Subtest 1: Verbal Analogies

Directions: This subtest measures your ability to reason and see relationships between words. You are to choose the answer that best completes the analogy developed at the beginning of each question. The best way to approach this type of test is to look for patterns or comparisons between the first phrase and the choices available to you. You have eight (8) minutes to complete this subtest.

Questions: 25
Time: 8 minutes

1. *Cup* is to *coffee* as *bowl* is to
- **a.** dish
- **b.** soup
- **c.** spoon
- **d.** food
- **e.** saucer

2. *Bicycle* is to *pedal* as *canoe* is to
- **a.** water
- **b.** kayak
- **c.** oar
- **d.** fleet
- **e.** lake

3. *Window* is to *pane* as *book* is to
- **a.** novel
- **b.** glass
- **c.** cover
- **d.** pages
- **e.** index

4. *Play* is to *actor* as *concert* is to
- **a.** symphony
- **b.** musician
- **c.** piano
- **d.** percussion
- **e.** violin

5. *Pride* is to *lion* as *school* is to
- **a.** teacher
- **b.** student
- **c.** self-respect
- **d.** learning
- **e.** fish

6. *Elated* is to *despondent* as *enlightened* is to
- **a.** aware
- **b.** ignorant
- **c.** miserable
- **d.** tolerant
- **e.** humble

7. *Embarrassed* is to *humiliated* as *frightened* is to
- **a.** terrified
- **b.** agitated
- **c.** courageous
- **d.** reckless
- **e.** timid

8. *Odometer* is to *mileage* as *compass* is to
- **a.** speed
- **b.** hiking
- **c.** needle
- **d.** direction
- **e.** humidity

9. *Fray* is to *ravel* as
- **a.** tremble is to roll
- **b.** hungry is to eat
- **c.** jolt is to shake
- **d.** stroll is to run
- **e.** stitch is to tear

10. *Elephant* is to *pachyderm* as
- **a.** mantis is to rodent
- **b.** poodle is to feline
- **c.** kangaroo is to marsupial
- **d.** zebra is to horse
- **e.** tuna is to mollusk

11. *Psychologist* is to *neurosis* as
- **a.** ophthalmologist is to cataract
- **b.** dermatologist is to fracture
- **c.** infant is to pediatrician
- **d.** rash is to orthopedist
- **e.** oncologist is to measles

12. *Cotton* is to *bale* as
- **a.** butter is to churn
- **b.** wine is to ferment
- **c.** grain is to shock
- **d.** curd is to cheese
- **e.** beef is to steak

13. *Division* is to *section* as
- **a.** layer is to tier
- **b.** tether is to bundle
- **c.** chapter is to verse
- **d.** riser is to stage
- **e.** dais is to speaker

14. *Mechanic* is to *garage* as
- **a.** teacher is to recess
- **b.** actor is to role
- **c.** jockey is to horse
- **d.** surgeon is to hospital
- **e.** author is to book

15. *Chickadee* is to *bird* as
- **a.** crocodile is to alligator
- **b.** giraffe is to reptile
- **c.** Siamese is to cat
- **d.** shepherd is to marsupial
- **e.** grasshopper is to ant

16. *Walk* is to *saunter* as
- **a.** trot is to race
- **b.** swim is to dive
- **c.** hop is to shuffle
- **d.** juggle is to bounce
- **e.** rain is to drizzle

17. *Tailor* is to *suit* as
- **a.** scheme is to agent
- **b.** edit is to manuscript
- **c.** revise is to writer
- **d.** mention is to opinion
- **e.** implode is to building

18. *Jaundice* is to *liver* as
- **a.** rash is to skin
- **b.** dialysis is to kidney
- **c.** smog is to lung
- **d.** valentine is to heart
- **e.** imagination is to brain

19. *Interest* is to *obsession* as
- **a.** mood is to feeling
- **b.** weeping is to sadness
- **c.** dream is to fantasy
- **d.** plan is to negation
- **e.** highlight is to indication

20. *Slapstick* is to *laughter* as
- **a.** fallacy is to dismay
- **b.** genre is to mystery
- **c.** satire is to anger
- **d.** mimicry is to tears
- **e.** horror is to fear

21. *Verve* is to *enthusiasm* as
- **a.** loyalty is to duplicity
- **b.** devotion is to reverence
- **c.** intensity is to color
- **d.** eminence is to anonymity
- **e.** generosity is to elation

22. *Conviction* is to *incarceration* as
- **a.** reduction is to diminution
- **b.** induction is to amelioration
- **c.** radicalization is to estimation
- **d.** marginalization is to intimidation
- **e.** proliferation is to alliteration

23. *Professor* is to *erudite* as
- **a.** aviator is to licensed
- **b.** inventor is to imaginative
- **c.** procrastinator is to conscientious
- **d.** overseer is to wealthy
- **e.** moderator is to vicious

24. *Dependable* is to *capricious* as
- **a.** fallible is to cantankerous
- **b.** erasable is to obtuse
- **c.** malleable is to limpid
- **d.** capable is to inept
- **e.** incorrigible is to guilty

25. *Dominance* is to *hegemony* as
- **a.** romance is to sympathy
- **b.** furtherance is to melancholy
- **c.** independence is to autonomy
- **d.** tolerance is to philanthropy
- **e.** recompense is to hilarity

Subtest 2: Arithmetic Reasoning

Directions: This subtest measures mathematical reasoning and problem solving. Each problem is followed by five possible answers. Decide which one of the five answers is most nearly correct. A method for attacking each of these questions is given in the answer block at the end of this chapter. You have twenty-nine (29) minutes to complete this subtest.

Questions: 25
Time: 29 minutes

1. What is the estimated product when 157 and 817 are rounded to the nearest hundred and multiplied?
- **a.** 16,000
- **b.** 80,000
- **c.** 160,000
- **d.** 180,000
- **e.** 1,600,000

2. Mr. James Rossen is just beginning a computer consulting firm and has purchased the following equipment: 3 telephone sets, each costing $125; 2 computers, each costing $1,300; 2 computer monitors, each costing $950; 1 printer, costing $600; and 1 answering machine, costing $50. Mr. Rossen is reviewing his finances. What should he write as the total value of the equipment he has purchased so far?
- **a.** $3,025
- **b.** $4,025
- **c.** $5,400
- **d.** $5,525
- **e.** $6,525

3. One lap on a particular outdoor track measures a quarter of a mile around. To run a total of three-and-a-half miles, how many laps must a person complete?
- **a.** 7
- **b.** 9
- **c.** 10
- **d.** 13
- **e.** 14

4. $\frac{5}{8} \times \frac{4}{7} =$
- **a.** $\frac{5}{14}$
- **b.** $\frac{20}{8}$
- **c.** $\frac{25}{32}$
- **d.** $\frac{9}{16}$
- **e.** $\frac{10}{17}$

5. Newly hired nurses have to buy duty shoes at the full price of $84.50, but nurses who have served at least a year get a 15% discount. Nurses who have served at least three years get an additional 10% off the discounted price. How much does a nurse who has served at least three years have to pay for shoes?
a. $63.78
b. $64.65
c. $67.49
d. $71.83
e. $72.05

6. The basal metabolic rate (BMR) is the rate at which our bodies use calories. The BMR for a man in his twenties is about 1,700 calories per day. If 204 of those calories should come from protein, about what percentage of this man's diet should be protein?
a. 1.2%
b. 8.3%
c. 12%
d. 16%
e. 18%

7. How much water must be added to one liter of a 5% saline solution to get a 2% saline solution?
a. .5 liter
b. 1 liter
c. 1.5 liters
d. 2 liters
e. 2.5 liters

8. All of the rooms in a building are rectangular, with 8-foot ceilings. One room is 9 feet wide by 11 feet long. What is the combined area of the four walls, including doors and windows?
a. 90 square feet
b. 160 square feet
c. 180 square feet
d. 280 square feet
e. 320 square feet

9. A child has a temperature of 40° C. What is the child's temperature in degrees Fahrenheit? ($F = \frac{9}{5}C + 32$)
a. 100° F
b. 101° F
c. 102° F
d. 103° F
e. 104° F

10. A woman drives west at 45 miles per hour. After half an hour, a man starts to follow her. How fast must he drive to catch up to her three hours after he starts?
a. 52.5 miles per hour
b. 55 miles per hour
c. 60 miles per hour
d. 65 miles per hour
e. 67.5 miles per hour

11. Jason is six times as old as Kate. In two years, Jason will be twice as old as Kate is then. How old is Jason now?
a. 3 years old
b. 6 years old
c. 9 years old
d. 12 years old
e. 15 years old

12. A flash drive shows 827,036 bytes free. If you delete a file of size 542,159 bytes and create a new file of size 489,986 bytes, how many free bytes will the flash drive have?
a. 489,986 free bytes
b. 577,179 free bytes
c. 681,525 free bytes
d. 774,863 free bytes
e. 879,209 free bytes

