 10 minutes before Sena. The biggest head start belongs to Jalane, so Jalane finished first and takes the extra piece. Moti is tempting because he is named first in the question, but 3 minutes is the smallest lead of the three.

**23.** Pointing to a photograph of a boy, Mr. Tulu said, 'He is the son of the only son of my mother.' How is Mr. Tulu related to that boy? (1)

**A.** Brother

**B.** Uncle

**C.** Cousin

**D.** ✓ **Father**

> **Answer:** D
> Unpack the sentence from the inside. "The only son of my mother" is Mr Tulu himself, because he is the one son his mother has. The boy in the photograph is therefore the son of Mr Tulu, which makes Mr Tulu his father. Brother is tempting if you stop reading at "son of my mother" and forget that the photograph shows that man's son, not that man.

**24.** Statement: 'All mathematicians are logical thinkers. Some logical thinkers are not philosophers.' Conclusions: I. Some mathematicians are not philosophers. II. All mathematicians are philosophers. III. Some logical thinkers are philosophers. (1)

**A.** Only conclusion I follows

**B.** Only conclusion II follows

**C.** Only conclusion III follows

**D.** ✓ **Neither conclusion follows**

> **Answer:** D
> "All mathematicians are logical thinkers" puts every mathematician inside the larger group of logical thinkers. "Some logical thinkers are not philosophers" tells you about a part of that larger group, and that part need not contain a single mathematician, so conclusion I is not secure. Conclusion II claims something the statements never say. Conclusion III fails too, because "some are not" gives no promise that any of them are. With all three unsupported, the answer is that neither conclusion follows. Conclusion I is the tempting one because it looks like a chain, but a chain would need the "some" statement to be about mathematicians in the first place.

**25.** *Psychology and motivation are crucial in developmental classrooms. Many students enter these classes resentful, feeling they've been denied access to college-level courses. Some have struggled in previous academic settings, where they lacked support and found their classes ineffective. These students often expect little from themselves and their instructors, which leads to underperformance. Teachers must recognize these misaligned expectations and address them early. If students begin to opt out of assignments, miss classes, or submit work that isn't their best, it's important not to just mark down these failures. Instead, intervention is necessary. Teachers should engage students in a discussion to identify the causes of their lack of motivation or poor performance. This early intervention is key to helping students regain their footing and improve their work. By addressing these issues early on, teachers can guide students to better engage with their assignments and make more progress. Ignoring these early signs of disengagement only allows the problem to grow, making it harder for students to succeed later. Helping students recognize their potential and offering timely support can motivate them to perform to the best of their ability.* (1)

Who is the implied audience?

**A.** ✓ **Developmental teachers**

**B.** Developmental students

**C.** High school teachers

**D.** Parents of developmental students

> **Answer:** A
> Look at who is being told what to do. The passage says teachers must recognise misaligned expectations, teachers should engage students in a discussion, and teachers can guide students to better engagement. Every instruction is aimed at the person standing in front of the class, so the implied reader is the developmental teacher. Developmental students are tempting because the passage is about them, but they are the subject being described, not the reader being advised.

**26.** *Psychology and motivation are crucial in developmental classrooms. Many students enter these classes resentful, feeling they've been denied access to college-level courses. Some have struggled in previous academic settings, where they lacked support and found their classes ineffective. These students often expect little from themselves and their instructors, which leads to underperformance. Teachers must recognize these misaligned expectations and address them early. If students begin to opt out of assignments, miss classes, or submit work that isn't their best, it's important not to just mark down these failures. Instead, intervention is necessary. Teachers should engage students in a discussion to identify the causes of their lack of motivation or poor performance. This early intervention is key to helping students regain their footing and improve their work. By addressing these issues early on, teachers can guide students to better engage with their assignments and make more progress. Ignoring these early signs of disengagement only allows the problem to grow, making it harder for students to succeed later. Helping students recognize their potential and offering timely support can motivate them to perform to the best of their ability.* (1)

Which of the following can be inferred from the passage?

**A.** The writer dislikes developmental students.

**B.** The writer thinks all students should study psychology.

**C.** The writer thinks that teachers criticize students too much.

**D.** ✓ **The writer wants to help developmental teachers understand students.**

> **Answer:** D
> The passage does two things: it explains why these students arrive resentful and expecting little, and it tells the teacher what to do about it. Put those together and you have a writer helping developmental teachers understand their students. Option C is tempting because the passage warns against marking failures down, but the point there is to intervene early, not that teachers criticise too much.

