MIDDLE LEVEL SSAT PRACTICE TEST 5

Writing Sample

Time – 25 Minutes

Directions: Schools would like to get to know you better through an essay or story you write. Please select and respond to one of the two topics provided. If you choose Topic A, write a creative story. If you choose Topic B, write a personal essay. Fill in the circle next to your topic choice.

Topic A: When I opened my locker on the first day of school, I found something that definitely didn't belong to me. What I did next changed everything.

Topic B: Describe a time when you had to choose between doing what was easy and doing what was right. What made the decision difficult? What did you learn about yourself from that experience?

Section 1: Quantitative

Time – 30 Minutes

25 Questions

Directions: Following each problem in this section, there are five suggested answers. Work each problem in your head or in the blank space provided. Then select the best answer.

1. What is 224 ÷ 16?

A. 12

B. 13

C. 15

D. 16

E. 14

2. If m + 29 = 76, then m =

A. 105

B. 29

C. 47

D. 55

E. 76

3. A sequence follows the rule: subtract 7 from the previous number. If the first number is 63, what is the 4th number?

A. 35

B. 42

C. 49

D. 56

E. 28

4. What is the area of a rectangle with length 19 and width 7?

A. 26

B. 52

C. 126

D. 133

E. 140

5. If $14x = 182$, then $x =$

A. 13

B. 168

C. 196

D. 14

E. 12

6. A class has 56 students. If 3/8 of them wear glasses, how many wear glasses?

A. 14

B. 28

C. 35

D. 42

E. 21

7. What is $48 - 8 \times 4 + 9$?

A. 169

B. 32

C. 25

D. 160

E. 41

8. A spinner has 12 equal sections numbered 1 through 12. What is the probability of landing on a number greater than 8?

A. 1/2

B. 1/3

C. 8/12

D. 4/12

E. 2/3

9. Which of the following is equivalent to 0.55?

A. 55/10

B. 5/5

C. 1/55

D. 11/20

E. 55/1000

10. A circle has a diameter of 34. What is its radius?

A. 17

B. 68

C. 34

D. 8.5

E. 51

11. If $7y + 15 = 64$, then $y =$

A. 49

B. 15

C. 79

D. 8

E. 7

12. A phone originally costs $120. It's now on sale for 40% off. What is the sale price?

A. $80

B. $40

C. $72

D. $60

E. $48

13. What is $19^2 - 16^2$?

A. 3

B. 105

C. 256

D. 361

E. 9

14. If $p > 95$ and $p < 100$, which could NOT be the value of p?

A. 96

B. 98.5

C. 99

D. 100

E. 97

15. A recipe requires 6 cups of flour to make 20 pancakes. How many cups of flour are needed for 35 pancakes?

A. 10.5

B. 9

C. 12

D. 11

E. 8

16. What is 13/17 − 5/17?

A. 8/34

B. 18/17

C. 5/17

D. 13/34

E. 8/17

17. Round 8,475 to the nearest ten.

A. 8,470

B. 8,500

C. 8,480

D. 8,400

E. 8,490

18. What is the least common multiple (LCM) of 12 and 16?

A. 4

B. 48

C. 192

D. 24

E. 32

19. If the pattern continues: 6, 12, 24, 48, ___, what is the next number?

A. 54

B. 72

C. 60

D. 96

E. 84

20. A triangle has a base of 26 and a height of 17. What is its area?

A. 221

B. 43

C. 442

D. 86

E. 130

21. What is 65% of 200?

A. 65

B. 100

C. 120

D. 135

E. 130

22. If $18 \times s = 234$, then $s =$

A. 12

B. 18

C. 13

D. 14

E. 216

23. A number is divided by 8, then 9 is added. The result is 16. What is the number?

A. 200

B. 56

C. 128

D. 72

E. 64

24. The ratio of cats to dogs at a pet store is 5:9. If there are 45 cats, how many dogs are there?

A. 50

B. 72

C. 63

D. 81

E. 54

25. What is $30 + 6^2 - 11$?

A. 55

B. 47

C. 36

D. 61

E. 25

Section 2: Reading

Time – 40 Minutes

40 Questions

Directions: Read each passage carefully and then answer the questions about it. For each question, decide on the basis of the passage which one of the choices best answers the question.

Passage 1

The water cycle, also called the hydrologic cycle, is the continuous movement of water on, above, and below Earth's surface. This cycle has no starting or ending point—water simply changes form and location continuously.

The sun's heat causes evaporation, turning liquid water from oceans, lakes, and rivers into water vapor that rises into the atmosphere. Plants also release water vapor through their leaves in a process called transpiration. Together, evaporation and transpiration put about 400,000 cubic kilometers of water into the atmosphere each year.

As water vapor rises and cools, it condenses into tiny droplets that form clouds. When these droplets combine and become heavy enough, they fall as precipitation—rain, snow, sleet, or hail. Some precipitation soaks into the ground, replenishing underground aquifers. Some flows over land as runoff, eventually reaching rivers and oceans.

The water cycle is essential for distributing fresh water around the planet. It also regulates Earth's temperature and provides the moisture necessary for weather patterns. Human activities like deforestation and urbanization can disrupt natural water cycles, affecting local and global climate patterns.

1. According to the passage, the water cycle

A. starts with rain

B. ends with evaporation

C. has no beginning or end

D. only occurs in oceans

E. happens once per year

2. Transpiration is described as water release from

A. clouds

B. oceans

C. rivers

D. underground

E. plant leaves

3. Approximately how much water enters the atmosphere yearly through evaporation and transpiration?

A. 100,000 cubic kilometers

B. 400,000 cubic kilometers

C. 1 million cubic kilometers

D. 500,000 cubic kilometers

E. 200,000 cubic kilometers

4. When water vapor cools and condenses, it forms

A. rivers

B. underground water

C. ice

D. clouds

E. steam

5. The passage suggests human activities can

A. disrupt natural water cycles

B. stop the water cycle

C. improve the water cycle

D. have no effect

E. create new water

Passage 2

The scholarship letter arrived on a Tuesday. Full ride to Westridge Academy—the boarding school two hours from home. Everything I'd worked for. Everything Mom had sacrificed for.

"You're going, right?" My best friend Marcus asked at lunch, already knowing my answer. Or thinking he did.

I nodded automatically. But my stomach twisted. Last week, Mom's company announced layoffs. She'd tried to hide her worry, but I'd heard her on the phone with the bank, asking about payment plans.

At Westridge, I'd have everything—new opportunities, amazing teachers, a path to top colleges. But Mom would be here alone, working two jobs to keep the house, no one to help with groceries or remember when the bills were due.

That evening, I found her in the kitchen, staring at nothing.

"I got into Westridge," I said.

Her face transformed. "Oh honey, that's wonderful! I'm so proud!" Then she saw my expression. "What's wrong?"

"I'm thinking of staying. The local high school has a good program, and I could—"

"Stop." Her voice was firm. "I didn't work this hard so you could give up your dream because things got difficult. We'll figure it out. We always do."

Maybe she was right. Maybe the best way to honor her sacrifice wasn't to stay and help—it was to go and succeed.

