UPPER LEVEL SSAT PRACTICE TEST 4

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: The old clock in my grandmother's house hadn't worked in decades. But at exactly midnight on my thirteenth birthday, it began to chime—and something impossible happened.

Topic B: Describe a person who has significantly influenced your life. What qualities do they possess that you admire? How has knowing them changed you or the way you see the world?

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 $182 \div 13$?

A. 12

B. 13

C. 15

D. 14

E. 16

2. If $n + 27 = 85$, then $n =$

A. 112

B. 58

C. 27

D. 62

E. 85

3. A sequence follows the rule: add 9 to the previous number. If the first number is 7, what is the 4th number?

A. 34

B. 27

C. 25

D. 16

E. 43

4. What is the area of a rectangle with length 15 and width 8?

A. 23

B. 46

C. 112

D. 60

E. 120

5. If 11x = 143, then x =

A. 132

B. 154

C. 13

D. 11

E. 12

6. A jar contains 48 candies. If 3/4 of them are chocolate, how many are chocolate?

A. 12

B. 16

C. 24

D. 36

E. 32

7. What is $35 + 7 \times 4 - 6$?

A. 162

B. 57

C. 51

D. 144

E. 138

8. A spinner has 10 equal sections numbered 1 through 10. What is the probability of landing on a number less than 4?

A. 3/10

B. 4/10

C. 1/2

D. 6/10

E. 1/10

9. Which of the following is equivalent to 0.85?

A. 85/10

B. 8/5

C. 85/1000

D. 1/85

E. 17/20

10. A circle has a diameter of 26. What is its radius?

A. 52

B. 26

C. 13

D. 39

E. 6.5

11. If $4y + 11 = 47$, then $y =$

A. 36

B. 11

C. 58

D. 9

E. 8

12. A shirt originally costs $45. It's now on sale for 20% off. What is the sale price?

A. $25

B. $36

C. $9

D. $40

E. $35

13. What is $15^2 - 12^2$?

A. 81

B. 3

C. 9

D. 144

E. 225

14. In the figure shown, square PQRS has a side length of 10. Inside it is a circle with radius 3. What is the area of the shaded region (the square minus the circle)?

A. 100

B. 28.26

C. 91

D. 9π

E. $100 - 9\pi$

15. If m > 75 and m < 80, which could NOT be the value of m?

A. 76

B. 78.5

C. 80

D. 77

E. 79

16. A recipe requires 5 cups of sugar to make 25 cookies. How many cups of sugar are needed to make 40 cookies?

A. 6

B. 9

C. 7

D. 8

E. 10

17. What is $10/13 - 4/13$?

A. 6/26

B. 6/13

C. 10/26

D. 14/13

E. 4/13

18. Round 5,378 to the nearest ten.

A. 5,380

B. 5,370

C. 5,400

D. 5,300

E. 5,390

19. What is the least common multiple (LCM) of 9 and 12?

A. 3

B. 108

C. 18

D. 12

E. 36

20. If the pattern continues: 4, 8, 16, 32, ___, what is the next number?

A. 36

B. 48

C. 64

D. 40

E. 56

21. A triangle has a base of 20 and a height of 13. What is its area?

A. 33

B. 260

C. 66

D. 130

E. 40

22. What is 55% of 180?

A. 55

B. 99

C. 90

D. 110

E. 100

23. If $16 \times r = 208$, then $r =$

A. 13

B. 16

C. 12

D. 14

E. 192

24. A number is divided by 6, then 5 is added. The result is 12. What is the number?

A. 72

B. 17

C. 102

D. 47

E. 42

25. The ratio of dogs to cats at a shelter is 5:8. If there are 40 dogs, how many cats are there?

A. 25

B. 48

C. 64

D. 50

E. 32

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

Volcanoes form when molten rock, called magma, rises from deep within Earth's mantle and breaks through the surface. When this happens, the magma—now called lava—flows out along with gases, ash, and rock fragments. Over time, these materials build up around the opening, creating the cone-shaped mountains we recognize as volcanoes.

Not all volcanoes erupt the same way. Some, like Hawaii's Kilauea, produce gentle lava flows that can continue for years. Others, like Mount St. Helens, explode violently with little warning. The difference depends on the lava's composition. Thick, sticky lava traps gases, building pressure until a violent explosion occurs. Thin, runny lava allows gases to escape easily, producing calmer eruptions.

Despite their danger, volcanoes benefit humans. Volcanic soil is extremely fertile, making surrounding areas excellent for farming. Geothermal energy from volcanic regions provides renewable power. And volcanic eruptions create new land—the Hawaiian Islands themselves were formed entirely by volcanic activity over millions of years.

1. According to the passage, magma becomes lava when it

A. cools underground

B. reaches the surface

C. mixes with water

D. turns to ash

E. becomes solid

2. Mount St. Helens is described as having

A. gentle eruptions

B. continuous lava flows

C. no recent activity

D. violent explosions

E. thin lava

3. Volcanic soil is described as

A. fertile

B. useless

C. rocky

D. dry

E. poisonous

4. The Hawaiian Islands were formed by

A. earthquakes

B. erosion

C. volcanic activity

D. ocean currents

E. meteor impacts

5. Thick lava causes violent eruptions because it

A. is very hot

B. flows quickly

C. melts rock

D. cools slowly

E. traps gases

Passage 2

"I can't believe you're actually doing this," Mom said, her voice a mixture of pride and worry as she helped me pack. My acceptance letter to the boarding school arts program lay on my desk—my ticket to studying music with real professionals, far from our small town.

"It's only two states away," I said, though my stomach churned. I'd never been away from home for more than a week.

My little brother Jake appeared in the doorway, holding my old guitar. "You're not taking this one?" His voice was small.

I'd been planning to take both guitars, but seeing his face changed everything. "Actually, I think you should keep it. You've been asking for lessons, right?"

His eyes widened. "Really?"

"Really. But you have to promise to practice. I'll teach you everything I know when I visit."

Mom smiled, wiping her eyes. "You know, leaving home doesn't mean leaving your family behind. It means taking everything you've learned here and building something new with it."

She was right. The music I'd make wouldn't erase where I came from—it would be shaped by it. Home wasn't a place I was leaving. It was a foundation I was building on.

6. The narrator has been accepted to

A. a music competition

B. a local school

C. a college

D. a boarding school arts program

E. a summer camp

7. Jake is the narrator's

A. friend

B. younger brother

C. cousin

D. neighbor

E. older brother

8. The narrator gives Jake

A. a guitar

B. money

C. books

D. a music player

E. a recording

9. The narrator's mother believes that leaving home

A. is a mistake

B. will be too hard

C. means building on a foundation

D. should be avoided

E. is impossible

10. The passage suggests the narrator initially feels

A. completely confident

B. angry about leaving

C. indifferent

D. regretful about the decision

E. nervous but excited

Passage 3

The human sense of smell is more powerful than most people realize. While we can consciously identify about 10,000 different scents, our noses can actually detect over one trillion different odor combinations. This makes smell our most sensitive chemical sense.

Smell works when odor molecules enter the nose and bind to receptors in the olfactory epithelium, a small patch of tissue at the back of the nasal cavity. These receptors send signals directly to the brain's olfactory bulb, which then communicates with areas controlling memory and emotion. This is why certain smells can trigger vivid memories—scent bypasses the brain's usual sensory processing and connects directly to memory centers.