13. On the cardiac ward, there are 7 nursing assistants. NA Basil has 8 patients; NA Hobbes has 5 patients; NA McGuire has 9 patients; NA Hicks has 10 patients; NA Garcia has 10 patients; NA James has 14 patients; and NA Davis has 7 patients. What is the average number of patients per nursing assistant?

a. 6
b. 7
c. 8
d. 9
e. 10

14. A patient's hospice stay cost one-fourth as much as his visit to the emergency room. His home nursing cost twice as much as his hospice stay. If his total health care bill was $140,000, how much did his home nursing cost?

a. $10,000
b. $20,000
c. $40,000
d. $60,000
e. $80,000

15. At a certain school, half of all the students are female and one-twelfth of the students are from outside the state. Half of the out-of-state students are also female. What proportion of the students would you expect to be females from outside the state?

a. $\frac{1}{12}$
b. $\frac{1}{24}$
c. $\frac{1}{8}$
d. $\frac{1}{6}$
e. $\frac{1}{3}$

16. Based on the following information, estimate the weight of a person who is 5′5″ tall.

Height	Weight
5′	110 lbs.
6′	170 lbs.

a. 125
b. 130
c. 135
d. 140
e. 145

17. During exercise, a person's heart rate should be between 60% and 90% of the difference between 220 and the person's age. According to this guideline, what should a 30-year-old person's maximum heart rate be during exercise?

a. 114
b. 132
c. 156
d. 171
e. 198

18. A certain water pollutant is unsafe at a level of 20 ppm (parts per million). A city's water supply now contains 50 ppm of this pollutant. What percentage of improvement will make the water safe?

a. 20%
b. 30%
c. 40%
d. 50%
e. 60%

19. A study shows that 600,000 women die each year in pregnancy and childbirth, one-fifth more than scientists previously estimated. How many such deaths did the scientists previously estimate?

a. 120,000
b. 240,000
c. 300,000
d. 480,000
e. 500,000

20. What is 250 milligrams in terms of grams?

a. 0.0250 grams
b. 0.250 grams
c. 2.50 grams
d. 25 grams
e. 250,000 grams

21. An Army food supply truck can carry three tons. A breakfast ration weighs 12 ounces, and the other two daily meals weigh 18 ounces each. Assuming each soldier gets three meals per day, on a 10-day trip, how many soldiers can be supplied by one truck?

a. 100 soldiers
b. 150 soldiers
c. 200 soldiers
d. 320 soldiers
e. 270 soldiers

	Aluminum	Cardboard	Glass	Plastic
Recycler X	6 cents/pound	3 cents/pound	8 cents/pound	2 cents/pound
Recycler Y	7 cents/pound	4 cents/pound	7 cents/pound	3 cents/pound

22. If you take recyclables to whichever recycler will pay the most, what is the greatest amount of money you could get for 2,200 pounds of aluminum, 1,400 pounds of cardboard, 3,100 pounds of glass, and 900 pounds of plastic?

a. $440
b. $447
c. $454
d. $469
e. $485

23. A train must travel 3,450 miles in six days. How many miles must it travel each day?

a. 525
b. 550
c. 600
d. 575
e. 625

24. A dormitory now houses 30 men and allows 42 square feet of space per man. If five more men are put into this dormitory, how much less space will each man have?

a. 5 square feet
b. 6 square feet
c. 7 square feet
d. 8 square feet
e. 9 square feet

25. Ron is half as old as Sam, who is three times as old as Ted. The sum of their ages is 55. How old is Ron?
- **a.** 5 years old
- **b.** 10 years old
- **c.** 15 years old
- **d.** 20 years old
- **e.** 30 years old

Subtest 3: Word Knowledge

Directions: This subtest measures your vocabulary comprehension. For each question you are to choose the answer that most closely means the same as the italicized word. If you are somewhat familiar with the italicized word, you can quickly eliminate the options that you know are incorrect. You have five (5) minutes to complete this subtest.

Questions: 25
Time: 5 minutes

1. *Gauche*
- **a.** awkward
- **b.** tactful
- **c.** graceful
- **d.** experienced
- **e.** expert

2. *Enumerate*
- **a.** pronounce
- **b.** count
- **c.** explain
- **d.** plead
- **e.** exhaust

3. *Triumphant*
- **a.** defeated
- **b.** vanquished
- **c.** victorious
- **d.** musical
- **e.** beaten

4. *Magnanimous*
- **a.** enormous
- **b.** scholarly
- **c.** generous
- **d.** dignified
- **e.** wealthy

5. *Aversion*
- **a.** harmony
- **b.** greed
- **c.** weariness
- **d.** dislike
- **e.** outrage

6. *Poignant*
- **a.** varied
- **b.** exclusive
- **c.** singular
- **d.** distressing
- **e.** comprehensive

7. *Antagonist*
- **a.** comrade
- **b.** leader
- **c.** master
- **d.** perfectionist
- **e.** opponent

8. *Perseverance*
- **a.** unhappiness
- **b.** fame
- **c.** persistence
- **d.** humility
- **e.** efficiency

9. *Homogeneous*
- **a.** alike
- **b.** plain
- **c.** native
- **d.** dissimilar
- **e.** ordinary

10. *Conspicuous*
- **a.** unknown
- **b.** excel
- **c.** obvious
- **d.** forgotten
- **e.** stellar

11. *Recluse*
- **a.** prophet
- **b.** fool
- **c.** intellectual
- **d.** hermit
- **e.** perfectionist

12. *Tote*
- **a.** acquire
- **b.** complete
- **c.** tremble
- **d.** abandon
- **e.** carry

13. *Preeminent*
- **a.** basic
- **b.** final
- **c.** observed
- **d.** responsible
- **e.** outstanding

14. *Grotesque*
- **a.** extreme
- **b.** frenzied
- **c.** bizarre
- **d.** typical
- **e.** majestic

15. *Outmoded*
- **a.** worthless
- **b.** unusable
- **c.** obsolete
- **d.** unnecessary
- **e.** pretentious

16. *Garbled*
- **a.** lucid
- **b.** unintelligible
- **c.** devoured
- **d.** outrageous
- **e.** invalid

17. *Frail*
- **a.** vivid
- **b.** delicate
- **c.** robust
- **d.** adaptable
- **e.** scarce

18. *Vindictive*
- **a.** disorderly
- **b.** outrageous
- **c.** insulting
- **d.** offensive
- **e.** spiteful

19. *Oration*
- **a.** nuisance
- **b.** independence
- **c.** address
- **d.** length
- **e.** elaboration

20. *Glib*
- **a.** angry
- **b.** superficial
- **c.** insulting
- **d.** dishonest
- **e.** descriptive

21. *Eccentric*
- **a.** normal
- **b.** frugal
- **c.** wild
- **d.** selective
- **e.** peculiar

22. *Panacea*
- **a.** cure
- **b.** result
- **c.** cause
- **d.** necessity
- **e.** problem

23. *Detrimental*
- **a.** harmful
- **b.** beneficial
- **c.** cumulative
- **d.** angered
- **e.** outstanding

24. *Ostentatious*
- **a.** hilarious
- **b.** pretentious
- **c.** outrageous
- **d.** obnoxious
- **e.** obsequious

25. *Negligible*
- **a.** insignificant
- **b.** delicate
- **c.** meaningful
- **d.** illegible
- **e.** nonchalant

Subtest 4: Math Knowledge

Directions: This subtest measures your ability to use learned mathematical relationships. Each problem is followed by five possible answers. You must decide which one of the five answers is correct. The best method for attacking each of these questions is given in the answer block at the end of this chapter. When you take the actual test, scratch paper will be provided for working out the problems. You have twenty-two (22) minutes to finish this subtest.

Questions: 25
Time: 22 minutes

1. The first digit of the square root of 112,092 is
- **a.** 1
- **b.** 2
- **c.** 3
- **d.** 4
- **e.** 5

2. Roberta draws two similar pentagons. The perimeter of the larger pentagon is 93 feet; one of its sides measures 24 feet. If the perimeter of the smaller pentagon equals 31 feet, then the corresponding side of the smaller pentagon measures
- **a.** $5s = 31$
- **b.** $93s = 24 \times 31$
- **c.** $93 \times 24 = 31s$
- **d.** $5 \times 31 = s$
- **e.** $31 \times 24 = s$

3. Which measurement uses the largest increment?
- **a.** perimeter
- **b.** area
- **c.** surface area
- **d.** volume
- **e.** They all use the same size increment.

4. What is the distance, in miles, around a circular course with a radius of 49 miles? (pi = $\frac{22}{7}$)
- **a.** 154 miles
- **b.** 308 miles
- **c.** 462 miles
- **d.** 539 miles
- **e.** 616 miles

5. Examine (A), (B), and (C) and choose the best answer.

(A) 0.5
(B) 5%
(C) $\frac{1}{5}$

a. (A) is greater than (B).
b. (B) is greater than (A).
c. (C) is greater than (A).
d. (A) and (B) are equal.
e. (B) times (A) is equal to (C).