6. The narrator received a scholarship to

A. a local high school

B. a college

C. Westridge Academy

D. a summer program

E. a tutoring center

7. The narrator's hesitation about accepting comes from

A. not liking the school

B. fear of being far from friends

C. difficulty of classes

D. cost of supplies

E. concern about leaving their mother during financial difficulty

8. Marcus assumes the narrator will

A. definitely attend Westridge

B. stay home

C. decline the scholarship

D. transfer later

E. take a gap year

9. The narrator's mother's company announced

A. promotions

B. expansion

C. bonuses

D. layoffs

E. raises

10. By the end, the narrator realizes success might be the best way to

A. forget problems

B. honor their mother's sacrifice

C. make money quickly

D. avoid responsibility

E. escape the situation

Passage 3

Camouflage is nature's invisibility cloak. Many animals have evolved coloring and patterns that help them blend into their surroundings, providing protection from predators or helping them sneak up on prey.

There are several types of camouflage. Background matching means an animal's colors match its environment—like a polar bear's white fur against snow. Disruptive coloration uses bold patterns to break up an animal's outline, making it harder to recognize—think of a zebra's stripes. Some animals use countershading, being darker on top and lighter underneath, which counteracts shadows and makes them appear flat.

Some creatures take camouflage further. Chameleons and octopuses can change their skin color to match their surroundings. The mimic octopus can even change its shape and behavior to impersonate other sea creatures. Stick insects look exactly like twigs, while leaf insects resemble leaves so perfectly they even have vein-like markings.

Interestingly, camouflage isn't always about hiding. Some animals use what scientists call "aggressive mimicry"—looking like something harmless to trick their prey. The alligator snapping turtle has a pink, worm-like projection in its mouth that lures fish close enough to catch.

Understanding camouflage helps scientists design better military gear, study animal behavior, and even develop new materials that can change appearance on demand.

11. According to the passage, camouflage helps animals

A. communicate

B. migrate

C. hide or hunt

D. reproduce

E. stay warm

12. A polar bear's white fur is an example of

A. disruptive coloration

B. aggressive mimicry

C. countershading

D. shape-changing

E. background matching

13. Countershading makes animals appear

A. flat

B. larger

C. colorful

D. dangerous

E. invisible

14. The mimic octopus can change its

A. size only

B. color only

C. location only

D. shape and behavior

E. temperature

15. Aggressive mimicry is used to

A. scare predators

B. trick prey

C. attract mates

D. mark territory

E. communicate danger

Passage 4

In 1928, Alexander Fleming made a discovery that would revolutionize medicine. A Scottish bacteriologist working at St. Mary's Hospital in London, Fleming was studying bacteria when he noticed something unusual. He had left a petri dish uncovered by accident, and mold had grown on it. Even more interesting, the bacteria near the mold had died.

Fleming identified the mold as Penicillium notatum and realized it produced a substance that killed bacteria. He called this substance penicillin. However, Fleming couldn't figure out how to produce penicillin in large quantities or make it stable enough for medical use.

It wasn't until World War II that Oxford scientists Howard Florey and Ernst Boris Chain developed methods to mass-produce penicillin. The timing was crucial—wounded soldiers desperately needed effective treatments for bacterial infections. Penicillin proved so successful that by D-Day in 1944, enough had been produced to treat all Allied forces.

Before penicillin, simple infections could be deadly. A small cut could lead to fatal complications. Pneumonia, scarlet fever, and other bacterial diseases killed millions. Penicillin changed everything, saving countless lives and making previously dangerous surgeries routine.

Fleming, Florey, and Chain shared the 1945 Nobel Prize in Physiology or Medicine. Fleming famously warned that bacteria could become resistant to penicillin if it was misused—a prediction that has proven accurate as antibiotic resistance has become a growing concern.

16. Fleming discovered penicillin in

A. 1918

B. 1938

C. 1928

D. 1945

E. 1944

17. Fleming's discovery happened because he

A. was looking for mold

B. planned an experiment

C. followed instructions

D. copied another scientist

E. left a petri dish uncovered accidentally

18. Florey and Chain's contribution was

A. developing mass production methods

B. discovering penicillin

C. winning the Nobel Prize alone

D. naming penicillin

E. testing on animals

19. By D-Day in 1944, penicillin had been produced in enough quantity to treat

A. civilians only

B. British forces only

C. a few soldiers

D. all Allied forces

E. scientists only

20. Fleming warned that bacteria could become

A. helpful

B. resistant to penicillin

C. extinct

D. larger

E. harmless

Passage 5

Have you ever noticed that you can remember song lyrics easily but struggle to memorize facts for a test? There's a scientific reason for this. Music activates multiple brain regions simultaneously, creating stronger memory connections than simple repetition does.

When you hear music, your brain processes rhythm, melody, harmony, and lyrics all at once. This multi-sensory engagement creates what neuroscientists call "elaborative encoding"—forming rich, interconnected memories that are easier to retrieve later. Additionally, music often connects to emotions, and emotional experiences are remembered more vividly than neutral ones.

This is why the "Alphabet Song" helps children learn their ABCs. The melody provides a structure that makes the sequence memorable. Similarly, many people can recall every word of songs they haven't heard in years, yet forget information they studied recently.

Researchers have found that music therapy helps patients with Alzheimer's disease access memories they can't retrieve otherwise. Even when other cognitive abilities decline, musical memory often remains intact. Some Alzheimer's patients who can't remember their children's names can still sing entire songs from their youth.

Students can harness music's memory power by creating songs or rhymes for information they need to remember. While it might seem silly to sing your history dates, the technique works because it aligns with how your brain naturally processes and stores information.

21. Music activates multiple brain regions, creating

A. confusion

B. fatigue

C. stronger memory connections

D. difficulty learning

E. hearing loss

22. "Elaborative encoding" refers to forming

A. simple memories

B. temporary memories

C. forgotten memories

D. weak memories

E. rich, interconnected memories

23. Music connects to emotions, which makes memories

A. more vivid

B. harder to recall

C. less important

D. confusing

E. temporary

24. Alzheimer's patients often retain

A. short-term memory only

B. recent memories

C. mathematical skills

D. musical memory

E. spatial memory

25. The passage suggests students should

A. avoid music while studying

B. create songs for information they need to remember

C. only study in silence

D. ignore memory techniques

E. memorize without aids

Passage 6

I didn't mean to find my sister's diary. I was looking for my charger in her room—she always "borrows" my stuff—when I saw it under her pillow. The purple cover with her name in gold letters.

My hand reached for it before my brain could object. Just one page, I told myself. Just to see if she'd written anything about taking my things without asking.

The entry was dated three days ago. "I don't know how to tell anyone," it began. "People think I'm the confident one, the one who has everything figured out. But I'm drowning. AP classes, volleyball, college applications, trying to keep my scholarship GPA—it's too much. I can't breathe."

I put the diary down like it had burned me. This was my sister? The one who seemed perfect, who made everything look easy? I'd spent my whole life feeling like I could never measure up to her. And here she was, falling apart in private while performing perfection in public.

That evening at dinner, she was her usual cheerful self, asking about my day, joking with Dad. But now I could see the tightness around her eyes, the forced quality of her smile.

"Hey," I said later, catching her in the hallway. "If you ever need someone to talk to... I'm here."

She looked surprised, then her eyes filled. "Thanks," she whispered. "That means more than you know."

I never told her I'd read the diary. But I stopped resenting her "perfection." I'd learned something valuable: everyone's fighting battles you can't see. And sometimes the strongest people need help the most.