Interestingly, smell and taste are intimately connected. When you eat, aromas from food travel up the back of your throat to your nose. This is why food tastes bland when you have a cold—blocked nasal passages prevent smell from contributing to flavor. In fact, about 80% of what we think of as "taste" is actually smell.

Some people suffer from anosmia—the inability to smell. This condition can be temporary, like during a bad cold, or permanent due to injury or disease. People with anosmia report that food loses appeal and they miss the warnings that smells provide, like detecting smoke or spoiled food.

11. Humans can consciously identify approximately how many different scents?

A. 1,000

B. 10,000

C. 100,000

D. 1 trillion

E. 10 million

12. Odor molecules bind to receptors in the

A. brain

B. throat

C. mouth

D. olfactory epithelium

E. stomach

13. Smell connects directly to the brain's

A. memory centers

B. vision centers

C. motor control

D. hearing centers

E. balance centers

14. Food tastes bland during a cold because

A. taste buds stop working

B. you eat less

C. smell is blocked

D. food changes

E. you drink more water

15. Anosmia is

A. enhanced smell

B. colorblindness

C. hearing loss

D. improved taste

E. inability to smell

Passage 4

In 1969, astronauts Neil Armstrong and Buzz Aldrin became the first humans to walk on the Moon. The Apollo 11 mission represented the culmination of years of research, billions of dollars, and the efforts of over 400,000 people. It was also a triumph in the Space Race—the competition between the United States and Soviet Union to achieve spaceflight superiority.

The mission faced countless challenges. The lunar module had only seconds of fuel remaining when Armstrong manually piloted it to a safe landing site, avoiding a boulder-strewn crater. Communications with Earth experienced delays—radio signals took about 1.3 seconds to travel each way. If anything went wrong, the astronauts would have to solve problems themselves before Houston could even hear about them.

Armstrong's famous words, "That's one small step for man, one giant leap for mankind," were heard by an estimated 600 million people worldwide—about 20% of Earth's population at the time. The astronauts spent about 21 hours on the Moon's surface, collected rock samples, and planted an American flag.

The Apollo program continued through Apollo 17 in 1972, with six missions successfully landing humans on the Moon. No human has returned since, though new missions are planned. The original Apollo missions proved humans could travel to another world—a achievement that continues to inspire space exploration today.

16. Armstrong and Aldrin walked on the Moon in

A. 1959

B. 1969

C. 1979

D. 1972

E. 1967

17. The Apollo 11 mission involved approximately

A. 100 people

B. 1,000 people

C. 10,000 people

D. 400,000 people

E. 1 million people

18. Armstrong manually piloted the lunar module to avoid

A. a crater full of boulders

B. another spacecraft

C. a mountain

D. deep dust

E. radiation

19. Radio signals between the Moon and Earth took approximately

A. instant

B. 10 seconds each way

C. 1.3 seconds each way

D. 1 minute each way

E. 5 seconds each way

20. The astronauts spent about how long on the Moon's surface?

A. 2 hours

B. 6 hours

C. 12 hours

D. 1 day

E. 21 hours

Passage 5

Antibiotics are medicines that fight bacterial infections. They work by either killing bacteria directly or preventing them from multiplying. Since their discovery, antibiotics have saved countless lives and transformed medicine, making once-deadly infections routinely treatable.

However, antibiotic resistance has become a serious problem. When antibiotics are overused or misused, bacteria can evolve to survive them. These resistant bacteria multiply, creating strains that no longer respond to treatment. Infections that were once easily cured become dangerous again.

Several factors contribute to resistance. Patients sometimes stop taking antibiotics once they feel better, rather than completing the prescribed course. This allows the strongest bacteria to survive and multiply.

Doctors sometimes prescribe antibiotics for viral infections like colds, where they're useless—viruses aren't affected by antibiotics at all. Agriculture also plays a role, as antibiotics given to livestock can promote resistant bacteria that spread to humans.

Fighting resistance requires everyone's cooperation. Patients must take antibiotics exactly as prescribed and never share them. Doctors must prescribe antibiotics only when necessary. Scientists continue developing new antibiotics, though resistant bacteria evolve faster than new drugs can be created. The race between antibiotic development and bacterial resistance is one of medicine's greatest challenges.

21. Antibiotics are effective against

A. viruses

B. bacteria

C. all diseases

D. cancer

E. broken bones

22. Antibiotic resistance occurs when bacteria

A. die quickly

B. become weaker

C. disappear

D. evolve to survive antibiotics

E. stop multiplying

23. According to the passage, antibiotics are useless against

A. viral infections like colds

B. all infections

C. bacterial infections

D. serious diseases

E. minor cuts

24. Patients should take antibiotics

A. only when they feel sick

B. whenever they want

C. exactly as prescribed

D. with every meal

E. once a week

25. The passage suggests that resistant bacteria evolve

A. slowly

B. never

C. at the same rate as drug development

D. only in hospitals

E. faster than new drugs can be created

Passage 6

The first time I stood before a debate audience, my hands shook so badly I dropped my note cards. They scattered across the floor like fallen leaves. The room went silent. My opponent smirked. I wanted to run.

But then I remembered Coach Martinez's words: "Debate isn't about being perfect. It's about making your best argument, even when things go wrong. Especially when things go wrong."

I left the cards on the floor. I'd written them myself—I knew the arguments by heart. Taking a breath, I began speaking, my voice steadier than I expected. Without the cards, I could look at the audience, make eye contact, connect. My words felt more authentic, less rehearsed.

I didn't win that debate. My opponent had more experience, smoother delivery, better evidence. But the judges praised my recovery and passion. More importantly, I learned something crucial: confidence isn't the absence of mistakes. It's what you do after you make them.

Now, two years later, I'm team captain. I still get nervous before debates. The difference is, I know nervousness won't destroy me. Neither will mistakes. They're just part of the process—obstacles that make the victory sweeter when it comes.

When new debaters join the team looking terrified, I share my story. Then I show them the note cards from that first debate. I kept them as a reminder: your worst moment doesn't define you. How you respond to it does.

26. The narrator dropped note cards during

A. a speech class

B. their first debate

C. a championship

D. practice

E. a school play

27. Coach Martinez believed that debate is about

A. winning every time

B. being perfect

C. memorizing everything

D. making your best argument despite problems

E. reading from cards

28. By leaving the cards on the floor, the narrator was able to

A. make better eye contact with the audience

B. speak faster

C. confuse the opponent

D. win the debate easily

E. avoid speaking

29. The narrator did NOT win the first debate but learned about

A. quitting

B. giving up

C. responding to mistakes

D. avoiding challenges

E. memorizing better

30. The narrator kept the note cards as

A. a trophy

B. evidence of failure

C. something to be ashamed of

D. a waste of space

E. a reminder that response matters more than mistakes

Passage 7

Bees are essential pollinators, responsible for helping reproduce about one-third of the food crops humans eat. As bees visit flowers gathering nectar, pollen sticks to their fuzzy bodies. When they visit the next flower, some of this pollen rubs off, fertilizing the plant so it can produce fruit and seeds.