6. Examine (A), (B), and (C) and choose the best answer.

(A) $n \times n$
(B) n^2
(C) $n(n)$

a. (A) plus (C) equals (B).
b. (B) is greater than (C) but less than (A).
c. (A) is less than (C).
d. (A), (B), and (C) are all equal.
e. (B) times (A) is equal to (C).

7. Find the circumference of a circle with a diameter of 10 centimeters.

a. 3.14 cm
b. 31.4 cm
c. 62.8 cm
d. 6.28 cm
e. none of the above

8. Which of the measures represents an obtuse angle?

a. 45°
b. 60°
c. 85°
d. 90°
e. 105°

9. $\frac{n^5}{n^2} =$

a. n^7
b. n^2
c. n^3
d. $2n^3$
e. $7n$

10. Simplify the following radical expression: $\sqrt{3n^2}$

a. $n\sqrt{3}$
b. $9n$
c. $n\sqrt{9}$
d. $\sqrt{9}$
e. $3\sqrt{n}$

11. Look at this series: $\frac{1}{6}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \ldots$ What number should come next?

a. 1
b. $\frac{4}{6}$
c. $\frac{5}{6}$
d. $\frac{8}{9}$
e. $\frac{7}{12}$

12. Find the volume of a pyramid with four congruent base sides. The length of each base side and the prism's height measure 2.4 feet.

a. 46 cubic feet
b. 4.6 cubic feet
c. 4.8 cubic feet
d. 48 cubic feet
e. 1.2 cubic feet

13. What number is 42 less than $\frac{1}{5}$ of 820?

a. 98
b. 112
c. 122
d. 210
e. 222

14. Simplify the following radical expression:
$2\sqrt{7} - 3\sqrt{28}$
a. $-6\sqrt{7}$
b. $5\sqrt{196}$
c. $-5\sqrt{196}$
d. $\sqrt{7}$
e. $-4\sqrt{7}$

15. $\frac{8xy^2}{2xy} =$
a. $2xy$
b. $4x^2$
c. $16y$
d. $4y$
e. $4y^2$

16. What number is 6 less than $\frac{2}{5}$ of 25?
a. –4
b. 1
c. 4
d. 9
e. 12

17. What number is 3 times 4% of 20?
a. 2.4
b. 5.4
c. 24
d. 27
e. 32

18. Examine (A), (B), and (C) and choose the best answer.

(A) 7^2
(B) 4^3
(C) $3^2 + 6$

a. (A) and (B) are equal.
b. (A) is greater than (B).
c. (B) minus (A) is equal to (C).
d. (B) and (C) are equal to (A).
e. (B) times (A) is equal to (C).

19. The expression *5 factorial* equals
a. $\frac{1}{4}$
b. 16
c. 50
d. 120
e. 500

20. What number added to 15% of 30 equals 20?
a. –25
b. 4.5
c. 12
d. 15.5
e. 25.5

21. The reciprocal of 10 is
a. 0.1
b. 0.2
c. 0.5
d. 1.0
e. 2.0

22. What number plus 2 times the same number equals 99?
a. 16
b. 33
c. 66
d. 297
e. 365

23. Examine (A), (B), and (C) and choose the best answer.

(A) $\frac{2}{5}$ of 100
(B) $\frac{1}{2}$ of 80
(C) $\frac{1}{8}$ of 160

a. (A) is less than (B) or (C).
b. (A) and (B) are equal.
c. (B) and (C) are equal.
d. (B) is greater than (A) but less than (C).
e. (B) times (A) is equal to (C).

24. Isadora wants to know the perimeter of the face of a building; however, she does not have a ladder. She knows that the building's rectangular facade casts a 36-foot shadow at noon, while a nearby mailbox casts a 12-foot shadow at noon. The mailbox is 4.5-feet tall. If the length of the façade is 54 feet, what is the measure of the façade's perimeter?

a. $p = 13.5 \times 4$
b. $p = 54 \times 4$
c. $p = 4.5(2) + 12(2)$
d. $p = 13.5(2) + 54(2)$
e. $p = 13.5 + 4$

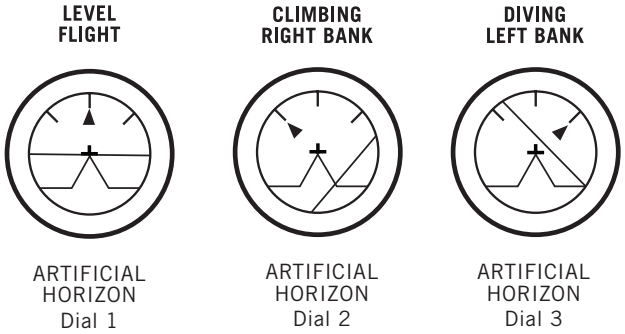
25. Find the circumference, in meters, of a circle with a radius of 25 centimeters.

a. 1.57 m
b. 157 m
c. 15.7 cm
d. 78.5 m
e. 7.85 m

Subtest 5: Instrument Comprehension

Directions: This test measures your ability to determine the position of an aircraft in flight by reading instruments showing its compass heading, its amount of climb or dive, and its degree of bank to right or left. In each test item, the left-hand dial is labeled *artificial horizon*. The small aircraft silhouette remains stationary on the face of this dial, while the positions of the heavy black line and black pointer vary with the changes in the position of the aircraft in which the instrument is located.

The heavy black line represents the *horizon line*, and the black pointer shows the degree of *bank* to right or left. If the aircraft is neither climbing nor diving, the horizon line is directly on the silhouette's fuselage. If the aircraft has no bank, the black pointer will point to zero (Dial 1).



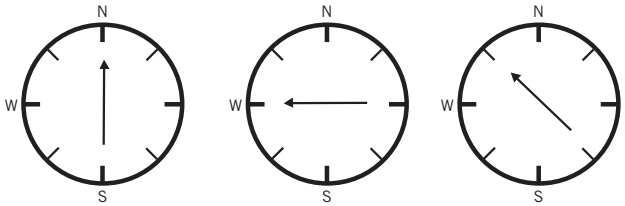
ARTIFICIAL HORIZON Dial 1 — ARTIFICIAL HORIZON Dial 2 — ARTIFICIAL HORIZON Dial 3

If the aircraft is climbing, the fuselage silhouette is seen between the horizon line and the pointer. The greater the amount of climb, the greater the distance between the horizon line and the fuselage silhouette. If the aircraft is banked to the pilot's right, the pointer will point to the left of zero (Dial 2).

If the aircraft is diving, the horizon line is between the fuselage silhouette and the pointer. The greater the amount of dive, the greater the distance between the horizon line and the fuselage silhouette. If the aircraft is banked to the pilot's left, the pointer will point to the right of zero (Dial 3).

The *horizon line* tilts as the aircraft is banked. It is always at a right angles to the pointer.

In each test item, the right-hand dial is the *compass*. This dial shows the direction in which the aircraft is headed. Dial 4 shows north, Dial 5 is west, and Dial 6 is northwest.



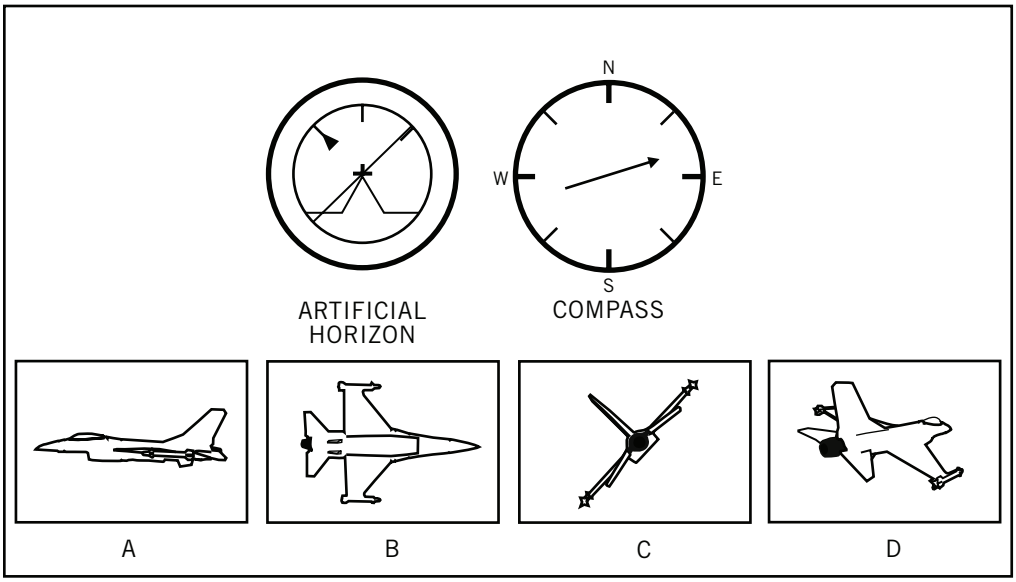
COMPASS Dial 4 — COMPASS Dial 5 — COMPASS Dial 6

Each item in this test consists of two dials and four silhouettes of aircraft in flight. Your task is to determine which of the four aircraft is closest to the position indicated by the two dials. Remember, you are always looking NORTH at the same altitude as each plane. East is always to the RIGHT as you look at the

page. (*Note:* C in Question 3 is the rear view of the aircraft, and B is the front view.) You have nine (9) minutes to complete this subtest.