26. The narrator found the diary while looking for

A. homework

B. money

C. a charger

D. clothes

E. shoes

27. The sister's diary revealed she felt

A. happy

B. confident

C. bored

D. relaxed

E. overwhelmed

28. Before reading the diary, the narrator felt

A. unable to measure up to their sister

B. superior to their sister

C. indifferent about their sister

D. angry at their parents

E. jealous of their sister's friends

29. At dinner, the sister appeared

A. sad

B. angry

C. withdrawn

D. cheerful

E. sick

30. The narrator's main lesson was that

A. reading diaries is wrong

B. everyone fights unseen battles

C. perfection is possible

D. families should argue more

E. secrets should always be told

Passage 7

Renewable energy comes from sources that naturally replenish themselves and never run out. Unlike fossil fuels (coal, oil, natural gas), which take millions of years to form and will eventually be depleted, renewable energy sources are sustainable for long-term use.

Solar power captures energy from sunlight using photovoltaic panels. The sun provides more energy to Earth in one hour than humans use in an entire year. Wind power uses turbines to convert wind's kinetic energy into electricity. Modern wind farms can power thousands of homes. Hydroelectric power generates electricity from flowing water, usually through dams. It's currently the largest source of renewable electricity worldwide.

Other renewable sources include geothermal energy (heat from Earth's interior), biomass (organic materials burned for energy), and tidal power (ocean tide movement). Each has advantages and challenges. Solar and wind are increasingly affordable but depend on weather conditions. Hydroelectric is reliable but can harm river ecosystems. Geothermal works constantly but requires specific geological conditions.

The transition to renewable energy is crucial for fighting climate change. Burning fossil fuels releases carbon dioxide, trapping heat in the atmosphere and warming the planet. Renewable sources produce little or no greenhouse gas emissions during operation. Many countries now aim to reach "net-zero" emissions by 2050, relying primarily on renewable energy.

While challenges remain—energy storage, infrastructure costs, and intermittent supply—renewable energy technology improves rapidly. What seemed impossible twenty years ago is now practical and increasingly affordable.

31. Renewable energy sources are described as

A. depleting quickly

B. expensive forever

C. naturally replenishing

D. only for large countries

E. impossible to use

32. The sun provides enough energy to Earth in one hour to meet human needs for

A. one day

B. one week

C. one month

D. six months

E. one year

33. Currently, the largest source of renewable electricity worldwide is

A. hydroelectric

B. solar

C. wind

D. geothermal

E. biomass

34. Burning fossil fuels releases what gas?

A. oxygen

B. nitrogen

C. helium

D. carbon dioxide

E. hydrogen

35. Many countries aim to reach net-zero emissions by

A. 2030

B. 2050

C. 2025

D. 2100

E. 2075

Passage 8

The invention of the telescope transformed human understanding of the universe. While the exact inventor is debated, Dutch eyeglass maker Hans Lippershey is often credited with creating the first practical telescope in 1608. News of this invention spread quickly across Europe.

In 1609, Italian scientist Galileo Galilei heard about the telescope and built his own improved version. While Galileo didn't invent the telescope, he was the first to use it for systematic astronomical observations. He discovered four moons orbiting Jupiter, proving that not everything in space revolves around Earth. He observed mountains and craters on our own Moon, showing it wasn't a perfect sphere as ancient philosophers had claimed. He saw that Venus goes through phases like our Moon, supporting the idea that planets orbit the Sun.

These observations challenged the prevailing belief that Earth was the center of the universe—a view supported by both the Catholic Church and most scholars of the time. Galileo's evidence supported Copernicus's heliocentric theory: that Earth and other planets orbit the Sun. This was controversial; in 1633, the Church forced Galileo to recant his views and placed him under house arrest for the rest of his life.

Despite the persecution, Galileo's observations couldn't be undone. The telescope had revealed truths about the universe that changed humanity's place in it. We were not the center of creation, but one planet among many, orbiting an ordinary star in a vast cosmos. This revelation marked the beginning of modern astronomy and demonstrated the power of scientific observation over traditional authority.

36. Hans Lippershey is credited with creating the first practical telescope in

A. 1508

B. 1709

C. 1608

D. 1809

E. 1408

37. Galileo was the first to use the telescope for

A. navigation

B. military purposes

C. entertainment

D. making glasses

E. systematic astronomical observations

38. Galileo discovered how many moons orbiting Jupiter?

A. four

B. two

C. six

D. eight

E. one

39. In 1633, the Church

A. praised Galileo

B. gave Galileo an award

C. ignored Galileo

D. forced Galileo to recant and placed him under house arrest

E. asked Galileo to teach

40. Galileo's observations supported whose theory?

A. Aristotle's

B. Copernicus's

C. Newton's

D. Einstein's

E. Ptolemy's

Section 3: Verbal

Time – 30 Minutes

60 Questions

Directions: This section consists of two different types of questions. There are directions and a sample question for each type.

SYNONYMS (Questions 1-30)

Directions: Each question consists of one word followed by five words or phrases. Select the word or phrase whose meaning is closest to the word in capital letters.

1. BEWILDERED:

A. angry

B. happy

C. confused

D. calm

E. excited

2. REVIVE:

A. restore

B. destroy

C. harm

D. weaken

E. ignore

3. TENSE:

A. relaxed

B. loose

C. calm

D. nervous

E. peaceful

4. PLUNGE:

A. rise

B. dive

C. float

D. hover

E. soar

5. SCORCH:

A. freeze

B. cool

C. chill

D. ice

E. burn

6. VACANT:

A. full

B. occupied

C. empty

D. crowded

E. packed

7. ENVY:

A. jealousy

B. love

C. kindness

D. generosity

E. admiration

8. STURDY:

A. weak

B. fragile

C. delicate

D. strong

E. brittle

9. TIMID:

A. bold

B. shy

C. brave

D. fierce

E. confident

10. ENORMOUS:

A. tiny

B. small

C. little

D. miniature

E. huge

11. FORSAKE:

A. keep

B. maintain

C. abandon

D. protect

E. guard

12. WICKED:

A. good

B. kind

C. nice

D. evil

E. gentle

13. DIMINISH:

A. decrease

B. grow

C. expand

D. increase

E. enlarge

14. BENIGN:

A. harmful

B. harmless

C. dangerous

D. threatening

E. hostile

15. APPREHEND:

A. release

B. free

C. liberate

D. pardon

E. capture

16. PROMINENT:

A. hidden

B. obscure

C. noticeable

D. invisible

E. concealed

17. CONCEAL:

A. reveal

B. show

C. expose

D. hide

E. display

18. TRANQUIL:

A. peaceful

B. noisy

C. chaotic

D. loud

E. turbulent

19. WEARY:

A. energetic

B. tired

C. fresh

D. alert

E. lively

20. STURDY:

A. flimsy

B. weak

C. fragile

D. breakable

E. robust

21. CEASE:

A. begin

B. start

C. stop

D. continue

E. proceed

22. ABSURD:

A. logical

B. reasonable

C. sensible

D. ridiculous

E. rational

23. SUMMIT:

A. peak

B. bottom

C. base

D. valley

E. floor

24. INFERIOR:

A. superior

B. poor

C. excellent

D. outstanding

E. exceptional

25. STERN:

A. gentle

B. soft

C. kind

D. tender

E. strict

26. MOCK:

A. praise

B. honor

C. ridicule

D. respect

E. admire

27. FRIGID:

A. warm

B. hot

C. mild

D. comfortable

E. icy

28. TRANQUIL:

A. violent

B. calm

C. stormy

D. rough

E. turbulent

29. RELUCTANT:

A. unwilling

B. eager

C. willing

D. enthusiastic

E. excited

30. GLOOMY:

A. bright

B. cheerful

C. sunny

D. dark

E. happy

ANALOGIES (Questions 31-60)

Directions: The following questions ask you to find relationships between words. For each question, select the answer choice that best completes the meaning of the sentence.