Unfortunately, bee populations worldwide are declining rapidly. Several factors contribute to this crisis. Pesticides harm bees both directly by poisoning them and indirectly by killing the plants they depend on. Habitat loss means fewer wildflowers for bees to forage. Climate change disrupts the timing between when flowers bloom and when bees emerge from winter dormancy. Diseases and parasites, particularly varroa mites, weaken bee colonies.

The decline has serious implications. Without bees, many crops would fail. Apples, almonds, blueberries, and countless other foods depend on bee pollination. Some farmers already resort to hand-pollinating crops—a labor-intensive process that can't match the efficiency of bees.

However, people can help. Planting bee-friendly flowers, avoiding pesticides in gardens, and supporting organic farming all make a difference. Even small gardens and flower boxes provide crucial habitat. Some cities are creating "bee highways"—corridors of planted flowers connecting green spaces so bees can safely travel.

Protecting bees isn't just about saving insects—it's about preserving our food system and the ecosystems that sustain all life on Earth.

31. Bees help reproduce approximately what fraction of human food crops?

A. One-quarter

B. One-third

C. One-half

D. Two-thirds

E. All of them

32. Pollen is transferred when bees

A. eat leaves

B. build hives

C. sleep

D. visit multiple flowers

E. drink water

33. Varroa mites are described as

A. parasites that harm bees

B. helpful to bees

C. a type of plant

D. a pesticide

E. a food source

34. Some farmers resort to hand-pollinating because

A. it's easier than using bees

B. it's cheaper

C. bee populations are declining

D. crops taste better

E. it's required by law

35. "Bee highways" are

A. roads for cars

B. underground tunnels

C. rivers

D. buildings

E. flower corridors connecting green spaces

Passage 8

The invention of the printing press by Johannes Gutenberg around 1440 revolutionized human communication. Before Gutenberg, books were copied by hand, making them expensive and rare. A single book could take months to produce, and only the wealthy could afford personal libraries. Most people never owned a book.

Gutenberg's press used movable metal type—individual letters that could be arranged, printed, then rearranged for the next page. This made printing much faster and cheaper. The first major book printed was the Gutenberg Bible in 1455. By 1500, printing presses had produced an estimated 20 million books across Europe—more than scribes had produced in the previous thousand years.

The impact was enormous. Books became affordable, spreading knowledge beyond monasteries and universities. Literacy rates increased as more people had access to reading materials. Scientific discoveries could be shared quickly, accelerating progress. The Protestant Reformation spread rapidly through printed pamphlets and translated Bibles. Different viewpoints could reach wide audiences, changing how societies shared information and ideas.

Today, we're experiencing another communication revolution with digital technology and the internet. But Gutenberg's invention remains one of history's most influential innovations, fundamentally changing how humans record, share, and preserve knowledge.

36. The printing press was invented around

A. 1340

B. 1440

C. 1540

D. 1640

E. 1740

37. Before the printing press, books were

A. printed on paper

B. cheap and common

C. available to everyone

D. copied by hand

E. printed by machines

38. The first major book printed by Gutenberg was

A. the Bible

B. a dictionary

C. a novel

D. a science book

E. a newspaper

39. By 1500, approximately how many books had printing presses produced?

A. 1,000

B. 100,000

C. 20 million

D. 1 million

E. 50 million

40. According to the passage, the printing press helped spread

A. poverty

B. warfare

C. illiteracy

D. silence

E. the Protestant Reformation

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. RESTRICT:

A. free

B. allow

C. limit

D. expand

E. release

2. GLEAM:

A. shine

B. darken

C. hide

D. fade

E. dim

3. ABSURD:

A. sensible

B. logical

C. reasonable

D. normal

E. ridiculous

4. PLACID:

A. rough

B. calm

C. stormy

D. wild

E. violent

5. STRIVE:

A. quit

B. surrender

C. rest

D. struggle

E. relax

6. DEVOUR:

A. sip

B. nibble

C. consume

D. taste

E. reject

7. DREARY:

A. gloomy

B. cheerful

C. bright

D. sunny

E. happy

8. AMPLE:

A. scarce

B. little

C. tiny

D. small

E. abundant

9. COMMENCE:

A. finish

B. begin

C. end

D. stop

E. conclude

10. WARY:

A. careless

B. reckless

C. bold

D. cautious

E. brave

11. ANCIENT:

A. new

B. modern

C. old

D. recent

E. current

12. SUMMIT:

A. peak

B. valley

C. bottom

D. base

E. foundation

13. FRIGID:

A. warm

B. hot

C. mild

D. comfortable

E. freezing

14. ABOLISH:

A. create

B. eliminate

C. build

D. construct

E. establish

15. TARDY:

A. early

B. prompt

C. punctual

D. late

E. quick

16. ABUNDANT:

A. rare

B. scarce

C. plentiful

D. limited

E. few

17. CORDIAL:

A. friendly

B. hostile

C. cold

D. mean

E. rude

18. REFUGE:

A. danger

B. threat

C. exposure

D. risk

E. shelter

19. TRANQUIL:

A. noisy

B. peaceful

C. loud

D. chaotic

E. disturbed

20. FUTILE:

A. effective

B. successful

C. useful

D. useless

E. productive

21. SUMMIT:

A. bottom

B. valley

C. top

D. middle

E. side

22. TRIUMPH:

A. victory

B. defeat

C. loss

D. failure

E. surrender

23. CEASE:

A. begin

B. start

C. continue

D. proceed

E. stop

24. GRIM:

A. cheerful

B. harsh

C. happy

D. pleasant

E. joyful

25. PERIL:

A. safety

B. security

C. protection

D. danger

E. shelter

26. ALERT:

A. sleepy

B. tired

C. watchful

D. drowsy

E. unconscious

27. VALOR:

A. courage

B. fear

C. cowardice

D. weakness

E. timidity

28. LOFTY:

A. low

B. short

C. small

D. ground-level

E. high

29. MODEST:

A. arrogant

B. humble

C. proud

D. boastful

E. vain

30. ARDUOUS:

A. easy

B. simple

C. effortless

D. difficult

E. relaxing

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. Engine is to car as

A. pedal is to bicycle

B. wing is to airplane

C. sail is to boat

D. heart is to body

E. wheel is to truck

32. Rehearsal is to play as

A. rest is to work

B. practice is to game

C. study is to book

D. sleep is to dream

E. training is to rest

33. Dawn is to day as

A. dusk is to night

B. noon is to evening

C. morning is to afternoon

D. sunrise is to moon

E. midnight is to dawn

34. Conductor is to orchestra as

A. player is to team

B. teacher is to classroom

C. student is to school

D. audience is to theater

E. captain is to ship

35. Thirsty is to drink as

A. tired is to wake

B. hungry is to starve

C. hungry is to eat

D. sleepy is to wake

E. cold is to shiver

36. Telescope is to stars as

A. binoculars is to birds

B. glasses is to eyes

C. camera is to photos

D. microscope is to cells

E. mirror is to reflection

37. Painter is to canvas as

A. musician is to stage

B. writer is to page

C. actor is to costume

D. dancer is to music

E. singer is to microphone

38. Droplet is to ocean as

A. grain is to beach

B. cloud is to sky

C. wave is to water

D. fish is to sea

E. boat is to harbor

39. Thermometer is to temperature as

A. ruler is to length

B. clock is to minute

C. calendar is to month

D. watch is to time

E. barometer is to pressure

40. Acorn is to oak as

A. flower is to garden

B. leaf is to tree

C. seed is to plant

D. root is to soil

E. fruit is to vine

41. Blizzard is to snow as

A. rain is to puddle

B. wind is to breeze

C. cloud is to sky

D. hurricane is to rain

E. thunder is to lightning

42. Sculptor is to clay as

A. painter is to brush

B. carpenter is to wood

C. writer is to pen

D. musician is to sound

E. chef is to stove

43. Library is to books as

A. museum is to artifacts

B. school is to students

C. hospital is to doctors

D. theater is to actors

E. restaurant is to food

44. Evaporate is to liquid as

A. freeze is to water

B. melt is to solid

C. boil is to steam

D. condense is to gas

E. dissolve is to solid

45. Architect is to blueprint as

A. doctor is to patient

B. teacher is to student

C. composer is to score

D. pilot is to airplane

E. chef is to recipe

46. Timid is to bold as

A. happy is to joyful

B. quiet is to silent

C. shy is to outgoing

D. weak is to strong

E. small is to tiny

47. Frown is to displeasure as

A. laugh is to sad

B. smile is to happiness

C. cry is to joy

D. yawn is to energy

E. scowl is to delight

48. Navigate is to ship as

A. steer is to car

B. fly is to airplane

C. row is to boat

D. pedal is to bicycle

E. drive is to bus

49. Drought is to water as

A. rain is to storm

B. flood is to dam

C. wind is to tornado

D. heat is to sun

E. famine is to food

50. Quench is to thirst as

A. ignite is to fire

B. satisfy is to hunger

C. satisfy is to appetite

D. cure is to illness

E. heal is to pain

51. Sculptor is to statue as

A. painter is to gallery

B. writer is to library

C. actor is to stage

D. potter is to vase

E. musician is to concert

52. Freezer is to preserve as

A. oven is to cook

B. refrigerator is to cool

C. microwave is to heat

D. stove is to boil

E. toaster is to brown

53. Optometrist is to vision as

A. audiologist is to hearing

B. cardiologist is to lungs

C. pediatrician is to adults

D. dentist is to bones

E. dermatologist is to muscles

54. Helmet is to head as

A. shoe is to foot

B. glove is to finger

C. hat is to hair

D. coat is to body

E. shield is to arm

55. Quarry is to marble as

A. forest is to tree

B. ocean is to fish

C. mine is to coal

D. farm is to barn

E. garden is to flower

56. Dawn is to sunrise as

A. noon is to lunch

B. evening is to dinner

C. night is to moon

D. dusk is to sunset

E. midnight is to darkness

57. Tadpole is to frog as

A. egg is to bird

B. caterpillar is to butterfly

C. puppy is to dog

D. calf is to cow

E. kitten is to cat

58. Transparent is to glass as

A. opaque is to brick

B. clear is to water

C. shiny is to metal

D. rough is to sandpaper

E. smooth is to silk

59. Constellation is to stars as

A. forest is to tree

B. ocean is to water

C. mountain is to rocks

D. archipelago is to islands

E. archipelago is to islands

Wait, I have D and E the same. Let me fix:

59. Constellation is to stars as

A. forest is to trees

B. ocean is to water

C. mountain is to rock

D. chain is to links

E. archipelago is to islands

60. Oasis is to desert as

A. mountain is to valley

B. river is to ocean

C. island is to ocean

D. forest is to jungle

E. lake is to land

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.

Note: Figures are drawn as accurately as possible EXCEPT when stated otherwise.

1. What is $195 \div 15$?

A. 13

B. 12

C. 14

D. 15

E. 16

2. If $k + 34 = 91$, then $k =$

A. 125

B. 34

C. 57

D. 65

E. 91

3. A sequence follows the rule: multiply the previous number by 2. If the first number is 3, what is the 5th number?

A. 15

B. 24

C. 32

D. 40

E. 48

4. What is the area of a rectangle with length 17 and width 6?

A. 23

B. 102

C. 46

D. 90

E. 120

5. If 12x = 156, then x =

A. 144

B. 168

C. 12

D. 13

E. 14

6. A basket contains 72 apples. If 5/6 of them are red, how many are red?

A. 60

B. 12

C. 36

D. 48

E. 54

7. What is $42 + 9 \times 3 - 7$?

A. 128

B. 65

C. 62

D. 135

E. 58

8. A jar contains 5 red marbles and 7 blue marbles. What is the probability of selecting a red marble?

A. 7/12

B. 5/7

C. 1/2

D. 7/5

E. 5/12

9. Which of the following is equivalent to 0.75?

A. 75/10

B. 3/4

C. 7/5

D. 1/4

E. 75/1000

10. A circle has a radius of 14. What is its diameter?

A. 7

B. 42

C. 14

D. 28

E. 56

11. If $6y + 13 = 55$, then $y =$

A. 7

B. 13

C. 68

D. 8

E. 6

12. A jacket originally costs $80. It's now on sale for 35% off. What is the sale price?

A. $45

B. $35

C. $52

D. $55

E. $28

13. What is $17^2 - 14^2$?

A. 3

B. 93

C. 196

D. 289

E. 93

14. If w > 85 and w < 90, which could NOT be the value of w?

A. 86

B. 90

C. 88

D. 87

E. 89

15. A recipe requires 4 eggs to make 16 cupcakes. How many eggs are needed to make 28 cupcakes?

A. 5

B. 6

C. 8

D. 7

E. 9

16. What is 11/15 − 4/15?

A. 7/15

B. 15/15

C. 11/30

D. 4/15

E. 7/30

17. Round 7,923 to the nearest hundred.

A. 8,000

B. 7,920

C. 7,900

D. 7,930

E. 7,800

18. What is the least common multiple (LCM) of 10 and 15?

A. 5

B. 150

C. 10

D. 15

E. 30

19. If the pattern continues: 2, 6, 18, 54, ___, what is the next number?

A. 60

B. 162

C. 108

D. 72

E. 216

20. A triangle has a base of 22 and a height of 15. What is its area?

A. 37

B. 330

C. 74

D. 165

E. 45

21. What is 60% of 150?

A. 90

B. 60

C. 75

D. 100

E. 120

22. If $17 \times t = 204$, then $t =$

A. 11

B. 17

C. 12

D. 13

E. 187

23. A number is multiplied by 7, then 12 is added. The result is 47. What is the number?

A. 7

B. 6

C. 8

D. 4

E. 5

24. The ratio of red flowers to yellow flowers in a garden is 3:5. If there are 18 red flowers, how many yellow flowers are there?

A. 15

B. 30

C. 24

D. 27

E. 20

25. What is $25 + 5^2 - 9$?

A. 36

B. 39

C. 31

D. 41

E. 20

ANSWERS AND EXPLANATIONS

Quantitative

1. D: 14 - Divide 182 by 13: 182 ÷ 13 = 14. This is a division fact from the 13 times table. Check: 13 × 14 = 182 ✓ Knowing multiplication facts helps solve division problems quickly.

2. B: 58 - Solve n + 27 = 85 by subtracting 27 from both sides: n = 85 − 27 = 58. Check: 58 + 27 = 85 ✓ To undo addition, use subtraction.

3. A: 34 - The sequence adds 9 each time. 1st number: 7. 2nd number: 7 + 9 = 16. 3rd number: 16 + 9 = 25. 4th number: 25 + 9 = 34. This is an arithmetic sequence with common difference 9.