Questions: 20
Time: 9 minutes

1.



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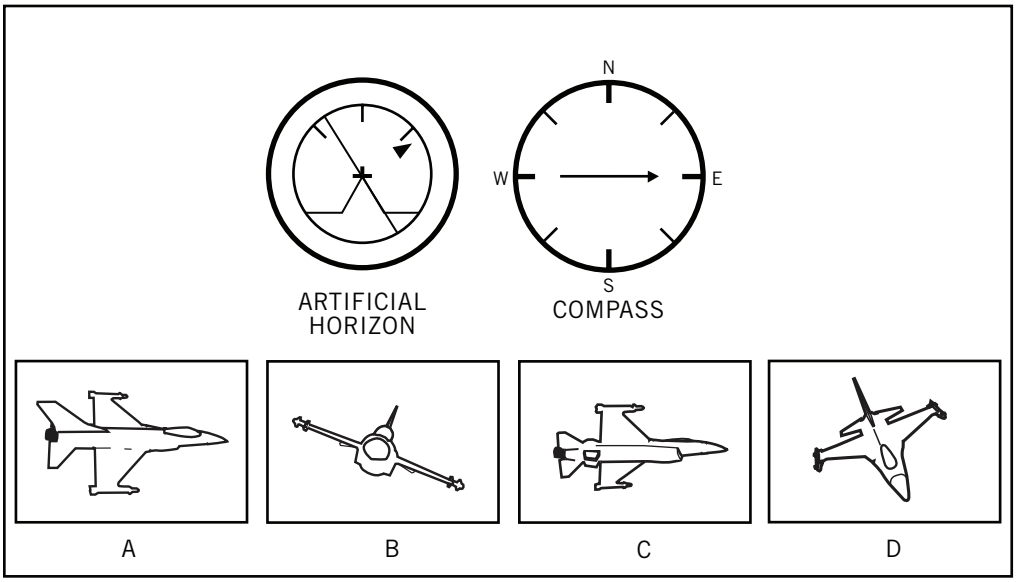