**27.** *Psychology and motivation are crucial in developmental classrooms. Many students enter these classes resentful, feeling they've been denied access to college-level courses. Some have struggled in previous academic settings, where they lacked support and found their classes ineffective. These students often expect little from themselves and their instructors, which leads to underperformance. Teachers must recognize these misaligned expectations and address them early. If students begin to opt out of assignments, miss classes, or submit work that isn't their best, it's important not to just mark down these failures. Instead, intervention is necessary. Teachers should engage students in a discussion to identify the causes of their lack of motivation or poor performance. This early intervention is key to helping students regain their footing and improve their work. By addressing these issues early on, teachers can guide students to better engage with their assignments and make more progress. Ignoring these early signs of disengagement only allows the problem to grow, making it harder for students to succeed later. Helping students recognize their potential and offering timely support can motivate them to perform to the best of their ability.* (1)

As presented in the first paragraph, a main challenge developmental students face is to:

**A.** Overcome their hatred of teachers in general

**B.** Understand what will be expected of them in college

**C.** ✓ **Stay motivated and do their assignments to the best of their ability**

**D.** Manage their time so they can pass their classes despite work and family commitments

> **Answer:** C
> The first paragraph says these students often expect little from themselves and their instructors, and that this expectation leads to underperformance. Stated as a challenge, that is staying motivated and doing the work to the best of their ability. Option B is tempting because college-level courses are mentioned, but the passage raises them only to explain where the resentment comes from, not as a problem the students must solve.

**28.** *Psychology and motivation are crucial in developmental classrooms. Many students enter these classes resentful, feeling they've been denied access to college-level courses. Some have struggled in previous academic settings, where they lacked support and found their classes ineffective. These students often expect little from themselves and their instructors, which leads to underperformance. Teachers must recognize these misaligned expectations and address them early. If students begin to opt out of assignments, miss classes, or submit work that isn't their best, it's important not to just mark down these failures. Instead, intervention is necessary. Teachers should engage students in a discussion to identify the causes of their lack of motivation or poor performance. This early intervention is key to helping students regain their footing and improve their work. By addressing these issues early on, teachers can guide students to better engage with their assignments and make more progress. Ignoring these early signs of disengagement only allows the problem to grow, making it harder for students to succeed later. Helping students recognize their potential and offering timely support can motivate them to perform to the best of their ability.* (1)

The reason the author refers to students' opting out of assignments and missing classes is to:

**A.** Warn developmental students not to lose motivation

**B.** Shame students for being slackers and not taking class seriously

**C.** ✓ **Warn developmental teachers to take action to prevent students from failing**

**D.** Give an example of which students should not be allowed to take college-level classes

> **Answer:** C
> Opting out of assignments, missing classes and handing in work that is not their best appear in the passage right before the line saying it is important not to mark down these failures but to intervene instead. They are listed as the early warning signs that should make a teacher act. Option A is tempting because those signs are things students do, but the passage is written for teachers, so the warning is aimed at them.

**29.** *Today, even toasters can be voice-activated, so it's no surprise that cars are becoming fully automated. Self-driving cars can navigate without human intervention, scanning their surroundings to drive. While this technology offers convenience, the challenges it presents make it largely undesirable. The main issue is the lack of legal frameworks and regulations for autonomous vehicles, leaving room for disastrous risks, including cyber-attacks by hackers or terrorists. Although driver-assisted features like speed control or emergency braking offer clear benefits, they are fundamentally different from full automation. Automated systems are helpful, but the technology still requires addressing safety concerns and potential risks. As technology advances, it's important to draw a line and assert that humans, not computers, should be responsible for driving vehicles. Self-driving cars offer promise, but the unresolved problems make them less appealing at this stage.* (1)

Author's main argument about self-driving cars:

**A.** There are no laws that govern automated vehicles.

**B.** People have become too lazy if they can't even drive their own cars.

**C.** Although convenient, self-driving cars would lead to an increase in terrorism.

**D.** ✓ **The potential dangers of self-driving cars are much greater than the advantages they offer.**

> **Answer:** D
> The passage allows that the technology is convenient, then says the challenges make it largely undesirable, and it names the missing legal framework and the risk of attacks. Weighing the dangers against the advantages and finding the dangers heavier is the argument being made. Option C is tempting because terrorism appears in the text, but it is given as one example of the risks, not as a prediction that terrorism will rise.