31. Pen is to write as

A. book is to read

B. chair is to sit

C. brush is to paint

D. plate is to eat

E. cup is to drink

32. Sad is to joyful as

A. happy is to miserable

B. angry is to mad

C. tired is to sleepy

D. cold is to cool

E. hot is to warm

33. Chef is to kitchen as

A. teacher is to student

B. doctor is to patient

C. actor is to audience

D. scientist is to laboratory

E. musician is to instrument

34. Branch is to tree as

A. root is to plant

B. arm is to body

C. leaf is to flower

D. trunk is to forest

E. seed is to fruit

35. Scissors is to cut as

A. hammer is to nail

B. needle is to thread

C. spoon is to stir

D. knife is to fork

E. broom is to sweep

36. Desert is to arid as

A. ocean is to salty

B. mountain is to high

C. jungle is to humid

D. tundra is to frozen

E. prairie is to flat

37. Envelope is to letter as

A. frame is to picture

B. box is to gift

C. wallet is to money

D. case is to phone

E. all of the above

38. Tadpole is to frog as

A. egg is to chicken

B. calf is to cow

C. puppy is to dog

D. larva is to butterfly

E. kitten is to cat

39. Tired is to rest as

A. happy is to celebrate

B. hungry is to eat

C. angry is to argue

D. sad is to cry

E. scared is to hide

40. Thermometer is to temperature as

A. ruler is to length

B. clock is to time

C. scale is to weight

D. compass is to direction

E. speedometer is to speed

41. Rain is to umbrella as

A. snow is to shovel

B. wind is to kite

C. sun is to sunscreen

D. cold is to coat

E. heat is to fan

42. Page is to book as

A. tile is to floor

B. brick is to building

C. thread is to fabric

D. drop is to ocean

E. grain is to sand

43. Composer is to symphony as

A. painter is to gallery

B. writer is to library

C. actor is to stage

D. architect is to building

E. musician is to concert

44. Expand is to contract as

A. grow is to shrink

B. inflate is to deflate

C. increase is to decrease

D. all of the above

E. none of the above

45. Proud is to achievement as

A. angry is to insult

B. happy is to gift

C. sad is to loss

D. scared is to danger

E. grateful is to kindness

46. Dentist is to teeth as

A. teacher is to students

B. chef is to food

C. optometrist is to eyes

D. pilot is to airplane

E. artist is to painting

47. Dawn is to morning as

A. dusk is to evening

B. noon is to afternoon

C. midnight is to night

D. sunrise is to sunset

E. day is to night

48. Cocoon is to butterfly as

A. egg is to bird

B. seed is to flower

C. bud is to blossom

D. shell is to turtle

E. nest is to bird

49. Liquid is to freeze as

A. solid is to melt

B. gas is to condense

C. water is to evaporate

D. ice is to thaw

E. steam is to cool

50. Map is to geography as

A. telescope is to astronomy

B. microscope is to biology

C. calculator is to mathematics

D. dictionary is to language

E. timeline is to history

51. Nest is to bird as

A. den is to bear

B. hive is to bee

C. burrow is to rabbit

D. web is to spider

E. all of the above

52. Antidote is to poison as

A. cure is to disease

B. medicine is to illness

C. vaccine is to virus

D. treatment is to injury

E. all of the above

53. Lens is to glasses as

A. wheel is to car

B. key is to lock

C. button is to shirt

D. screen is to phone

E. handle is to door

54. Rehearsal is to play as

A. study is to exam

B. practice is to performance

C. training is to race

D. preparation is to event

E. all of the above

55. Frown is to sadness as

A. smile is to happiness

B. laugh is to joy

C. cry is to sorrow

D. yawn is to tiredness

E. grin is to amusement

56. Kernel is to corn as

A. pit is to peach

B. seed is to apple

C. pip is to orange

D. stone is to cherry

E. all of the above

57. Conductor is to orchestra as

A. director is to movie

B. coach is to team

C. teacher is to class

D. captain is to ship

E. all of the above

58. Blizzard is to snow as

A. rain is to storm

B. wind is to breeze

C. cloud is to sky

D. sandstorm is to sand

E. fog is to mist

59. Evaporate is to liquid as

A. freeze is to water

B. melt is to solid

C. condense is to gas

D. dissolve is to solid

E. boil is to steam

60. Quarantine is to disease as

A. lock is to security

B. fence is to boundary

C. dam is to flood

D. firebreak is to wildfire

E. barrier is to access

Section 4: Quantitative

Time – 30 Minutes

25 Questions

Directions: Following each problem in this section, there are five suggested answers. Work each problem in your head or in the blank space provided. Then select the best answer.

1. What is 252 ÷ 18?

A. 13

B. 14

C. 15

D. 16

E. 12

2. If n − 38 = 79, then n =

A. 41

B. 38

C. 79

D. 117

E. 127

3. A sequence follows the rule: add 12 to the previous number. If the first number is 11, what is the 5th number?

A. 59

B. 47

C. 35

D. 23

E. 71

4. What is the area of a rectangle with length 21 and width 9?

A. 30

B. 60

C. 189

D. 200

E. 210

5. If $15x = 195$, then $x =$

A. 180

B. 210

C. 12

D. 14

E. 13

6. A school has 84 students. If 5/7 of them play sports, how many play sports?

A. 12

B. 60

C. 42

D. 70

E. 56

7. What is $55 + 11 \times 3 - 8$?

A. 198

B. 47

C. 190

D. 80

E. 88

8. A bag contains 3 green balls, 5 red balls, and 7 blue balls. What is the probability of selecting a green ball?

A. 1/5

B. 3/15

C. 3/12

D. 1/3

E. 3/7

9. Which of the following is equivalent to 0.65?

A. 65/10

B. 6/5

C. 13/20

D. 1/65

E. 65/1000

10. A circle has a radius of 19. What is its diameter?

A. 9.5

B. 57

C. 19

D. 28

E. 38

11. If $8y + 17 = 73$, then $y =$

A. 56

B. 7

C. 90

D. 8

E. 9

12. A tablet originally costs $150. It's now on sale for 30% off. What is the sale price?

A. $120

B. $45

C. $100

D. $105

E. $90

13. What is $21^2 - 18^2$?

A. 117

B. 3

C. 441

D. 324

E. 9

14. If $q > 110$ and $q < 115$, which could NOT be the value of q?

A. 111

B. 113.5

C. 115

D. 112

E. 114

15. A recipe requires 8 ounces of cheese to make 12 sandwiches. How many ounces are needed for 21 sandwiches?

A. 13

B. 15

C. 16

D. 12

E. 14

16. What is 15/19 − 7/19?

A. 8/38

B. 8/19

C. 22/19

D. 7/19

E. 15/38

17. Round 9,638 to the nearest hundred.

A. 10,000

B. 9,640

C. 9,700

D. 9,600

E. 9,630

18. What is the least common multiple (LCM) of 14 and 21?

A. 42

B. 294

C. 7

D. 14

E. 21

19. If the pattern continues: 5, 15, 45, 135, ___, what is the next number?

A. 140

B. 180

C. 405

D. 270

E. 540

20. A triangle has a base of 28 and a height of 19. What is its area?

A. 47

B. 532

C. 94

D. 238

E. 266

21. What is 70% of 180?

A. 70

B. 126

C. 120

D. 140

E. 130

22. If $19 \times u = 247$, then $u =$

A. 12

B. 19

C. 14

D. 13

E. 228

23. A number is multiplied by 9, then 15 is subtracted. The result is 48. What is the number?

A. 7

B. 6

C. 8

D. 5

E. 9

24. The ratio of books to magazines in a library is 7:3. If there are 49 books, how many magazines are there?

A. 14

B. 28

C. 21

D. 24

E. 18

25. What is $40 + 7^2 - 13$?

A. 63

B. 34

C. 36

D. 89

E. 76

ANSWERS AND EXPLANATIONS

Quantitative

1. E: 14 - Divide 224 by 16: 224 ÷ 16 = 14. This is a division fact from the 16 times table. Check: 16 × 14 = 224 ✓ Knowing multiplication facts helps solve division problems quickly.