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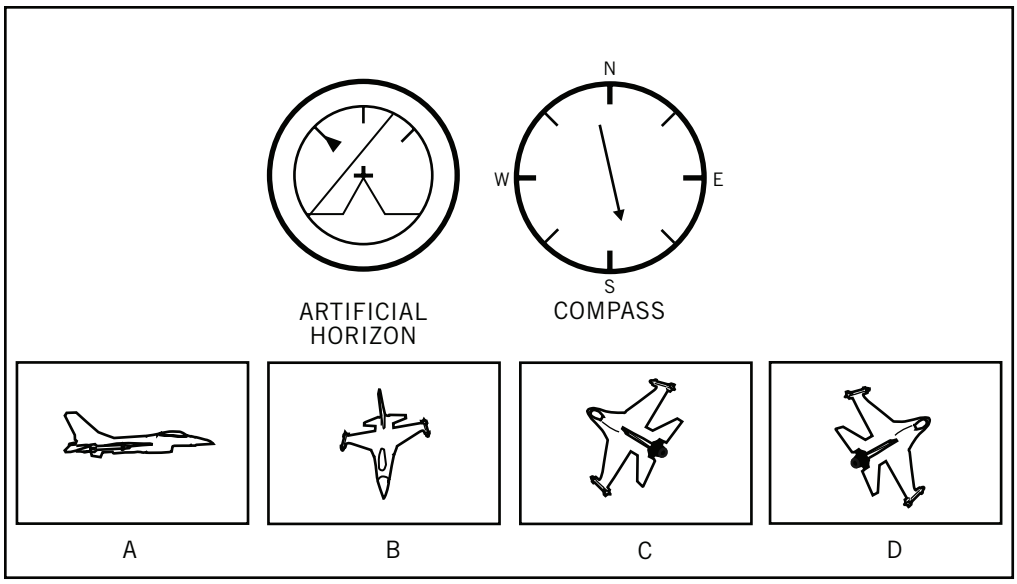
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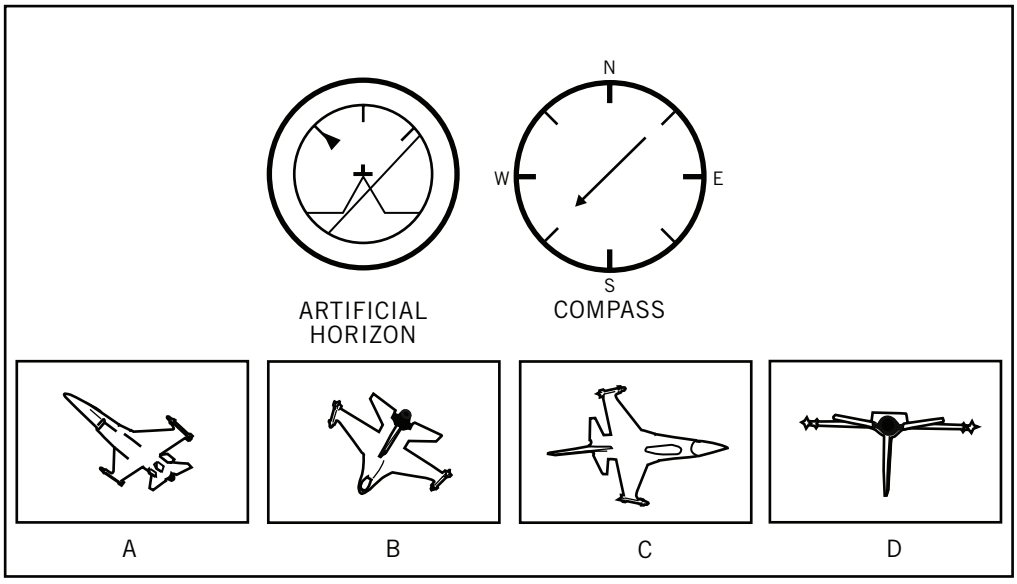
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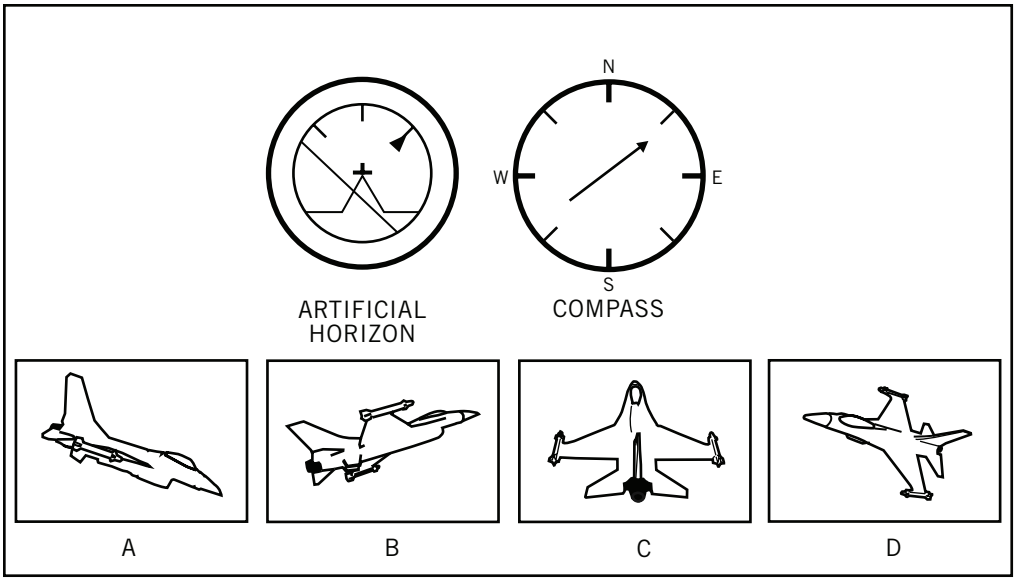
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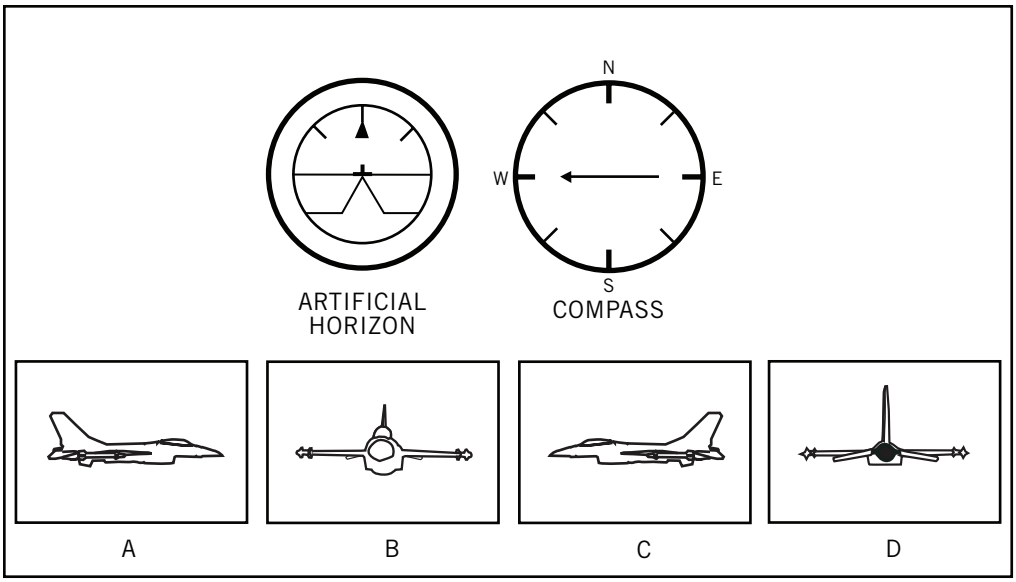
6.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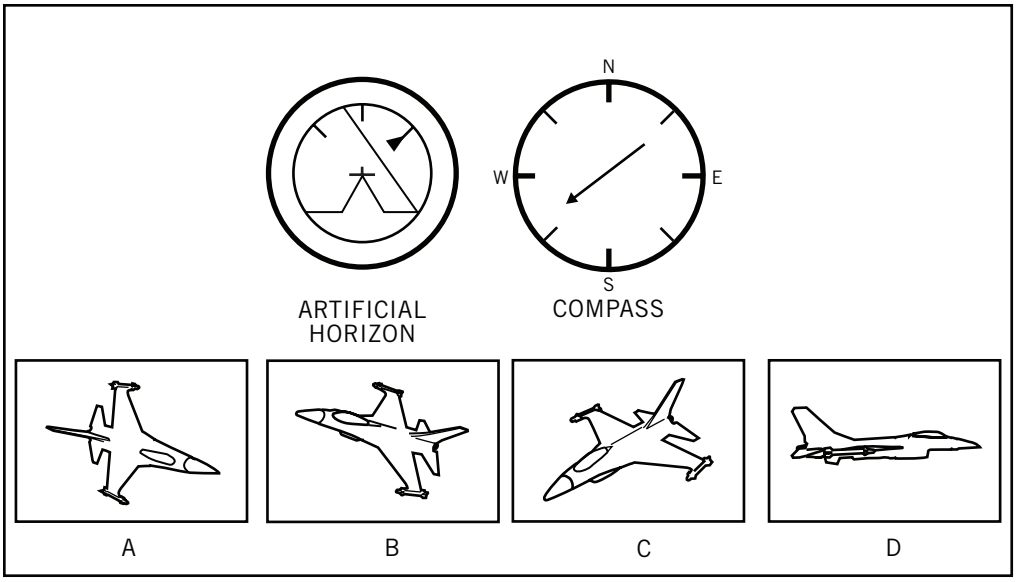
7.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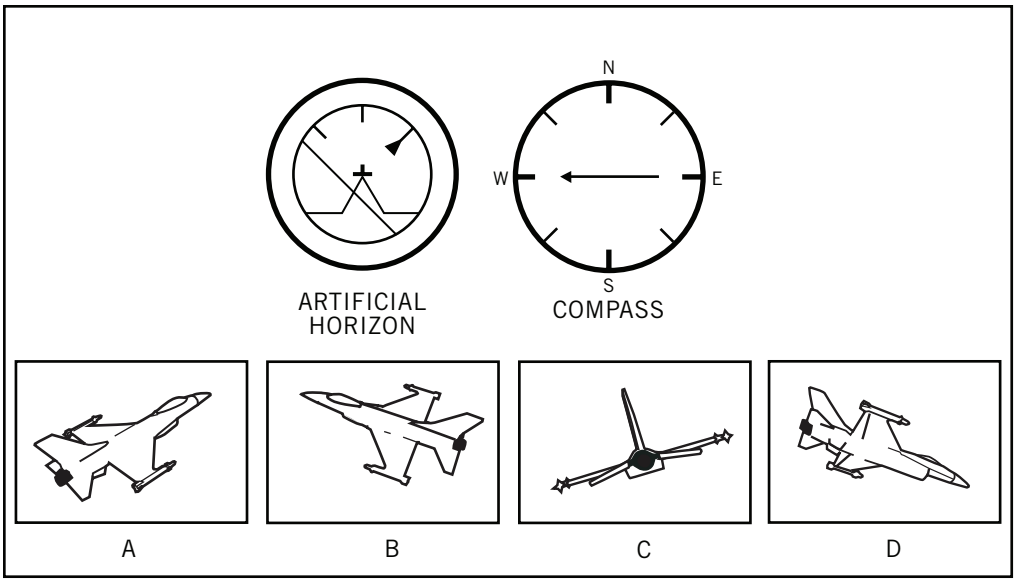
8.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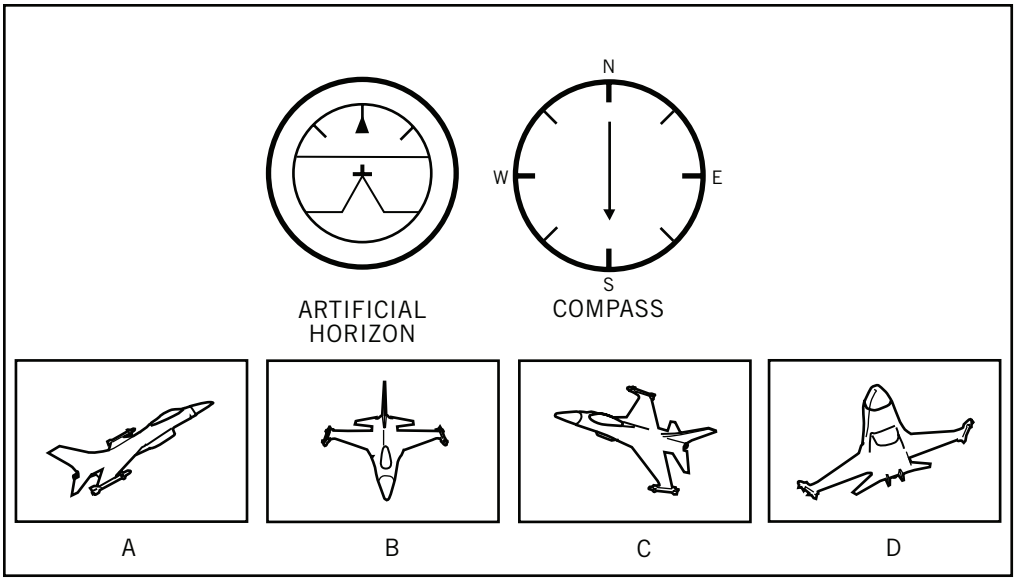