**30.** *Today, even toasters can be voice-activated, so it's no surprise that cars are becoming fully automated. Self-driving cars can navigate without human intervention, scanning their surroundings to drive. While this technology offers convenience, the challenges it presents make it largely undesirable. The main issue is the lack of legal frameworks and regulations for autonomous vehicles, leaving room for disastrous risks, including cyber-attacks by hackers or terrorists. Although driver-assisted features like speed control or emergency braking offer clear benefits, they are fundamentally different from full automation. Automated systems are helpful, but the technology still requires addressing safety concerns and potential risks. As technology advances, it's important to draw a line and assert that humans, not computers, should be responsible for driving vehicles. Self-driving cars offer promise, but the unresolved problems make them less appealing at this stage.* (1)

What does the author suggest about the future of self-driving cars?

**A.** They will eventually replace all human-driven vehicles

**B.** They are completely safe and ready for widespread use

**C.** ✓ **They offer convenience, but there are still major unresolved issues**

**D.** They are not yet technologically advanced enough to be implemented

> **Answer:** C
> The closing line says self-driving cars offer promise but that the unresolved problems make them less appealing at this stage. That leaves the future open: real convenience on one side, real problems still to be solved on the other. Option D is tempting, but the passage complains about missing laws and unaddressed safety concerns, not about the engineering being too weak.

**31.** *Today, even toasters can be voice-activated, so it's no surprise that cars are becoming fully automated. Self-driving cars can navigate without human intervention, scanning their surroundings to drive. While this technology offers convenience, the challenges it presents make it largely undesirable. The main issue is the lack of legal frameworks and regulations for autonomous vehicles, leaving room for disastrous risks, including cyber-attacks by hackers or terrorists. Although driver-assisted features like speed control or emergency braking offer clear benefits, they are fundamentally different from full automation. Automated systems are helpful, but the technology still requires addressing safety concerns and potential risks. As technology advances, it's important to draw a line and assert that humans, not computers, should be responsible for driving vehicles. Self-driving cars offer promise, but the unresolved problems make them less appealing at this stage.* (1)

Author's stance on the role of humans in driving vehicles:

**A.** Humans should only drive in emergencies

**B.** ✓ **Humans should be responsible for driving, not computers**

**C.** Humans should stop driving and let computers take control

**D.** Humans should only be allowed to drive on certain roads

> **Answer:** B
> The passage states the position outright: as technology advances, it is important to assert that humans, not computers, should be responsible for driving vehicles. Option A is tempting because the passage accepts driver-assist features such as emergency braking, but accepting help with braking is a long way from saying a person should drive only in emergencies.

**32.** *Today, even toasters can be voice-activated, so it's no surprise that cars are becoming fully automated. Self-driving cars can navigate without human intervention, scanning their surroundings to drive. While this technology offers convenience, the challenges it presents make it largely undesirable. The main issue is the lack of legal frameworks and regulations for autonomous vehicles, leaving room for disastrous risks, including cyber-attacks by hackers or terrorists. Although driver-assisted features like speed control or emergency braking offer clear benefits, they are fundamentally different from full automation. Automated systems are helpful, but the technology still requires addressing safety concerns and potential risks. As technology advances, it's important to draw a line and assert that humans, not computers, should be responsible for driving vehicles. Self-driving cars offer promise, but the unresolved problems make them less appealing at this stage.* (1)

Main difference between driver-assisted technology and full automation:

**A.** Full automation is more expensive

**B.** Full automation has more safety features

**C.** Driver-assisted technology can handle emergencies better

**D.** ✓ **Driver-assisted technology still requires human intervention, while full automation does not**

> **Answer:** D
> The passage draws the line itself. Driver-assisted features such as speed control and emergency braking support a person who is still doing the driving, while a self-driving car navigates without human intervention. So the difference is whether a human is still needed at the wheel. Option B is tempting, but the passage says automated systems still have safety concerns to address, so it does not credit them with more safety features.