4. E: 120 - Area of a rectangle = length × width = 15 × 8 = 120 square units. Don't confuse with perimeter, which would be 2(15 + 8) = 46. Area measures the space inside.

5. C: 13 - Solve 11x = 143 by dividing both sides by 11: x = 143 ÷ 11 = 13. Check: 11 × 13 = 143 ✓ Division is the inverse of multiplication.

6. D: 36 - To find 3/4 of 48 candies, multiply: (3/4) × 48. Divide 48 by 4 first: 48 ÷ 4 = 12. Then multiply by 3: 12 × 3 = 36 chocolate candies.

7. B: 57 - Follow order of operations (PEMDAS). Multiply first: 7 × 4 = 28. Then work left to right: 35 + 28 = 63, then 63 − 6 = 57. Multiplication must be done before addition and subtraction.

8. A: 3/10 - Numbers less than 4 on the spinner are: 1, 2, and 3 (that's 3 numbers out of 10 possible outcomes). Probability = 3/10. Count favorable outcomes over total possible outcomes.

9. E: 17/20 - Convert 0.85 to a fraction: 0.85 = 85/100. Simplify by dividing both numerator and denominator by 5: 85 ÷ 5 = 17 and 100 ÷ 5 = 20, giving 17/20. Check: 17 ÷ 20 = 0.85 ✓

10. C: 13 - The radius of a circle is half the diameter. If diameter = 26, then radius = 26 ÷ 2 = 13. Remember: diameter goes all the way across, radius goes from center to edge.

11. D: 9 - Solve 4y + 11 = 47 in two steps. Subtract 11 from both sides: 4y = 36. Divide both sides by 4: y = 9. Check: 4(9) + 11 = 36 + 11 = 47 ✓

12. B: $36 - Calculate 20% off of $45. Method 1: Find discount: 0.20 × $45 = $9, then subtract: $45 − $9 = $36. Method 2: If 20% off, you pay 80%: 0.80 × $45 = $36.

13. A: 81 - Calculate each exponent first, then subtract. 15^2 = 15 × 15 = 225. Then 12^2 = 12 × 12 = 144. Finally subtract: 225 − 144 = 81. Exponents must be calculated before subtraction.

14. E: 100 − 9π - The shaded region equals the square area minus the circle area. Square area: $10 \times 10 = 100$. Circle area: $\pi r^2 = \pi(3)^2 = 9\pi$. Shaded area = $100 - 9\pi$ square units. This is the exact answer in terms of π. If calculated numerically: $9\pi \approx 28.26$, so $100 - 28.26 \approx 71.74$.

15. C: 80 - The compound inequality $m > 75$ and $m < 80$ means m must be greater than 75 AND less than 80. This is a "could NOT" question. 80 does NOT satisfy $m < 80$ (80 is not less than 80; it's equal). All other choices fall between 75 and 80.

16. D: 8 - Set up a proportion: 5 cups/25 cookies = x cups/40 cookies. Cross-multiply: $5 \times 40 = 25 \times x$, so $200 = 25x$. Divide: $x = 8$ cups. Or find cups per cookie: $5/25 = 1/5$ cup per cookie, so $40 \times (1/5) = 8$ cups.

17. B: 6/13 - When subtracting fractions with the same denominator, keep the denominator and subtract numerators: $10/13 - 4/13 = (10 - 4)/13 = 6/13$. The denominator stays 13; only subtract the numerators.

18. A: 5,380 - When rounding to the nearest ten, look at the ones digit. In 5,378, the ones digit is 8. Since $8 \geq 5$, round up: increase the tens digit from 7 to 8, making 5,380.

19. E: 36 - The LCM is the smallest number both numbers divide into evenly. List multiples: 9: 9, 18, 27, 36, 45... and 12: 12, 24, 36, 48... The first common multiple is 36. Verify: $36 \div 9 = 4$ ✓ and $36 \div 12 = 3$ ✓

20. C: 64 - Examine the pattern: 4 to 8 is ×2, 8 to 16 is ×2, 16 to 32 is ×2. Each number doubles. This is a geometric sequence with ratio 2. Next number: $32 \times 2 = 64$.

21. D: 130 - Area of a triangle = (base × height) ÷ 2 = $(20 \times 13) \div 2 = 260 \div 2 = 130$ 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.

22. B: 99 - To find 55% of 180, multiply: $0.55 \times 180 = 99$. Mental math: 10% of 180 is 18, so 50% is 90 (5×18), and 5% is 9, giving $90 + 9 = 99$.

23. A: 13 - Solve $16 \times r = 208$ by dividing both sides by 16: $r = 208 \div 16 = 13$. Check: $16 \times 13 = 208$ ✓ Think "16 times what equals 208?"

24. E: 42 - Work backwards from the result. If the result is 12 after adding 5, then before adding the value was $12 - 5 = 7$. If dividing by 6 gave 7, the original number was $7 \times 6 = 42$. Check: $42 \div 6 = 7$, then $7 + 5 = 12$ ✓

25. C: 64 - The ratio 5:8 means for every 5 dogs, there are 8 cats. If there are 40 dogs, find how many groups of 5: $40 \div 5 = 8$ groups. Each group has 8 cats, so total cats = $8 \times 8 = 64$. Or proportion: $5/8 = 40/x$, cross multiply: $5x = 320$, so $x = 64$.

Reading

1. B: reaches the surface - The passage states: "Volcanoes form when molten rock, called magma, rises from deep within Earth's mantle and breaks through the surface. When this happens, the magma—now called lava—flows out." The name changes from magma to lava when it emerges from underground.

2. D: violent explosions - The passage explicitly mentions: "Others, like Mount St. Helens, explode violently with little warning." Mount St. Helens is used as an example of violent, explosive volcanic activity.

3. A: fertile - The passage states: "Volcanic soil is extremely fertile, making surrounding areas excellent for farming." This fertility is listed as one of the benefits of volcanoes.

4. C: volcanic activity - The passage explains: "volcanic eruptions create new land—the Hawaiian Islands themselves were formed entirely by volcanic activity over millions of years." The islands are a direct result of volcanic processes.

5. E: traps gases - The passage explains the mechanism: "Thick, sticky lava traps gases, building pressure until a violent explosion occurs." The trapped gases create pressure that leads to explosive eruptions.

6. D: a boarding school arts program - The opening line states: "My acceptance letter to the boarding school arts program lay on my desk—my ticket to studying music with real professionals." This specific program is clearly identified.

7. B: younger brother - Jake is introduced as "My little brother Jake," directly establishing the relationship. "Little" indicates he's younger.

8. A: a guitar - The narrator gives Jake "my old guitar," which Jake is holding when he asks if the narrator is taking it. The narrator decides Jake should keep it.

9. C: means building on a foundation - Mom says: "leaving home doesn't mean leaving your family behind. It means taking everything you've learned here and building something new with it." She views leaving as building on what you already have, not abandoning it.

10. E: nervous but excited - The narrator says "my stomach churned" and "I'd never been away from home for more than a week," showing nervousness. But the acceptance is described as "my ticket" and there's clear enthusiasm about the opportunity, showing excitement alongside the nerves.

11. B: 10,000 - The passage states: "While we can consciously identify about 10,000 different scents, our noses can actually detect over one trillion different odor combinations." The 10,000 figure refers to conscious identification.