9.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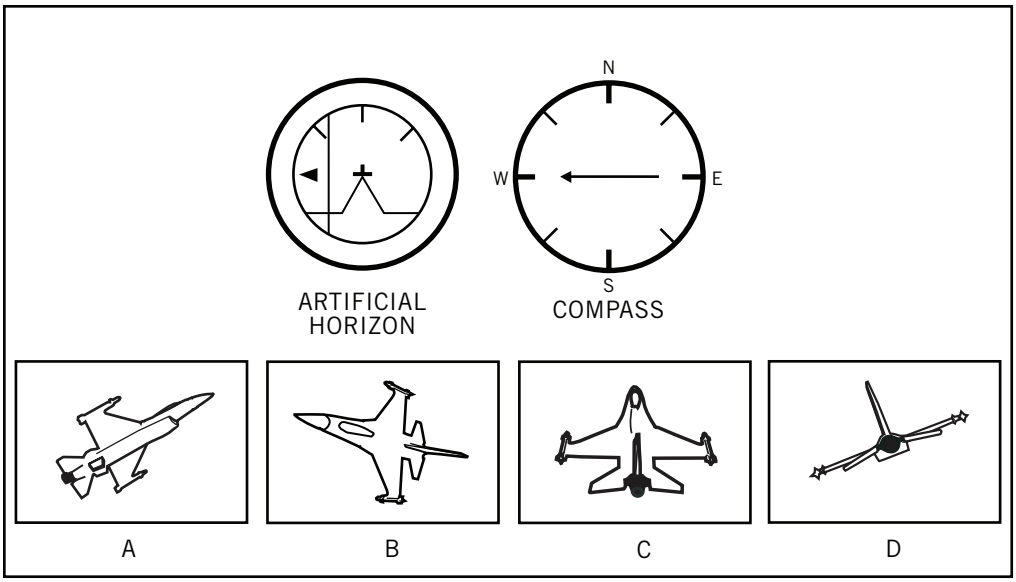
10.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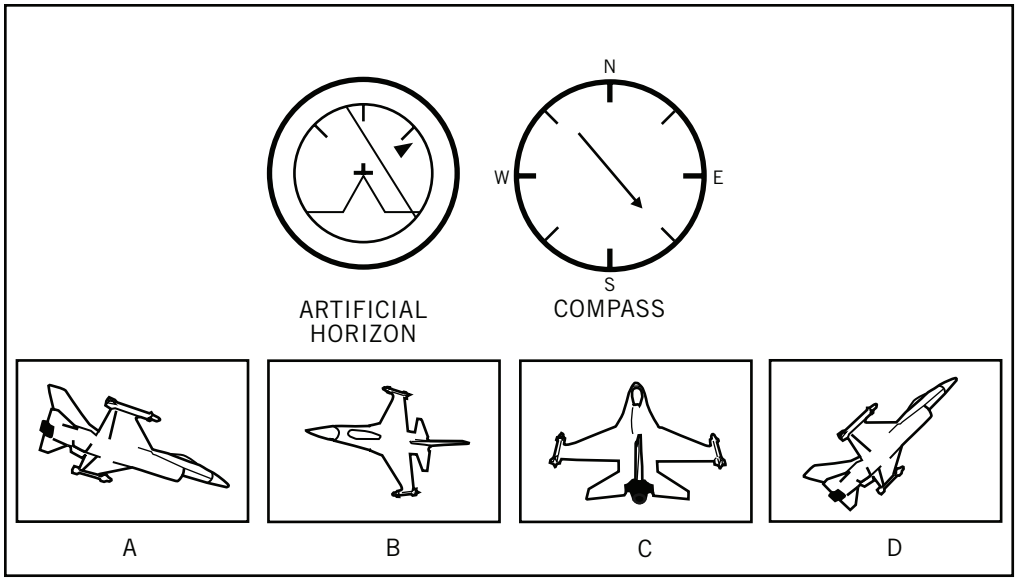
11.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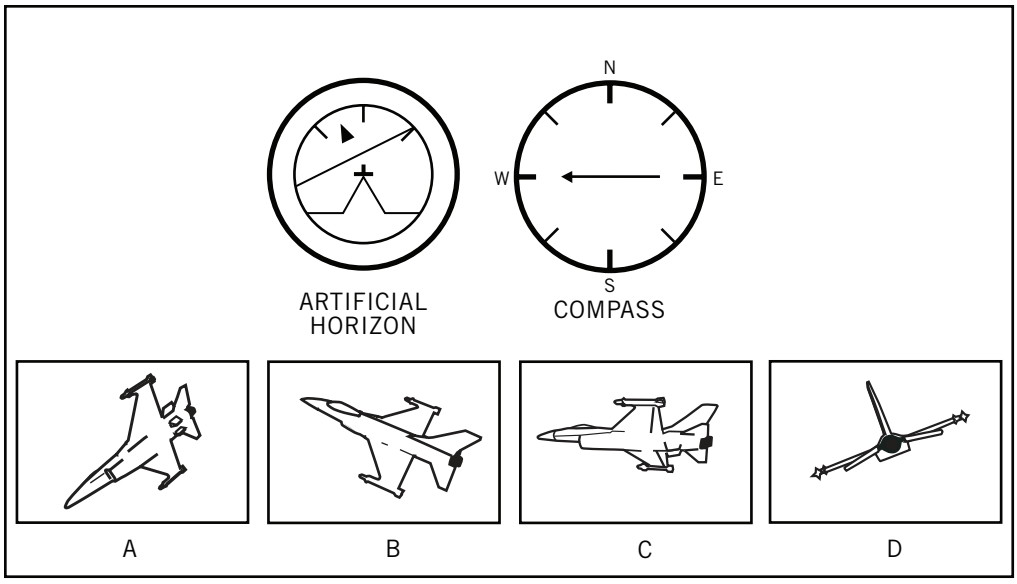
12.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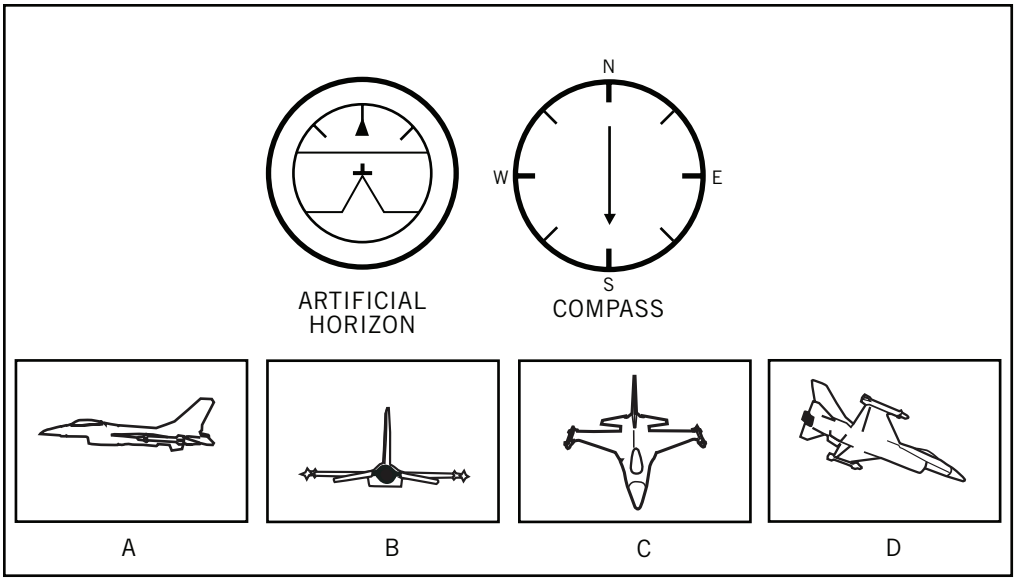
13.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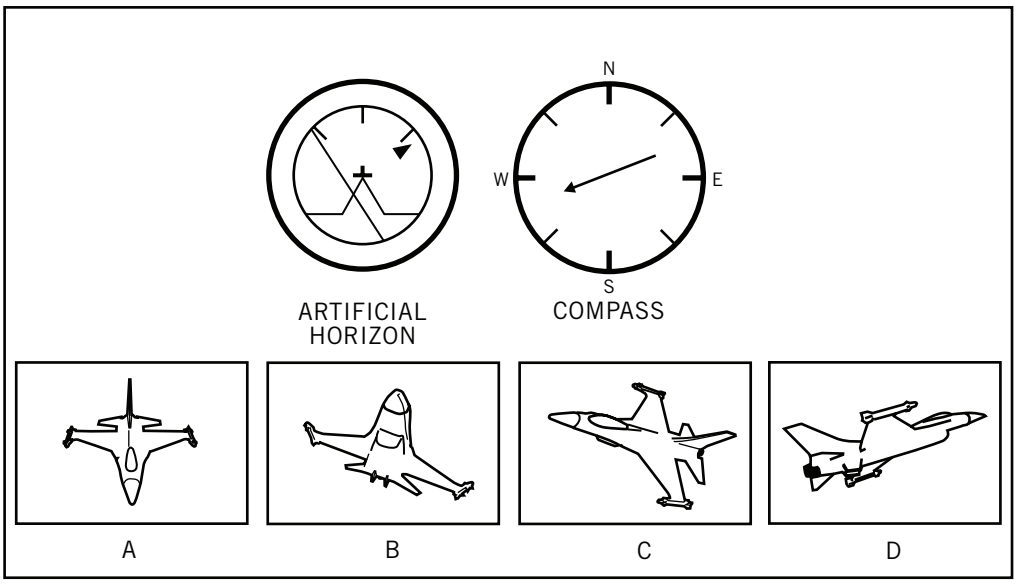
14.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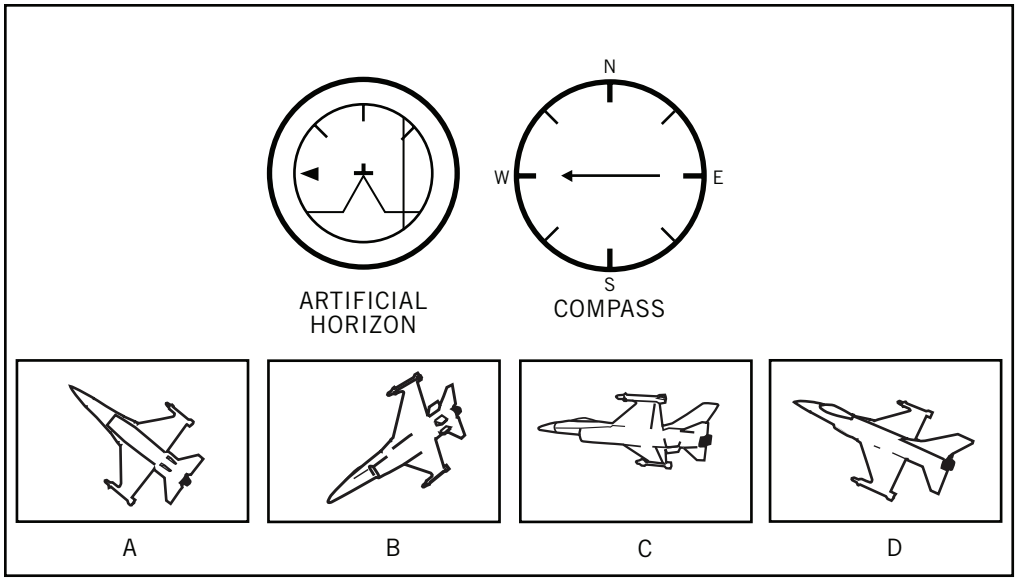