**33.** The integers x and y are greater than 1. If (4x)(7y) = 756, what is the value of x + y? (1)

**A.** 9

**B.** 27

**C.** ✓ **12**

**D.** 15

> **Answer:** C
> Multiply out the left side: $(4x)(7y) = 28xy = 756$, so $xy = 27$. Both x and y are whole numbers greater than 1, and the only such pair whose product is 27 is 3 and 9, because 27 times 1 uses a 1. So $x + y = 3 + 9 = 12$. The answer 27 is tempting because it is the product you found on the way, but the question asks for the sum.

**34.** Heran is scheduled to get a raise of 200 birr every 6 month during her first year on the job. If her starting salary is Birr 30000 per year. What is her annual salary at the end of 3 year? (1)

**A.** ✓ **30400**

**B.** 31200

**C.** 34200

**D.** 30800

> **Answer:** A
> Read the timing carefully: the raises are scheduled every 6 months during her first year only. That gives two raises, one at 6 months and one at 12 months, so her salary becomes $30000 + 200 + 200 = 30400$ birr. No further raise is scheduled after the first year, so at the end of year 3 she is still on 30400 birr. The answer 31200 is tempting if you keep adding 200 twice a year for all three years, but the question stops the raises after year one.

**35.** Which one of the following number is different from the other (1)

**A.** 47

**B.** 79

**C.** 97

**D.** ✓ **77**

> **Answer:** D
> Check each number for factors. 47, 79 and 97 are prime: nothing divides them except 1 and themselves. 77 breaks that pattern, because $77 = 7 \times 11$. The answer 97 is tempting because it is the largest of the four, but size does not separate one number from three others in a question like this.

**36.** What is the product root of quadratic equation (4/5)x² - (43/60)x - 1/6 = 0? (1)

**A.** ✓ **-5/24**
**B.** 43/48
**C.** -5/28
**D.** -14/15

**Answer:** A
For any quadratic $ax^2 + bx + c = 0$, the product of the two roots is $c/a$. Here $a = \frac{4}{5}$ and $c = -\frac{1}{6}$, so the product is $\frac{-1/6}{4/5} = -\frac{1}{6} \times \frac{5}{4} = -\frac{5}{24}$. The answer $\frac{43}{48}$ is tempting because it comes out of the same equation, but that is $-b/a$, which gives the sum of the roots, not the product.

**37.** From a group of 7men and 6women, five persons are to be selected to form a committee so that at least 3men are there in the committee. In how many ways can it be done? (1)

**A.** 564
**B.** 645
**C.** 735
**D.** ✓ **756**

**Answer:** D
"At least 3 men" out of 7 men and 6 women, with 5 people chosen, splits into three cases. Three men and two women: $\binom{7}{3}\binom{6}{2} = 35 \times 15 = 525$. Four men and one woman: $\binom{7}{4}\binom{6}{1} = 35 \times 6 = 210$. Five men and no women: $\binom{7}{5} = 21$. Adding them gives $525 + 210 + 21 = 756$. The answer 735 is tempting because it is what you get from the first two cases alone, but a committee of five men still satisfies "at least 3 men".

**38.** In an election between two candidates, one got 55% of the total valid votes, 20% of the votes were invalid. If the total number of votes was 7500, the number of valid votes that the other candidate got, was: (1)

**A.** ✓ **2700**
**B.** 2900
**C.** 3000
**D.** 3100

**Answer:** A
First strip out the invalid votes. 20 percent of the 7500 votes were invalid, so the valid votes number $0.8 \times 7500 = 6000$. One candidate took 55 percent of those, so the other took the remaining 45 percent: $0.45 \times 6000 = 2700$. The answer 3000 is tempting because it is half of the valid votes, but the split here is 55 to 45, not an even one.

**39.** Suppose you have a right triangle where the shorter leg is 13cm less than the longer leg. The hypotenuse is 13cm longer than the larger leg. What is the length of hypotenuse? (1)

**A.** 48cm
**B.** ✓ **65cm**
**C.** 45cm
**D.** 47cm

**Answer:** B
Call the longer leg $x$. Then the shorter leg is $x - 13$ and the hypotenuse is $x + 13$, and Pythagoras gives $(x - 13)^2 + x^2 = (x + 13)^2$. Expanding, $x^2 - 26x + 169 + x^2 = x^2 + 26x + 169$, which leaves $x^2 = 52x$, so $x = 52$. The hypotenuse is $52 + 13 = 65$ cm. It is tempting to stop the moment you find 52, but 52 is the longer leg, and the question asks for the hypotenuse.