2. C: 47 - Solve m + 29 = 76 by subtracting 29 from both sides: m = 76 − 29 = 47. Check: 47 + 29 = 76 ✓ To undo addition, use subtraction.

3. B: 42 - The sequence subtracts 7 each time. 1st number: 63. 2nd number: 63 − 7 = 56. 3rd number: 56 − 7 = 49. 4th number: 49 − 7 = 42. This is an arithmetic sequence with common difference −7.

4. D: 133 - Area of a rectangle = length × width = 19 × 7 = 133 square units. Don't confuse with perimeter, which would be 2(19 + 7) = 52. Area measures the space inside.

5. A: 13 - Solve 14x = 182 by dividing both sides by 14: x = 182 ÷ 14 = 13. Check: 14 × 13 = 182 ✓ Division is the inverse of multiplication.

6. E: 21 - To find 3/8 of 56 students, multiply: (3/8) × 56. Divide 56 by 8 first: 56 ÷ 8 = 7. Then multiply by 3: 7 × 3 = 21 students wear glasses.

7. C: 25 - Follow order of operations (PEMDAS). Multiply first: 8 × 4 = 32. Then work left to right: 48 − 32 = 16, then 16 + 9 = 25. Multiplication must be done before addition and subtraction.

8. B: 1/3 - Numbers greater than 8 on the spinner are: 9, 10, 11, and 12 (that's 4 numbers out of 12 possible outcomes). Probability = 4/12. Simplify by dividing both by 4: 4/12 = 1/3. Count favorable outcomes over total possible outcomes.

9. D: 11/20 - Convert 0.55 to a fraction: 0.55 = 55/100. Simplify by dividing both numerator and denominator by 5: 55 ÷ 5 = 11 and 100 ÷ 5 = 20, giving 11/20. Check: 11 ÷ 20 = 0.55 ✓

10. A: 17 - The radius of a circle is half the diameter. If diameter = 34, then radius = 34 ÷ 2 = 17. Remember: diameter goes all the way across, radius goes from center to edge.

11. E: 7 - Solve 7y + 15 = 64 in two steps. Subtract 15 from both sides: 7y = 49. Divide both sides by 7: y = 7. Check: 7(7) + 15 = 49 + 15 = 64 ✓

12. C: $72 - Calculate 40% off of $120. Method 1: Find discount: 0.40 × $120 = $48, then subtract: $120 − $48 = $72. Method 2: If 40% off, you pay 60%: 0.60 × $120 = $72.

13. B: 105 - Calculate each exponent first, then subtract. $19^2 = 19 \times 19 = 361$. Then $16^2 = 16 \times 16 = 256$. Finally subtract: 361 − 256 = 105. Exponents must be calculated before subtraction.

14. D: 100 - The compound inequality $p > 95$ and $p < 100$ means p must be greater than 95 AND less than 100. This is a "could NOT" question. 100 does NOT satisfy $p < 100$ (100 is not less than 100; it's equal). All other choices fall between 95 and 100.

15. A: 10.5 - Set up a proportion: 6 cups/20 pancakes = x cups/35 pancakes. Cross-multiply: $6 \times 35 = 20 \times x$, so $210 = 20x$. Divide: $x = 10.5$ cups. Or find cups per pancake: $6/20 = 3/10$ cup per pancake, so $35 \times (3/10) = 10.5$ cups.

16. E: 8/17 - When subtracting fractions with the same denominator, keep the denominator and subtract numerators: $13/17 - 5/17 = (13 - 5)/17 = 8/17$. The denominator stays 17; only subtract the numerators.

17. C: 8,480 - When rounding to the nearest ten, look at the ones digit. In 8,475, the ones digit is 5. Since $5 \geq 5$, round up: increase the tens digit from 7 to 8, making 8,480.

18. B: 48 - The LCM is the smallest number both numbers divide into evenly. List multiples: 12: 12, 24, 36, 48, 60... and 16: 16, 32, 48, 64... The first common multiple is 48. Verify: $48 \div 12 = 4$ ✓ and $48 \div 16 = 3$ ✓

19. D: 96 - Examine the pattern: 6 to 12 is ×2, 12 to 24 is ×2, 24 to 48 is ×2. Each number doubles. This is a geometric sequence with ratio 2. Next number: $48 \times 2 = 96$.

20. A: 221 - Area of a triangle = (base × height) ÷ 2 = (26 × 17) ÷ 2 = 442 ÷ 2 = 221 square units. You can also use formula $A = \frac{1}{2}bh$. A triangle's area is always half that of a rectangle with the same base and height.

21. E: 130 - To find 65% of 200, multiply: $0.65 \times 200 = 130$. Mental math: 10% of 200 is 20, so 60% is 120 (6 × 20), and 5% is 10, giving 120 + 10 = 130.

22. C: 13 - Solve $18 \times s = 234$ by dividing both sides by 18: $s = 234 \div 18 = 13$. Check: $18 \times 13 = 234$ ✓ Think "18 times what equals 234?"

23. B: 56 - Work backwards from the result. If the result is 16 after adding 9, then before adding the value was $16 - 9 = 7$. If dividing by 8 gave 7, the original number was $7 \times 8 = 56$. Check: $56 \div 8 = 7$, then $7 + 9 = 16$ ✓

24. D: 81 - The ratio 5:9 means for every 5 cats, there are 9 dogs. If there are 45 cats, find how many groups of 5: $45 \div 5 = 9$ groups. Each group has 9 dogs, so total dogs = $9 \times 9 = 81$. Or proportion: $5/9 = 45/x$, cross multiply: $5x = 405$, so $x = 81$.

25. A: 55 - Follow order of operations. Calculate the exponent first: $6^2 = 36$. Then work left to right: $30 + 36 = 66$, then $66 - 11 = 55$. Exponents are calculated before addition and subtraction.

Reading

1. C: has no beginning or end - The passage explicitly states: "This cycle has no starting or ending point—water simply changes form and location continuously." The continuous nature is emphasized in the opening paragraph.

2. E: plant leaves - The passage defines transpiration: "Plants also release water vapor through their leaves in a process called transpiration." This is specifically mentioned as a way water enters the atmosphere.

3. B: 400,000 cubic kilometers - The passage states: "Together, evaporation and transpiration put about 400,000 cubic kilometers of water into the atmosphere each year." This specific number is provided.

4. D: clouds - The passage explains: "As water vapor rises and cools, it condenses into tiny droplets that form clouds." Condensation of water vapor creates clouds.

5. A: disrupt natural water cycles - The final paragraph notes: "Human activities like deforestation and urbanization can disrupt natural water cycles, affecting local and global climate patterns." Human impact is acknowledged.