15.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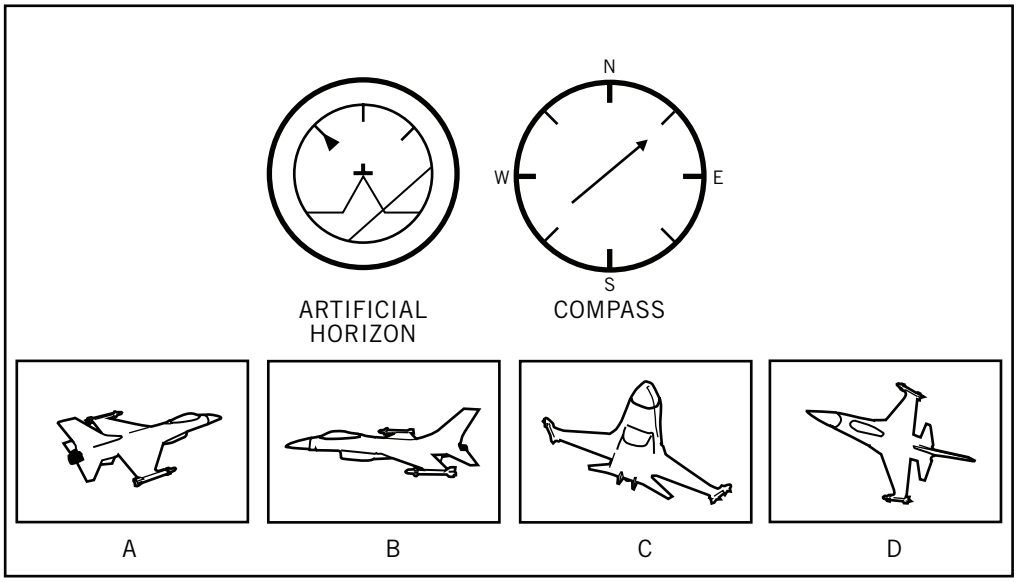
16.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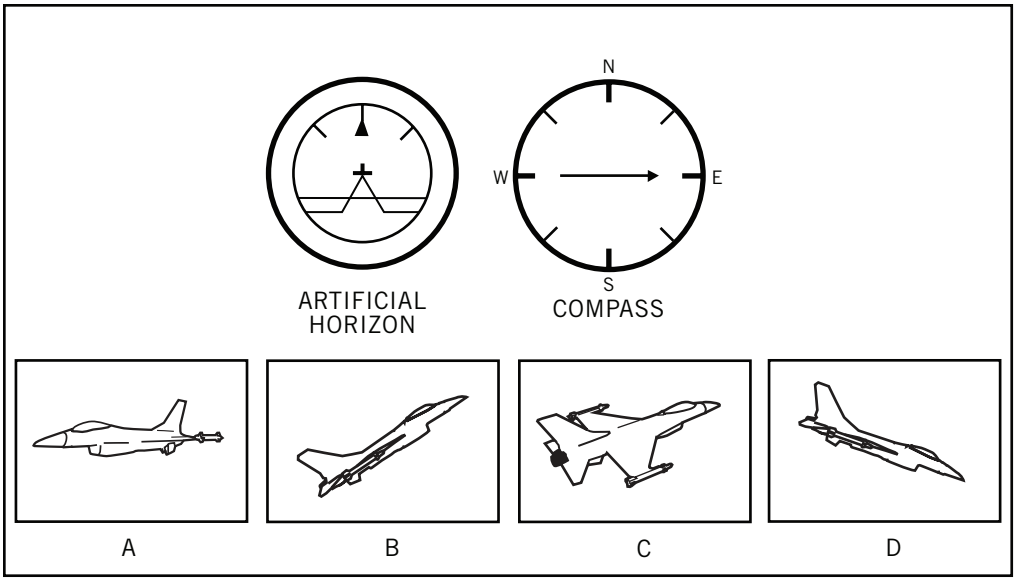
17.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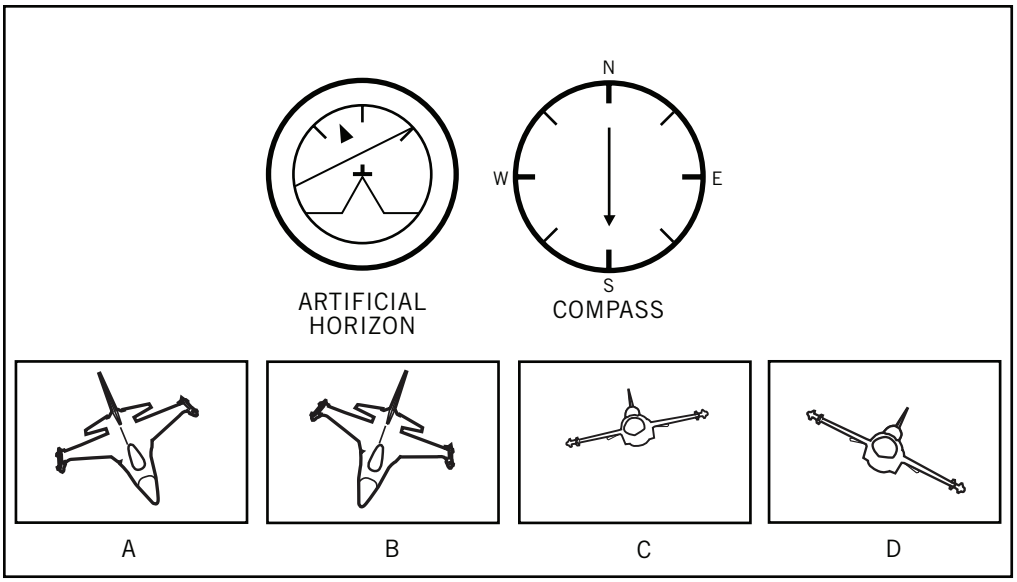
18.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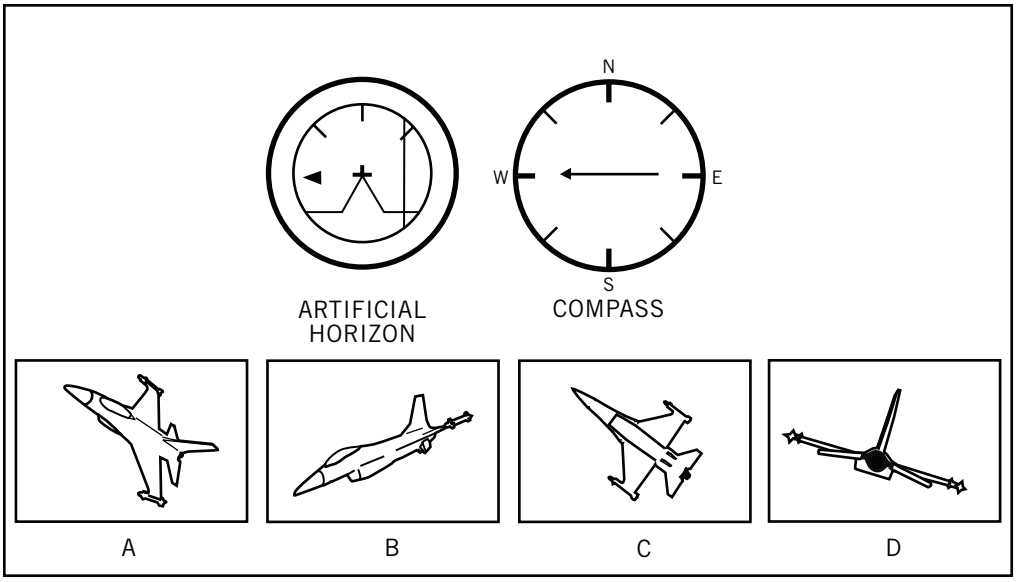
19.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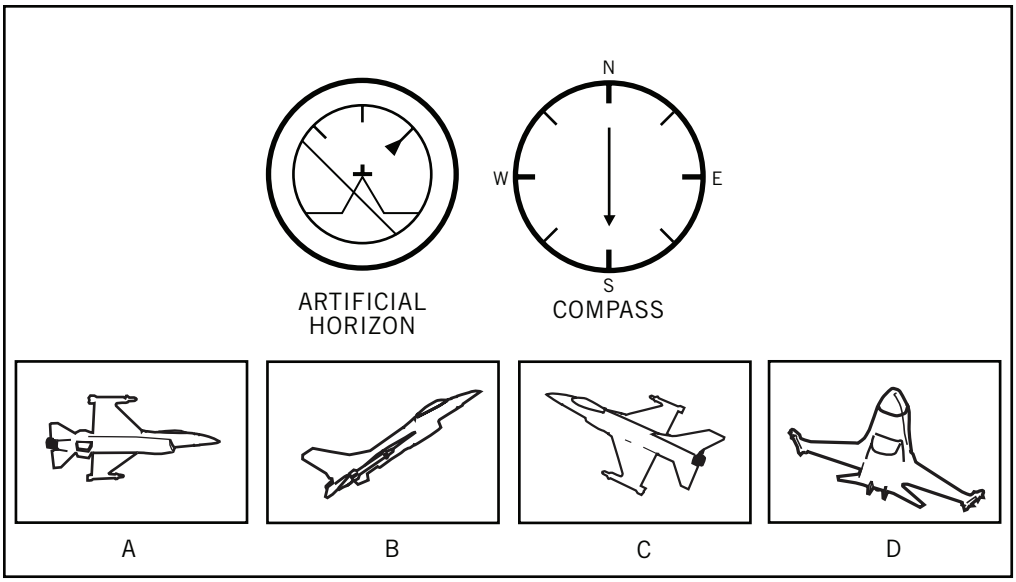
20.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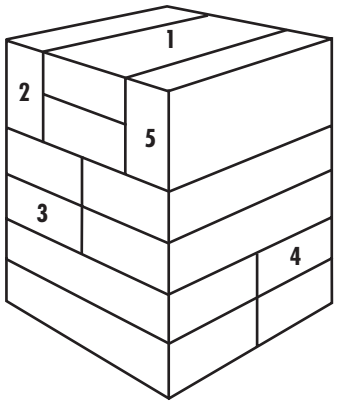
Subtest 6: Block Counting