**40.** In the sequence 1, 4, 11, 22, 37, 56, X, 96, _ _ _ , what is the value of X? (1)

**A.** ✓ **79**
**B.** 75
**C.** 71
**D.** 66

**Answer:** A
Look at the gaps between the terms: $4 - 1 = 3, 11 - 4 = 7, 22 - 11 = 11, 37 - 22 = 15, 56 - 37 = 19$. Each gap is 4 bigger than the one before it, so the next gap is $19 + 4 = 23$, which gives $X = 56 + 23 = 79$. The answer 75 is tempting if you add 19 a second time instead of widening the gap.

**41.** A person plans to open a new savings account at three different banks: Bank A, Bank B, and Bank C. Each bank offers an interest rate of 2.44%, but the compounding frequencies are different: Bank A compounds annually, Bank B compounds semi-annually, and Bank C compounds monthly. Which bank is offering the highest effective interest rate? (1)

**A.** Bank A
**B.** Bank B
**C.** ✓ **Bank C**
**D.** A and B

> **Answer:** C
> All three banks quote the same nominal rate of 2.44 percent, so the only thing separating them is how often the interest is added. Every time interest is added it starts earning interest of its own, so more frequent compounding produces a higher effective rate. Monthly beats semi-annual, which beats annual, so Bank C is highest. Option D is tempting if you assume the quoted rate is what you actually earn, but a quoted rate and an effective rate agree only when compounding happens once a year.

**42.** In a box, there are 8 red, 7 blue and 6 green balls. One ball is picked up randomly. What is the probability that it is neither red nor green? (1)

**A.** ✓ **1/3**
**B.** 2/4
**C.** 7/19
**D.** 8/21

> **Answer:** A
> There are $8 + 7 + 6 = 21$ balls in the box. A ball that is neither red nor green has to be blue, and there are 7 blue balls, so the probability is $\frac{7}{21} = \frac{1}{3}$. The answer $\frac{8}{21}$ is tempting because 8 is the first number in the question, but 8 counts the red balls, which the question rules out.

**43.** Saron has Birr 15,000 to invest. She plans to invest part of it in a savings account that offers 6% annual interest and the rest in a bond that offers 7.5% annual interest. She wants to earn a total of Birr 975 in interest each year. How much should she invest in each option? (1)

**A.** Birr 9000 at 6%, Birr 6000 at 7.5%
**B.** Birr 11000 at 6%, Birr 4000 at 7.5%
**C.** ✓ **Birr 10000 at 6%, Birr 5000 at 7.5%**
**D.** Birr 7500 at 6%, Birr 7500 at 7.5%

> **Answer:** C
> Let $x$ be the amount at 6 percent, so $15000 - x$ goes into the bond at 7.5 percent. The interest condition reads $0.06x + 0.075(15000 - x) = 975$. Expanding gives $0.06x + 1125 - 0.075x = 975$, so $-0.015x = -150$ and $x = 10000$. She puts 10,000 birr at 6 percent and 5,000 birr at 7.5 percent. An even split is tempting because it looks fair, but $0.06(7500) + 0.075(7500) = 1012.50$ birr, which overshoots the target.

**44.** If the degree measure of each interior angle of a regular polygon is 140 degrees, how many sides does the polygon have? (1)

**A.** ✓ **9**
**B.** 6
**C.** 8
**D.** 12

> **Answer:** A
> At each corner the interior and exterior angles make a straight line, so the exterior angle is $180 - 140 = 40$ degrees. The exterior angles of any polygon add up to 360 degrees, so the number of corners is $360 \div 40 = 9$, and a polygon has as many sides as corners. A common slip is to divide 360 by the interior angle instead. That gives $360 \div 140$, which is not a whole number, and that alone tells you the wrong angle was used.

**45.** Which one of the following is not in the term of sequence 3,6,12,24...? (1)

**A.** ✓ **84**
**B.** 384
**C.** 192
**D.** 768

> **Answer:** A
> Each term is double the one before it, so the sequence runs 3, 6, 12, 24, 48, 96, 192, 384, 768. Every term is 3 multiplied by a power of 2, which means every term stays divisible by 3, and 84 is not on that list. The answer 384 is tempting because it does not appear among the first few terms printed in the question, but keep doubling past 96 and you reach 192, then 384, then 768.