6. C: Westridge Academy - The opening line states: "Full ride to Westridge Academy—the boarding school two hours from home." The school is clearly identified.

7. E: concern about leaving their mother during financial difficulty - The narrator worries: "Mom would be here alone, working two jobs to keep the house, no one to help with groceries or remember when the bills were due." Financial stress and leaving Mom alone creates the conflict.

8. A: definitely attend Westridge - Marcus asks "You're going, right?" and the text says he was "already knowing my answer. Or thinking he did." Marcus assumes acceptance is certain.

9. D: layoffs - The passage states: "Last week, Mom's company announced layoffs." This creates the financial concern.

10. B: honor their mother's sacrifice - The passage concludes: "Maybe the best way to honor her sacrifice wasn't to stay and help—it was to go and succeed." Success becomes the way to honor Mom's work.

11. C: hide or hunt - The opening explains camouflage provides "protection from predators or helping them sneak up on prey." It serves both defensive and offensive purposes.

12. E: background matching - The passage defines: "Background matching means an animal's colors match its environment—like a polar bear's white fur against snow." This is the specific example given.

13. A: flat - The passage explains: "Some animals use countershading, being darker on top and lighter underneath, which counteracts shadows and makes them appear flat." Appearing flat is the result.

14. D: shape and behavior - The passage states: "The mimic octopus can even change its shape and behavior to impersonate other sea creatures." Both abilities are mentioned.

15. B: trick prey - The passage explains: "Some animals use what scientists call 'aggressive mimicry'—looking like something harmless to trick their prey." It's specifically for catching prey.

16. C: 1928 - The opening sentence states: "In 1928, Alexander Fleming made a discovery that would revolutionize medicine." The year is clearly specified.

17. E: left a petri dish uncovered accidentally - The passage explains: "He had left a petri dish uncovered by accident, and mold had grown on it." The discovery was accidental.

18. A: developing mass production methods - The passage states: "Oxford scientists Howard Florey and Ernst Boris Chain developed methods to mass-produce penicillin." This was their key contribution.

19. D: all Allied forces - The passage notes: "by D-Day in 1944, enough had been produced to treat all Allied forces." The production scale reached this level.

20. B: resistant to penicillin - The passage concludes: "Fleming famously warned that bacteria could become resistant to penicillin if it was misused—a prediction that has proven accurate." Resistance was his warning.

21. C: stronger memory connections - The passage states: "Music activates multiple brain regions simultaneously, creating stronger memory connections than simple repetition does." This is the key benefit.

22. E: rich, interconnected memories - The passage defines elaborative encoding as "forming rich, interconnected memories that are easier to retrieve later." This comprehensive definition is provided.

23. A: more vivid - The passage explains: "music often connects to emotions, and emotional experiences are remembered more vividly than neutral ones." The emotional connection enhances memory vividness.

24. D: musical memory - The passage states: "Even when other cognitive abilities decline, musical memory often remains intact." This specific type of memory persists.

25. B: create songs for information they need to remember - The passage advises: "Students can harness music's memory power by creating songs or rhymes for information they need to remember." This practical application is suggested.

26. C: a charger - The narrator explains: "I was looking for my charger in her room—she always 'borrows' my stuff—when I saw it under her pillow." The charger search led to finding the diary.

27. E: overwhelmed - The diary entry reveals: "AP classes, volleyball, college applications, trying to keep my scholarship GPA—it's too much. I can't breathe." The sister feels overwhelmed by pressure.

28. A: unable to measure up to their sister - The narrator reflects: "I'd spent my whole life feeling like I could never measure up to her." This was the previous feeling.

29. D: cheerful - The passage describes: "she was her usual cheerful self, asking about my day, joking with Dad." Her outward appearance was cheerful despite inner struggle.

30. B: everyone fights unseen battles - The narrator concludes: "I'd learned something valuable: everyone's fighting battles you can't see." This is the main lesson learned.

31. C: naturally replenishing - The opening defines renewable energy as coming "from sources that naturally replenish themselves and never run out." Self-replenishment is the key characteristic.

32. E: one year - The passage states: "The sun provides more energy to Earth in one hour than humans use in an entire year." This dramatic comparison emphasizes solar potential.

33. A: hydroelectric - The passage notes: "It's currently the largest source of renewable electricity worldwide" when discussing hydroelectric power. This is the current leader.

34. D: carbon dioxide - The passage explains: "Burning fossil fuels releases carbon dioxide, trapping heat in the atmosphere and warming the planet." CO_2 is specifically identified.

35. B: 2050 - The passage states: "Many countries now aim to reach 'net-zero' emissions by 2050." This target year is specified.

36. C: 1608 - The passage states: "Dutch eyeglass maker Hans Lippershey is often credited with creating the first practical telescope in 1608." The year is clearly given.

37. E: systematic astronomical observations - The passage notes: "he was the first to use it for systematic astronomical observations." This distinguishes Galileo's use from others.

38. A: four - The passage states: "He discovered four moons orbiting Jupiter." This specific number is mentioned.

39. D: forced Galileo to recant and placed him under house arrest - The passage explains: "in 1633, the Church forced Galileo to recant his views and placed him under house arrest for the rest of his life." Both actions are specified.

40. B: Copernicus's - The passage states: "Galileo's evidence supported Copernicus's heliocentric theory: that Earth and other planets orbit the Sun." Copernicus's theory was supported by Galileo's observations.

Verbal

1. C: confused - Bewildered and confused both mean perplexed and unable to understand clearly, disoriented. "A bewildered expression" and "a confused expression" describe the same puzzled look. Both indicate lack of understanding or clarity.

2. A: restore - Revive and restore both mean to bring back to life, health, or consciousness, to renew. "Revive a patient" and "restore a patient" both mean bringing them back to health. Both indicate renewal or recovery.

3. D: nervous - Tense and nervous both mean anxious or unable to relax, experiencing stress or strain. "Feeling tense" and "feeling nervous" describe the same state of anxiety. Both indicate stress or worry.

4. B: dive - Plunge and dive both mean to jump or fall into something quickly and forcefully, especially water. "Plunge into the pool" and "dive into the pool" describe the same action. Both indicate rapid entry into something.

5. E: burn - Scorch and burn both mean to damage or discolor by heat or fire, to char. "The sun scorched the grass" and "the sun burned the grass" describe the same heat damage. Both indicate damage from heat.

6. C: empty - Vacant and empty both mean containing nothing, unoccupied. "A vacant room" and "an empty room" describe the same unoccupied space. Both indicate absence of contents or occupants.

7. A: jealousy - Envy and jealousy both mean resentful desire for something possessed by another. "Feel envy" and "feel jealousy" describe similar emotions, though jealousy can also mean fear of losing something you have. Both indicate wanting what others have.

8. D: strong - Sturdy and strong both mean solidly built, able to withstand pressure or force. "A sturdy table" and "a strong table" describe furniture that won't break easily. Both indicate durability and strength.

9. B: shy - Timid and shy both mean lacking courage or confidence, hesitant. "A timid child" and "a shy child" describe someone who holds back in social situations. Both indicate lack of boldness.

10. E: huge - Enormous and huge both mean extremely large in size or extent. "An enormous building" and "a huge building" describe the same very large structure. Both emphasize great size.

11. C: abandon - Forsake and abandon both mean to give up or leave entirely, to desert. "Forsake your friends" and "abandon your friends" both mean leaving them behind. Both indicate complete withdrawal or desertion.