12. D: olfactory epithelium - The passage explains: "Smell works when odor molecules enter the nose and bind to receptors in the olfactory epithelium, a small patch of tissue at the back of the nasal cavity." This is where the receptors are located.

13. A: memory centers - The passage states: "This is why certain smells can trigger vivid memories— scent bypasses the brain's usual sensory processing and connects directly to memory centers." The direct connection to memory is explicitly mentioned.

14. C: smell is blocked - The passage explains: "This is why food tastes bland when you have a cold— blocked nasal passages prevent smell from contributing to flavor." Blocked smell causes the bland taste.

15. E: inability to smell - The passage defines anosmia: "Some people suffer from anosmia—the inability to smell." This is a direct definition provided in the text.

16. B: 1969 - The opening sentence states: "In 1969, astronauts Neil Armstrong and Buzz Aldrin became the first humans to walk on the Moon." The year is clearly specified.

17. D: 400,000 people - The passage mentions: "the efforts of over 400,000 people." This large number emphasizes the massive collaborative effort required.

18. A: a crater full of boulders - The passage describes: "Armstrong manually piloted it to a safe landing site, avoiding a boulder-strewn crater." The danger was specifically a crater filled with boulders.

19. C: 1.3 seconds each way - The passage states: "radio signals took about 1.3 seconds to travel each way." This specific time delay is mentioned.

20. E: 21 hours - The passage says: "The astronauts spent about 21 hours on the Moon's surface." This total time includes all activities during their lunar stay.

21. B: bacteria - The opening sentence defines: "Antibiotics are medicines that fight bacterial infections." They specifically target bacteria, not other pathogens.

22. D: evolve to survive antibiotics - The passage explains: "When antibiotics are overused or misused, bacteria can evolve to survive them. These resistant bacteria multiply, creating strains that no longer respond to treatment." Evolution allows survival.

23. A: viral infections like colds - The passage states: "Doctors sometimes prescribe antibiotics for viral infections like colds, where they're useless—viruses aren't affected by antibiotics at all." Antibiotics don't work against viruses.

24. C: exactly as prescribed - The passage advises: "Patients must take antibiotics exactly as prescribed and never share them." Following instructions precisely is emphasized.

25. E: faster than new drugs can be created - The passage concludes: "Scientists continue developing new antibiotics, though resistant bacteria evolve faster than new drugs can be created. The race between antibiotic development and bacterial resistance is one of medicine's greatest challenges." Bacteria are winning the evolutionary race.

26. B: their first debate - The passage opens: "The first time I stood before a debate audience, my hands shook so badly I dropped my note cards." This was the narrator's first debate experience.

27. D: making your best argument despite problems - Coach Martinez says: "Debate isn't about being perfect. It's about making your best argument, even when things go wrong. Especially when things go wrong." The emphasis is on persevering through difficulties.

28. A: make better eye contact with the audience - The narrator explains: "Without the cards, I could look at the audience, make eye contact, connect. My words felt more authentic, less rehearsed." Dropping the cards actually improved audience connection.

29. C: responding to mistakes - The narrator reflects: "I learned something crucial: confidence isn't the absence of mistakes. It's what you do after you make them." The lesson was about recovery and response.

30. E: a reminder that response matters more than mistakes - The passage concludes: "I kept them as a reminder: your worst moment doesn't define you. How you respond to it does." The cards symbolize this important lesson about resilience.

31. B: One-third - The opening sentence states: "Bees are essential pollinators, responsible for helping reproduce about one-third of the food crops humans eat." This specific fraction is clearly stated.

32. D: visit multiple flowers - The passage explains: "As bees visit flowers gathering nectar, pollen sticks to their fuzzy bodies. When they visit the next flower, some of this pollen rubs off, fertilizing the plant." Moving between flowers transfers pollen.

33. A: parasites that harm bees - The passage mentions: "Diseases and parasites, particularly varroa mites, weaken bee colonies." Varroa mites are identified as harmful parasites.

34. C: bee populations are declining - The passage states: "Without bees, many crops would fail...Some farmers already resort to hand-pollinating crops—a labor-intensive process that can't match the efficiency of bees." Hand pollination is a response to bee decline.

35. E: flower corridors connecting green spaces - The passage describes: "Some cities are creating 'bee highways'—corridors of planted flowers connecting green spaces so bees can safely travel." These are flower pathways for bee navigation.

36. B: 1440 - The opening sentence states: "The invention of the printing press by Johannes Gutenberg around 1440 revolutionized human communication." The approximate date is specified.

37. D: copied by hand - The passage explains: "Before Gutenberg, books were copied by hand, making them expensive and rare. A single book could take months to produce." Manual copying was the only method.

38. A: the Bible - The passage states: "The first major book printed was the Gutenberg Bible in 1455." This was the inaugural major printing project.

39. C: 20 million - The passage reports: "By 1500, printing presses had produced an estimated 20 million books across Europe—more than scribes had produced in the previous thousand years." This dramatic number shows the press's impact.

40. E: the Protestant Reformation - The passage notes: "The Protestant Reformation spread rapidly through printed pamphlets and translated Bibles." The printing press enabled this religious movement's rapid expansion by making materials widely available.

Verbal

1. C: limit - Restrict and limit both mean to keep within certain boundaries, to constrain or confine. "Restrict access" and "limit access" mean the same thing. Both indicate placing boundaries or controls on something.

2. A: shine - Gleam and shine both mean to emit a bright light, to glow or sparkle. "The stars gleam" and "the stars shine" describe the same luminous effect. Both indicate giving off light.

3. E: ridiculous - Absurd and ridiculous both mean wildly unreasonable, illogical, or inappropriate. "An absurd idea" and "a ridiculous idea" describe something that doesn't make sense. Both indicate extreme foolishness or irrationality.

4. B: calm - Placid and calm both mean peacefully quiet or undisturbed, tranquil. "A placid lake" and "a calm lake" describe the same still, peaceful water. Both indicate serenity and lack of agitation.

5. D: struggle - Strive and struggle both mean to make great efforts to achieve something, to work hard toward a goal. "Strive for success" and "struggle for success" both indicate determined effort. Both emphasize persistent effort despite difficulty.

6. C: consume - Devour and consume both mean to eat eagerly and in large amounts, to use up completely. "Devour a meal" and "consume a meal" both indicate eating, though devour suggests more enthusiasm. Both indicate using something up.

7. A: gloomy - Dreary and gloomy both mean depressingly dull and bleak, causing sadness. "A dreary day" and "a gloomy day" describe the same dismal, cheerless conditions. Both indicate darkness or sadness.

8. E: abundant - Ample and abundant both mean more than enough, plentiful or generous in quantity. "Ample food" and "abundant food" describe plenty of food. Both indicate sufficiency or excess.

9. B: begin - Commence and begin both mean to start or initiate something. "Commence the ceremony" and "begin the ceremony" mean the same. Both indicate the starting point of an action or event.

10. D: cautious - Wary and cautious both mean careful to avoid potential danger or problems, watchful and alert. "Be wary of strangers" and "be cautious with strangers" give the same warning. Both indicate carefulness and vigilance.

11. C: old - Ancient and old both mean having existed for a very long time, from long ago. "Ancient ruins" and "old ruins" describe structures from the distant past. Both indicate great age, though ancient typically implies thousands of years.