**46.** The sum of the present ages of a father and his son is 60 years. Six years ago, father's age was five times the age of the son. After 6 years, son's age will be: (1)

**A.** 12 years
**B.** 14 years
**C.** 18 years
**D.** ✓ **20 years**

> **Answer:** D
> Let the son be $s$ years old now, so the father is $60 - s$. Six years ago the son was $s - 6$ and the father was $54 - s$, and the father was five times as old: $54 - s = 5(s - 6)$. That expands to $54 - s = 5s - 30$, so $6s = 84$ and $s = 14$. Six years from now the son will be $14 + 6 = 20$. The answer 14 is tempting because it is the son's age today, but the question asks about six years ahead.

**47.** Abdisa, Hawai and Wariyo combined their money to purchase a laptop. Together they paid a total of 49000 birr for laptop including VAT. Abdisa paid 5000 birr more than Hawai paid and Hawai paid twice as much as Wariyo paid. How much abdisa paid? (1)

**A.** 17600
**B.** 8800
**C.** ✓ **22600**
**D.** 10800

> **Answer:** C
> Let Wariyo pay $w$ birr. Hawai paid twice as much, $2w$, and Abdisa paid 5000 more than Hawai, $2w + 5000$. Their total is $w + 2w + 2w + 5000 = 49000$, so $5w = 44000$ and $w = 8800$. Abdisa therefore paid $2(8800) + 5000 = 22600$ birr. The answer 17600 is tempting because it comes out of the same working, but 17600 is Hawai's share.

**48.** When the integer y is divided by 17, the quotient is p and the remainder is 5, when y is divide by 23, the quotient is q and the remainder is 14. Which one of the following is true? (1)

**A.** 23p + 17q = 19
**B.** ✓ **17p - 23q = 9**
**C.** 14p - 5q = 6
**D.** 5p - 14q = 6

> **Answer:** B
> Division with a remainder can be written as an equation. Dividing y by 17 with quotient p and remainder 5 means $y = 17p + 5$, and dividing the same y by 23 with quotient q and remainder 14 means $y = 23q + 14$. Since both describe one number, set them equal: $17p + 5 = 23q + 14$, which rearranges to $17p - 23q = 9$. Option A is tempting because it carries the same two divisors, but it adds the two expressions instead of setting them equal, and adding has no meaning here.

**49.** Which one of the following is not true about the graph of f(x)=$\log_2 x$? (1)

**A.** The domain is the set of positive real number

**B.** The X-intercept of the function is 1

**C.** It is an increasing function

**D.** ✓ **The domain of the function is the set of rear number**

> **Answer:** D
> You can only take a logarithm of a positive number, so the domain of $f(x) = \log_2 x$ is the positive real numbers, which makes statement A true and statement D false. Checking the rest: $\log_2 1 = 0$, so the graph crosses the x-axis at 1, and the base 2 is greater than 1, so the function increases. The question asks which statement is not true, and that is D. Statement A is tempting to mark instead if you are reading quickly, but A and D contradict each other, and A is the true one of the pair.

**50.** A product is sold for 1500 birr, and the seller gains a 25% profit. What should be the selling price to gain a 40% profit? (1)

**A.** 1200

**B.** 1600

**C.** ✓ **1680**

**D.** 1800

> **Answer:** C
> Profit is always measured against the cost, so a 25 percent profit means the selling price is 1.25 times the cost. That gives a cost of $1500 \div 1.25 = 1200$ birr. For a 40 percent profit the price must be $1200 \times 1.4 = 1680$ birr. The answer 1200 is tempting because it appears in your own working, but 1200 is the cost, not a selling price.

**51.** Suppose that 0 < X < 1. Compare the following two quantities. Quantity A: $X^2$, Quantity B: $X^3$. (1)

**A.** Quantity A is equal to quantity B

**B.** The relationship cannot determine from information's

**C.** ✓ **Quantity A is greater than quantity B**

**D.** Quantity B is greater than A

> **Answer:** C
> Take any value in the range, say $x = 0.5$. Then $x^2 = 0.25$ and $x^3 = 0.125$. Multiplying by a number smaller than 1 always makes a positive quantity smaller, so $x^3$ is $x^2$ made smaller again, and $x^2 > x^3$ holds for every x between 0 and 1. Option B is tempting because comparison questions often hide a missing fact, but the range $0 < x < 1$ settles the order for every value in it.