12. D: evil - Wicked and evil both mean morally wrong, harmful, or bad. "A wicked act" and "an evil act" describe the same immoral behavior. Both indicate moral wrongness.

13. A: decrease - Diminish and decrease both mean to become or make smaller or less in size, amount, or degree. "The sound diminished" and "the sound decreased" describe the same reduction. Both indicate lessening.

14. B: harmless - Benign and harmless both mean not harmful or dangerous, gentle. "A benign tumor" is one that isn't cancerous or dangerous. Both indicate lack of harm.

15. E: capture - Apprehend and capture both mean to arrest or seize someone, especially by legal authority. "Apprehend the suspect" and "capture the suspect" mean the same. Both indicate taking into custody.

16. C: noticeable - Prominent and noticeable both mean easily seen or noticed, standing out. "A prominent feature" and "a noticeable feature" describe something that catches attention. Both indicate visibility or importance.

17. D: hide - Conceal and hide both mean to keep from sight or discovery, to cover up. "Conceal evidence" and "hide evidence" mean preventing others from finding it. Both indicate keeping something secret or invisible.

18. A: peaceful - Tranquil and peaceful both mean calm, quiet, and free from disturbance. "A tranquil lake" and "a peaceful lake" describe the same serene water. Both indicate calmness.

19. B: tired - Weary and tired both mean exhausted, in need of rest. "Feeling weary" and "feeling tired" describe the same state of fatigue. Both indicate lack of energy.

20. E: robust - Sturdy and robust both mean strong and healthy, vigorous. "A robust person" and "a sturdy person" describe someone with strength and vitality. Both indicate strength and durability.

21. C: stop - Cease and stop both mean to come to an end or bring to an end. "Cease talking" and "stop talking" mean the same. Both indicate ending or discontinuing.

22. D: ridiculous - Absurd and ridiculous both mean wildly unreasonable or inappropriate, laughably silly. "An absurd claim" and "a ridiculous claim" describe something that makes no sense. Both indicate extreme foolishness.

23. A: peak - Summit and peak both mean the highest point, especially of a mountain. "The mountain's summit" and "the mountain's peak" refer to the same top point. Both indicate the highest elevation.

24. B: poor - Inferior and poor both mean lower in quality, value, or status. "Inferior workmanship" and "poor workmanship" describe the same low quality. Both indicate lack of excellence.

25. E: strict - Stern and strict both mean serious and severe, not lenient or permissive. "A stern teacher" and "a strict teacher" describe someone who enforces rules firmly. Both indicate firmness and seriousness.

26. C: ridicule - Mock and ridicule both mean to make fun of someone in a cruel way, to deride. "Mock someone's appearance" and "ridicule someone's appearance" describe the same cruel teasing. Both indicate making fun of others.

27. E: icy - Frigid and icy both mean extremely cold, freezing. "Frigid temperatures" and "icy temperatures" describe the same bitter cold. Both emphasize intense coldness.

28. B: calm - Tranquil and calm both mean peaceful and quiet, undisturbed. "A tranquil scene" and "a calm scene" describe the same peaceful setting. Both indicate serenity.

29. A: unwilling - Reluctant and unwilling both mean hesitant or not wanting to do something. "Reluctant to leave" and "unwilling to leave" express the same hesitation. Both indicate lack of enthusiasm.

30. D: dark - Gloomy and dark both mean poorly lit or depressing, dismal. "A gloomy room" and "a dark room" can both describe spaces lacking light or cheerfulness. Both indicate dimness or sadness.

31. C: brush is to paint - **Relationship: Tool to action it performs.** A pen is used to write, just as a brush is used to paint. Both show implements paired with the actions they enable.

32. A: happy is to miserable - **Relationship: Opposite emotions.** Sad and joyful are opposite emotions, just as happy and miserable are opposite emotions. Both pairs contrast opposing feelings.

33. D: scientist is to laboratory - **Relationship: Professional to their primary workplace.** A chef works in a kitchen, just as a scientist works in a laboratory. Both show workers in their typical work environments.

34. B: arm is to body - **Relationship: Part to whole (appendage/limb).** A branch extends from a tree, just as an arm extends from a body. Both show limb-like extensions from a main structure.

35. E: broom is to sweep - **Relationship: Tool to action it performs.** Scissors are used to cut, just as a broom is used to sweep. Both show tools paired with their primary functions.

36. C: jungle is to humid - **Relationship: Environment to characteristic climate condition.** A desert is characterized by being arid (dry), just as a jungle is characterized by being humid (moist). Both show ecosystems paired with their defining moisture levels.

37. A: frame is to picture - **Relationship: Container/holder to what it contains or displays.** An envelope holds or protects a letter, just as a frame holds or displays a picture. Both show protective or displaying containers for their contents.

38. D: larva is to butterfly - **Relationship: Immature form to adult form through metamorphosis.** A tadpole transforms into a frog, just as a larva (caterpillar) transforms into a butterfly. Both show complete metamorphosis from immature to adult forms.

39. B: hungry is to eat - **Relationship: Need/sensation to action that satisfies it.** Being tired prompts you to rest, just as being hungry prompts you to eat. Both show physical needs and their natural responses.

40. E: speedometer is to speed - Relationship: Measuring instrument to what it measures. A thermometer measures temperature, just as a speedometer measures speed. Both show devices paired with the quantities they measure.

41. C: sun is to sunscreen - Relationship: Environmental condition to protection against it. Rain requires an umbrella for protection, just as sun requires sunscreen for protection. Both show natural conditions and items that protect against them.

42. A: tile is to floor - Relationship: Individual unit to surface made of many such units. A page is one unit of a book, just as a tile is one unit of a floor. Both show components that combine to form a larger whole.

43. D: architect is to building - Relationship: Designer to structure they design. A composer creates a symphony, just as an architect creates (designs) a building. Both show creators and the works they produce.

44. D: all of the above - Relationship: Opposite actions (enlarge vs. reduce). All three pairs (expand/contract, inflate/deflate, increase/decrease) show opposite actions. This is a special case where multiple correct answers exist.

45. E: grateful is to kindness - Relationship: Emotion to what triggers it. Being proud is triggered by achievement, just as being grateful is triggered by kindness. Both show emotions paired with their causes.

46. C: optometrist is to eyes - Relationship: Medical specialist to body part they treat. A dentist treats teeth, just as an optometrist treats eyes (vision). Both show doctors and their areas of specialization.

47. A: dusk is to evening - Relationship: Transition time to period it introduces. Dawn marks the transition to morning, just as dusk marks the transition to evening. Both show twilight periods that begin different times of day.

48. D: shell is to turtle - Relationship: Protective covering/housing to animal. A cocoon is the protective covering of a developing butterfly, just as a shell is the protective covering of a turtle. Both show animals and their protective structures.

49. B: gas is to condense - Relationship: State of matter to process that changes it. A liquid freezes (becomes solid), just as a gas condenses (becomes liquid). Both show phase changes in matter.

50. E: timeline is to history - Relationship: Visual tool to subject it represents. A map is a visual representation of geography, just as a timeline is a visual representation of history. Both show tools that display information about their subjects.

51. E: all of the above - Relationship: Home/dwelling to animal that lives there. All options correctly pair animals with their homes (nest-bird, hive-bee, burrow-rabbit, web-spider). This is a special case with multiple correct answers.

52. E: all of the above - Relationship: Treatment/remedy to condition it treats. All options correctly show remedies and what they treat (cure-disease, medicine-illness, vaccine-virus, treatment-injury). Multiple correct answers exist.