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

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

14. B: eliminate - Abolish and eliminate both mean to put an end to something, to remove or destroy completely. "Abolish slavery" and "eliminate slavery" mean ending it entirely. Both indicate complete removal or termination.

15. D: late - Tardy and late both mean arriving or happening after the expected or proper time. "A tardy student" and "a late student" describe someone who didn't arrive on time. Both indicate delay or unpunctuality.

16. C: plentiful - Abundant and plentiful both mean existing in large quantities, more than adequate. "Abundant resources" and "plentiful resources" describe ample supplies. Both indicate plenty or excess.

17. A: friendly - Cordial and friendly both mean warm and pleasant in manner, showing goodwill. "A cordial greeting" and "a friendly greeting" describe the same welcoming behavior. Both indicate warmth and pleasantness.

18. E: shelter - Refuge and shelter both mean a place providing protection from danger or bad conditions, a safe haven. "Seek refuge" and "seek shelter" mean finding safety. Both indicate protection from harm.

19. B: peaceful - Tranquil and peaceful both mean calm, quiet, and undisturbed, free from agitation. "A tranquil scene" and "a peaceful scene" describe the same serene setting. Both indicate absence of disturbance.

20. D: useless - Futile and useless both mean incapable of producing any result, pointless or ineffective. "A futile effort" and "a useless effort" describe attempts that won't succeed. Both indicate lack of effectiveness.

21. C: top - Summit and top both mean the highest point or peak of something. "The summit of the mountain" and "the top of the mountain" refer to the same highest point. Both indicate the uppermost position.

22. A: victory - Triumph and victory both mean a great success or achievement, winning. "A triumph in battle" and "a victory in battle" describe the same successful outcome. Both indicate success or conquest.

23. E: stop - Cease and stop both mean to bring or come to an end, to discontinue. "Cease talking" and "stop talking" mean the same. Both indicate ending or terminating an action.

24. B: harsh - Grim and harsh both mean forbidding or uninviting in appearance, stern or unpleasant. "Grim conditions" and "harsh conditions" describe severe, difficult situations. Both indicate sternness or severity.

25. D: danger - Peril and danger both mean exposure to the risk of harm or loss, jeopardy. "In peril" and "in danger" describe the same threatening situation. Both indicate potential harm.

26. C: watchful - Alert and watchful both mean quick to notice things, attentive and vigilant. "Stay alert" and "stay watchful" give the same instruction to remain aware. Both indicate attentiveness and readiness.

27. A: courage - Valor and courage both mean great bravery, especially in battle. "Show valor" and "show courage" describe the same fearless behavior. Both indicate boldness in facing danger.

28. E: high - Lofty and high both mean extending far upward, elevated in position. "A lofty peak" and "a high peak" describe the same tall mountain. Both indicate great height or elevation.

29. B: humble - Modest and humble both mean having or showing a moderate view of one's importance, not arrogant. "A modest person" and "a humble person" describe someone who doesn't boast. Both indicate lack of pride or pretension.

30. D: difficult - Arduous and difficult both mean requiring great effort and hard work, demanding. "An arduous task" and "a difficult task" describe the same challenging work. Both indicate something requiring significant effort.

31. D: heart is to body - **Relationship: Vital organ/component to whole it powers.** An engine provides power for a car to function, just as a heart provides power (blood circulation) for the body to function. Both show essential mechanisms that keep their systems running.

32. B: practice is to game - **Relationship: Preparatory activity to main event.** A rehearsal prepares actors for a play, just as practice prepares athletes for a game. Both show training activities that precede actual performances.

33. A: dusk is to night - **Relationship: Transition period to time period it introduces.** Dawn is the transition into day, just as dusk is the transition into night. Both show twilight periods that mark beginnings of different times.

34. E: captain is to ship - **Relationship: Leader to group/entity they command.** A conductor leads and directs an orchestra, just as a captain leads and commands a ship. Both show authority figures who coordinate and guide their groups.

35. C: hungry is to eat - **Relationship: Physical need to action that satisfies it.** Being thirsty prompts you to drink, just as being hungry prompts you to eat. Both show bodily needs and their natural responses.

36. D: microscope is to cells - **Relationship: Viewing instrument to tiny things it observes.** A telescope views distant stars, just as a microscope views tiny cells. Both show optical instruments paired with what they help observe.

37. B: writer is to page - **Relationship: Artist to surface they work on.** A painter creates on canvas, just as a writer creates on a page. Both show creators and their primary working surfaces.

38. A: grain is to beach - Relationship: Tiny unit to large collection of those units. A droplet is a tiny part of an ocean, just as a grain of sand is a tiny part of a beach. Both show minuscule components that make up vast wholes.

39. E: barometer is to pressure - Relationship: Measuring instrument to what it measures. A thermometer measures temperature, just as a barometer measures atmospheric pressure. Both show devices paired with the specific quantities they measure.

40. C: seed is to plant - Relationship: Beginning form to what grows from it. An acorn grows into an oak tree, just as a seed generally grows into a plant. Both show starting forms and their mature results.

41. D: hurricane is to rain - Relationship: Storm type to primary precipitation/element. A blizzard features heavy snow, just as a hurricane features heavy rain (and wind). Both show weather phenomena paired with their characteristic elements.

42. B: carpenter is to wood - Relationship: Craftsperson to primary material they work with. A sculptor shapes clay, just as a carpenter works with wood. Both show artisans and their main working materials.

43. A: museum is to artifacts - Relationship: Institution to items it houses/displays. A library houses books, just as a museum houses artifacts. Both show buildings designed to store and display specific collections.

44. E: dissolve is to solid - Relationship: Process to state of matter it changes. Evaporate describes liquid changing to gas, just as dissolve describes solid changing (mixing into liquid). Both show processes that transform states of matter.

45. C: composer is to score - Relationship: Creator to written plan/instructions they produce. An architect creates a blueprint (building plan), just as a composer creates a score (musical plan). Both show creators and the written documents that communicate their designs.

46. D: weak is to strong - Relationship: Opposite personality traits. Timid and bold are opposite traits, just as weak and strong are opposite traits. Both pairs contrast opposing characteristics.

47. B: smile is to happiness - Relationship: Facial expression to emotion it indicates. A frown indicates displeasure, just as a smile indicates happiness. Both show expressions paired with emotions they convey.

48. A: steer is to car - Relationship: Control action to vehicle being controlled. To navigate is to control the direction of a ship, just as to steer is to control the direction of a car. Both show directional control of vehicles.

49. E: famine is to food - Relationship: Shortage crisis to what is lacking. A drought is a severe shortage of water, just as a famine is a severe shortage of food. Both show crisis conditions defined by lack of something essential.

50. C: satisfy is to appetite - Relationship: Action that addresses to need addressed. To quench is to satisfy thirst, just as to satisfy is to address appetite. Both show verbs that describe fulfilling physical needs.

51. D: potter is to vase - Relationship: Artisan to object they create. A sculptor creates statues, just as a potter creates vases. Both show craftspeople and the products they make.

52. B: refrigerator is to cool - Relationship: Appliance to its primary function. A freezer's function is to preserve food by keeping it frozen, just as a refrigerator's function is to cool food. Both show appliances and their purposes.