**52.** Suppose ΔXYZ is an equilateral triangle and point P lie on segment XY. Compare XP and PY. (1)

**A.** Quantity A is greater than B

**B.** ✓ **The relation cannot determine**

**C.** The two quantities are equal

**D.** Quantity B is greater than A

> **Answer:** B
> P is described only as a point lying on segment XY, and nothing fixes where on the segment it sits. Slide P towards X and XP becomes short while PY becomes long. Slide it towards Y and the two swap round. Because P can sit anywhere, the relationship cannot be determined. Option C is tempting because the triangle is equilateral, but equal sides say nothing about where a point falls along one of them.

**53.** *Town: M. Percentage below standard: 26%. Proportion below M:F = 2:3.* (1)

What will be the approximate number of females below standard level of line in M if the students of town M is 6000?

**A.** 870
**B.** ✓ **936**
**C.** 780
**D.** 970

> **Answer:** B
> 26 percent of town M is below the standard line, so that group holds $0.26 \times 6000 = 1560$ students. Within that group males and females stand in the ratio 2 to 3, which is 5 parts in total, so the females hold 3 of them: $\frac{3}{5} \times 1560 = 936$. The answer 780 is tempting because it is half of 1560, but the split is 2 to 3, not an even one.

**54.** *Town O: percentage below = 16%, so above = 84%. Above M:F = 3:2.* (1)

What will be the approximate number of females above standard level of line in town O if it is known that the students of town O is 5500?

**A.** ✓ **1848**
**B.** 1843
**C.** 1484
**D.** 1578

> **Answer:** A
> 16 percent of town O is below the line, so 84 percent is above it: $0.84 \times 5500 = 4620$ students. Above the line the males and females stand in the ratio 3 to 2, which is 5 parts, and the females hold 2 of them: $\frac{2}{5} \times 4620 = 1848$. It is tempting to reach for $\frac{3}{5}$ because 3 is written first in the ratio, but 3 is the male share and the question asks for the females.

**55.** *Town R: below = 18%, above = 82%. Above M:F = 5:7.* (1)

If the male students above standard level line for town R is 5400, then what is the total students of town R?

**A.** 14500
**B.** 15000
**C.** ✓ **15805**
**D.** 1250

> **Answer:** C
> Above the line in town R the ratio of males to females is 5 to 7, so the 5400 males make up $\frac{5}{12}$ of that group. The whole above-line group is therefore $5400 \times \frac{12}{5} = 12960$ students. Since 18 percent of the town is below the line, those 12960 are 82 percent of it, so the town has $12960 \div 0.82 \approx 15805$ students. The answer 15000 is tempting as a round figure, but 82 percent of 15000 is 12300, which falls short of 12960.

**56.** *Town A: below = 36%, above = 64%. Below M:F = 4:5; above M:F = 2:3.* (1)

If the male students below standard level line for town A is 3000, then what is the students of females above standard level of line in that town?

**A.** 6400
**B.** 6800
**C.** 6200
**D.** ✓ **7200**

> **Answer:** D
> Below the line the male to female ratio is 4 to 5, so the 3000 males are $\frac{4}{9}$ of that group, making it $3000 \times \frac{9}{4} = 6750$ students. That group is 36 percent of the town, so the town holds $6750 \div 0.36 = 18750$ students. Above the line sits the other 64 percent, which is 12000, and there the ratio is 2 to 3, so the females are $\frac{3}{5} \times 12000 = 7200$. It is tempting to reach 12000 and halve it, but the above-line split is 2 to 3, so the females take three parts out of five.

**57.** *Town O: above 84%; Town R: above 82%; Town M: above 74% (since below 26%).* (1)
What will be the approximate sum of students in town O, R and M score in above the standard level of the line if the total students in each town are 4000,5000 and 8000 respectively?

**A.** ✓ **13380**
**B.** 12280
**C.** 14480
**D.** 13330

**Answer:** A
Work out the above-line share town by town, then add. Town O: 84 percent of 4000 is 3360. Town R: 82 percent of 5000 is 4100. Town M gives only the 26 percent below the line, so above the line is 74 percent, and 74 percent of 8000 is 5920. The total is $3360 + 4100 + 5920 = 13380$. The answer 13330 is tempting as a near miss, so check town M with care, since its percentage has to be worked out from the 26 percent rather than read straight off.

— END OF MARKING KEY —

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