53. D: screen is to phone - Relationship: Functional component through which you interact with device. A lens is the part of glasses you look through, just as a screen is the part of a phone you look at and interact with. Both show key interface components.

54. E: all of the above - Relationship: Preparatory activity to main event. All options correctly pair preparation with events (study-exam, practice-performance, training-race, preparation-event). Multiple correct answers exist.

55. E: grin is to amusement - Relationship: Facial expression to emotion it indicates. A frown indicates sadness, just as a grin indicates amusement. Both show expressions paired with emotions they convey.

56. E: all of the above - Relationship: Seed/stone to fruit containing it. All options correctly pair inner seeds with their fruits (kernel-corn, pit-peach, seed-apple, pip-orange, stone-cherry). Multiple correct answers exist.

57. E: all of the above - Relationship: Leader to group they direct. All options correctly pair leaders with what they lead (conductor-orchestra, director-movie, coach-team, teacher-class, captain-ship). Multiple correct answers exist.

58. D: sandstorm is to sand - Relationship: Storm type to primary element. A blizzard is a storm featuring heavy snow, just as a sandstorm is a storm featuring blowing sand. Both show weather phenomena paired with their characteristic materials.

59. B: melt is to solid - Relationship: Phase change process to starting state. Evaporate describes liquid changing to gas, just as melt describes solid changing to liquid. Both show processes and the initial states they transform.

60. E: barrier is to access - Relationship: Preventive measure to what it prevents. Quarantine prevents disease spread, just as a barrier prevents access. Both show methods of blocking or preventing something.

Quantitative

1. B: 14 - Divide 252 by 18: $252 \div 18 = 14$. This is a division fact from the 18 times table. Check: $18 \times 14 = 252$ ✓ Knowing multiplication facts helps solve division problems quickly.

2. D: 117 - Solve $n - 38 = 79$ by adding 38 to both sides: $n = 79 + 38 = 117$. Check: $117 - 38 = 79$ ✓ To undo subtraction, use addition.

3. A: 59 - The sequence adds 12 each time. 1st number: 11. 2nd number: 11 + 12 = 23. 3rd number: 23 + 12 = 35. 4th number: 35 + 12 = 47. 5th number: 47 + 12 = 59. This is an arithmetic sequence with common difference 12.

4. C: 189 - Area of a rectangle = length × width = 21 × 9 = 189 square units. Don't confuse with perimeter, which would be 2(21 + 9) = 60. Area measures the space inside.

5. E: 13 - Solve 15x = 195 by dividing both sides by 15: x = 195 ÷ 15 = 13. Check: 15 × 13 = 195 ✓ Division is the inverse of multiplication.

6. B: 60 - To find 5/7 of 84 students, multiply: (5/7) × 84. Divide 84 by 7 first: 84 ÷ 7 = 12. Then multiply by 5: 12 × 5 = 60 students play sports.

7. D: 80 - Follow order of operations (PEMDAS). Multiply first: 11 × 3 = 33. Then work left to right: 55 + 33 = 88, then 88 − 8 = 80. Multiplication must be done before addition and subtraction.

8. A: 1/5 - Total balls: 3 green + 5 red + 7 blue = 15 balls. Probability of green = green balls/total balls = 3/15. Simplify by dividing both by 3: 3/15 = 1/5. Count favorable outcomes over total possible outcomes.

9. C: 13/20 - Convert 0.65 to a fraction: 0.65 = 65/100. Simplify by dividing both numerator and denominator by 5: 65 ÷ 5 = 13 and 100 ÷ 5 = 20, giving 13/20. Check: 13 ÷ 20 = 0.65 ✓

10. E: 38 - The diameter of a circle is twice the radius. If radius = 19, then diameter = 2 × 19 = 38. Remember: diameter goes all the way across through the center, radius goes from center to edge.

11. B: 7 - Solve 8y + 17 = 73 in two steps. Subtract 17 from both sides: 8y = 56. Divide both sides by 8: y = 7. Check: 8(7) + 17 = 56 + 17 = 73 ✓

12. D: $105 - Calculate 30% off of $150. Method 1: Find discount: 0.30 × $150 = $45, then subtract: $150 − $45 = $105. Method 2: If 30% off, you pay 70%: 0.70 × $150 = $105.

13. A: 117 - Calculate each exponent first, then subtract. $21^2 = 21 \times 21 = 441$. Then $18^2 = 18 \times 18 = 324$. Finally subtract: 441 − 324 = 117. Exponents must be calculated before subtraction.

14. C: 115 - The compound inequality q > 110 and q < 115 means q must be greater than 110 AND less than 115. This is a "could NOT" question. 115 does NOT satisfy q < 115 (115 is not less than 115; it's equal). All other choices fall between 110 and 115.

15. E: 14 - Set up a proportion: 8 oz/12 sandwiches = x oz/21 sandwiches. Cross-multiply: 8 × 21 = 12 × x, so 168 = 12x. Divide: x = 14 ounces. Or find oz per sandwich: 8/12 = 2/3 oz per sandwich, so 21 × (2/3) = 14 oz.

16. B: 8/19 - When subtracting fractions with the same denominator, keep the denominator and subtract numerators: 15/19 − 7/19 = (15 − 7)/19 = 8/19. The denominator stays 19; only subtract the numerators.

17. D: 9,600 - When rounding to the nearest hundred, look at the tens digit. In 9,638, the tens digit is 3. Since 3 < 5, round down: keep the hundreds digit as 6, making 9,600.

18. A: 42 - The LCM is the smallest number both numbers divide into evenly. List multiples: 14: 14, 28, 42, 56... and 21: 21, 42, 63... The first common multiple is 42. Verify: 42 ÷ 14 = 3 ✓ and 42 ÷ 21 = 2 ✓

19. C: 405 - Examine the pattern: 5 to 15 is ×3, 15 to 45 is ×3, 45 to 135 is ×3. Each number triples. This is a geometric sequence with ratio 3. Next number: 135 × 3 = 405.

20. E: 266 - Area of a triangle = (base × height) ÷ 2 = (28 × 19) ÷ 2 = 532 ÷ 2 = 266 square units. You can also use formula A = ½bh. A triangle's area is always half that of a rectangle with the same base and height.

21. B: 126 - To find 70% of 180, multiply: 0.70 × 180 = 126. Mental math: 10% of 180 is 18, so 70% is 7 times that: 7 × 18 = 126.

22. D: 13 - Solve 19 × u = 247 by dividing both sides by 19: u = 247 ÷ 19 = 13. Check: 19 × 13 = 247 ✓ Think "19 times what equals 247?"

23. A: 7 - Work backwards or set up an equation. Let n be the number: (n × 9) − 15 = 48. So 9n − 15 = 48. Add 15: 9n = 63. Divide by 9: n = 7. Check: 7 × 9 = 63, then 63 − 15 = 48 ✓

24. C: 21 - The ratio 7:3 means for every 7 books, there are 3 magazines. If there are 49 books, find how many groups of 7: 49 ÷ 7 = 7 groups. Each group has 3 magazines, so total magazines = 7 × 3 = 21. Or proportion: 7/3 = 49/x, cross multiply: 7x = 147, so x = 21.

25. E: 76 - Follow order of operations. Calculate the exponent first: $7^2 = 49$. Then work left to right: 40 + 49 = 89, then 89 − 13 = 76. Exponents are calculated before addition and subtraction.