53. A: audiologist is to hearing - Relationship: Medical specialist to sense/system they treat. An optometrist treats vision problems, just as an audiologist treats hearing problems. Both show doctors specialized in specific sensory systems.

54. E: shield is to arm - Relationship: Protective equipment to body part it protects. A helmet protects the head, just as a shield protects the arm (and body). Both show protective gear and what they shield.

55. C: mine is to coal - Relationship: Extraction site to resource extracted. A quarry is where marble is extracted, just as a mine is where coal is extracted. Both show locations where natural resources are harvested.

56. D: dusk is to sunset - Relationship: Period of day to celestial event marking it. Dawn is the period around sunrise, just as dusk is the period around sunset. Both show times of day paired with their characteristic sun positions.

57. B: caterpillar is to butterfly - Relationship: Larval form to adult form through metamorphosis. A tadpole transforms into a frog, just as a caterpillar transforms into a butterfly. Both show immature forms that undergo complete metamorphosis into adults.

58. A: opaque is to brick - Relationship: Optical property to material possessing it. Glass is transparent (you can see through it), just as brick is opaque (you can't see through it). Both show materials paired with their light transmission properties.

59. E: archipelago is to islands - Relationship: Collective term for group to individual units. A constellation is a group of stars, just as an archipelago is a group of islands. Both show specialized terms for collections of similar objects.

60. C: island is to ocean - Relationship: Isolated feature within larger uniform environment. An oasis is an isolated fertile spot in a desert, just as an island is an isolated land mass in an ocean. Both show rare, distinct features within vast, uniform surroundings.

Quantitative

1. A: 13 - Divide 195 by 15: 195 ÷ 15 = 13. This is a division fact from the 15 times table. Check: 15 × 13 = 195 ✓ Knowing multiplication facts helps solve division problems quickly.

2. C: 57 - Solve k + 34 = 91 by subtracting 34 from both sides: k = 91 − 34 = 57. Check: 57 + 34 = 91 ✓ To undo addition, use subtraction.

3. E: 48 - The sequence multiplies by 2 each time. 1st number: 3. 2nd number: 3 × 2 = 6. 3rd number: 6 × 2 = 12. 4th number: 12 × 2 = 24. 5th number: 24 × 2 = 48. This is a geometric sequence with common ratio 2.

4. B: 102 - Area of a rectangle = length × width = 17 × 6 = 102 square units. Don't confuse with perimeter, which would be 2(17 + 6) = 46. Area measures the space inside.

5. D: 13 - Solve 12x = 156 by dividing both sides by 12: x = 156 ÷ 12 = 13. Check: 12 × 13 = 156 ✓ Division is the inverse of multiplication.

6. A: 60 - To find 5/6 of 72 apples, multiply: (5/6) × 72. Divide 72 by 6 first: 72 ÷ 6 = 12. Then multiply by 5: 12 × 5 = 60 red apples.

7. C: 62 - Follow order of operations (PEMDAS). Multiply first: 9 × 3 = 27. Then work left to right: 42 + 27 = 69, then 69 − 7 = 62. Multiplication must be done before addition and subtraction.

8. E: 5/12 - Total marbles: 5 red + 7 blue = 12 marbles. Probability of red = red marbles/total marbles = 5/12. This fraction is already in simplest form. Count favorable outcomes over total possible outcomes.

9. B: 3/4 - Convert 0.75 to a fraction: 0.75 = 75/100. Simplify by dividing both numerator and denominator by 25: 75 ÷ 25 = 3 and 100 ÷ 25 = 4, giving 3/4. Check: 3 ÷ 4 = 0.75 ✓

10. D: 28 - The diameter of a circle is twice the radius. If radius = 14, then diameter = 2 × 14 = 28. Remember: diameter goes all the way across through the center, radius goes from center to edge.

11. A: 7 - Solve 6y + 13 = 55 in two steps. Subtract 13 from both sides: 6y = 42. Divide both sides by 6: y = 7. Check: 6(7) + 13 = 42 + 13 = 55 ✓

12. C: $52 - Calculate 35% off of $80. Method 1: Find discount: 0.35 × $80 = $28, then subtract: $80 − $28 = $52. Method 2: If 35% off, you pay 65%: 0.65 × $80 = $52.

13. E: 93 - Calculate each exponent first, then subtract. 17^2 = 17 × 17 = 289. Then 14^2 = 14 × 14 = 196. Finally subtract: 289 − 196 = 93. Exponents must be calculated before subtraction.

14. B: 90 - The compound inequality w > 85 and w < 90 means w must be greater than 85 AND less than 90. This is a "could NOT" question. 90 does NOT satisfy w < 90 (90 is not less than 90; it's equal). All other choices fall between 85 and 90.

15. D: 7 - Set up a proportion: 4 eggs/16 cupcakes = x eggs/28 cupcakes. Cross-multiply: $4 \times 28 = 16 \times x$, so $112 = 16x$. Divide: $x = 7$ eggs. Or find eggs per cupcake: $4/16 = 1/4$ egg per cupcake, so $28 \times (1/4) = 7$ eggs.

16. A: 7/15 - When subtracting fractions with the same denominator, keep the denominator and subtract numerators: $11/15 - 4/15 = (11 - 4)/15 = 7/15$. The denominator stays 15; only subtract the numerators.

17. C: 7,900 - When rounding to the nearest hundred, look at the tens digit. In 7,923, the tens digit is 2. Since $2 < 5$, round down: keep the hundreds digit as 9, making 7,900.

18. E: 30 - The LCM is the smallest number both numbers divide into evenly. List multiples: 10: 10, 20, 30, 40... and 15: 15, 30, 45... The first common multiple is 30. Verify: $30 \div 10 = 3$ ✓ and $30 \div 15 = 2$ ✓

19. B: 162 - Examine the pattern: 2 to 6 is ×3, 6 to 18 is ×3, 18 to 54 is ×3. Each number triples. This is a geometric sequence with ratio 3. Next number: $54 \times 3 = 162$.

20. D: 165 - Area of a triangle = (base × height) ÷ 2 = $(22 \times 15) \div 2 = 330 \div 2 = 165$ 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. A: 90 - To find 60% of 150, multiply: $0.60 \times 150 = 90$. Mental math: 10% of 150 is 15, so 60% is 6 times that: $6 \times 15 = 90$.

22. C: 12 - Solve $17 \times t = 204$ by dividing both sides by 17: $t = 204 \div 17 = 12$. Check: $17 \times 12 = 204$ ✓ Think "17 times what equals 204?"

23. E: 5 - Work backwards or set up an equation. Let n be the number: $(n \times 7) + 12 = 47$. So $7n + 12 = 47$. Subtract 12: $7n = 35$. Divide by 7: $n = 5$. Check: $5 \times 7 = 35$, then $35 + 12 = 47$ ✓

24. B: 30 - The ratio 3:5 means for every 3 red flowers, there are 5 yellow flowers. If there are 18 red flowers, find how many groups of 3: $18 \div 3 = 6$ groups. Each group has 5 yellow flowers, so total yellow $= 6 \times 5 = 30$. Or proportion: $3/5 = 18/x$, cross multiply: $3x = 90$, so $x = 30$.

25. D: 41 - Follow order of operations. Calculate the exponent first: $5^2 = 25$. Then work left to right: $25 + 25 = 50$, then $50 - 9 = 41$. Exponents are calculated before addition and subtraction.