Directions: This subtest measures your ability to see into a three-dimensional stack of blocks to determine how many pieces are touched by the numbered blocks. It is also a test of your abilities to observe and deduce what you cannot specifically see. Closely study the way in which the blocks are stacked. You may find it helpful to remember that all of the blocks in a pile are the same size and shape. Each stack of blocks is followed by five questions pertaining only to that stack. You have three (3) minutes to complete this subtest.

Questions: 20
Time: 3 minutes

Use the following figure to answer questions 1 through 5.



1. Block 1 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

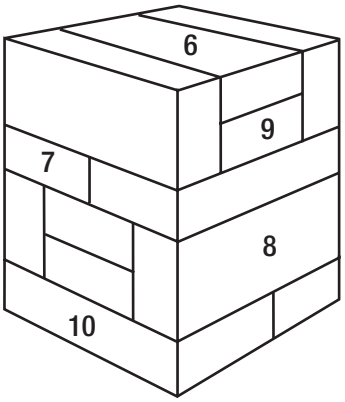
2. Block 2 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

3. Block 3 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

4. Block 4 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

5. Block 5 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

Use the following figure to answer questions 6 through 10.



6. Block 6 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

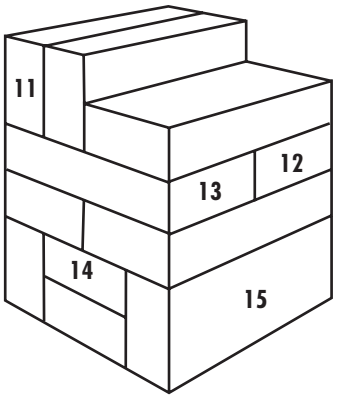
7. Block 7 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

8. Block 8 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

9. Block 9 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

10. Block 10 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

Use the following figure to answer questions 11 through 15.



11. Block 11 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

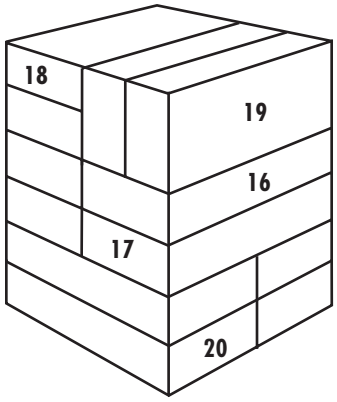
12. Block 12 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

13. Block 13 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

14. Block 14 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

15. Block 15 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

Use the following figure to answer questions 16 through 20.



16. Block 16 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

17. Block 17 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

18. Block 18 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

19. Block 19 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

20. Block 20 is touched by _____ other blocks.
- **a.** 2
- **b.** 3
- **c.** 4
- **d.** 5
- **e.** 6

Subtest 7: Table Reading

Directions: This subtest assesses your ability to read tables quickly and accurately. Notice that the X values in each table are shown at the top of the table and the Y values are shown on the left of the table. In this subtest, you are to find the entry that occurs at the intersection of the row and the column corresponding to the values given. On your answer sheet, fill in the letter that corresponds with the number at the intersection of the X and Y values. Accuracy is important. You have seven (7) minutes to complete this subtest.

Questions: 40
Time: 7 minutes

Use the following table to determine the correct value for the X and Y values given in questions 1 through 5.

		X VALUE						
		–3	–2	–1	0	1	2	3
Y VALUE	–3	45	23	77	93	52	54	92
	–2	82	12	71	55	25	48	30
	–1	13	65	33	14	50	38	19
	0	40	84	85	53	66	73	88
	1	55	43	22	70	20	99	32
	2	23	10	62	62	15	42	63
	3	32	44	55	72	83	11	60

1. –3,2
- **a.** 82
- **b.** 54
- **c.** 23
- **d.** 44
- **e.** 36

2. 2,–2
- **a.** 12
- **b.** 10
- **c.** 48
- **d.** 42
- **e.** 38

3. –2,3
- **a.** 44
- **b.** 82
- **c.** 30
- **d.** 23
- **e.** 32

4. 0,–1
- **a.** 85
- **b.** 33
- **c.** 53
- **d.** 70
- **e.** 14

5. 3,1
- **a.** 13
- **b.** 55
- **c.** 32
- **d.** 83
- **e.** 44

Use the following table to determine the correct value for the X and Y values given in questions 6 through 10.

		X VALUE						
		–3	–2	–1	0	1	2	3
Y VALUE	–3	32	64	12	98	25	74	15
	–2	35	57	97	66	43	52	44
	–1	76	49	84	12	68	14	68
	0	45	29	79	61	37	82	11
	1	92	28	63	24	77	29	65
	2	74	26	99	54	55	16	62
	3	97	58	46	81	22	34	53

6. 2,–1
- **a.** 99
- **b.** 88
- **c.** 55
- **d.** 43
- **e.** 14

7. 0,0
- **a.** 11
- **b.** 45
- **c.** 0
- **d.** 61
- **e.** 76

8. –2,–1
- **a.** 25
- **b.** 33
- **c.** 39
- **d.** 45
- **e.** 49

9. –1,2
- **a.** 24
- **b.** 14
- **c.** 29
- **d.** 55
- **e.** 99

10. 3,3
- **a.** 32
- **b.** 53
- **c.** 61
- **d.** 82
- **e.** 62

Use the following table to determine the correct value for the X and Y values given in questions 11 through 15.

		X VALUE						
		–3	–2	–1	0	1	2	3
Y VALUE	–3	45	89	79	77	29	68	58
	–2	86	27	48	38	97	66	96
	–1	39	37	43	36	45	56	78
	0	18	17	55	98	44	87	34
	1	88	49	31	59	28	69	67
	2	37	76	47	22	16	45	33
	3	46	19	99	54	57	18	26

11. –1,–1
- **a.** 28
- **b.** 43
- **c.** 41
- **d.** 45
- **e.** 26

12. –2,1
- **a.** 49
- **b.** 56
- **c.** 86
- **d.** 93
- **e.** 99

13. –3,0
- **a.** 18
- **b.** 77
- **c.** 54
- **d.** 34
- **e.** 26

14. 1,3
- **a.** 29
- **b.** 34
- **c.** 41
- **d.** 52
- **e.** 57

15. –3,–2
- **a.** 96
- **b.** 86
- **c.** 33
- **d.** 18
- **e.** 89

Use the following table to determine the correct value for the X and Y values given in questions 16 through 20.

		X VALUE						
		–3	–2	–1	0	1	2	3
Y VALUE	–3	24	17	72	55	23	95	35
	–2	12	53	93	97	66	32	13
	–1	56	65	34	22	44	87	43
	0	75	52	43	48	92	45	85
	1	84	87	36	16	76	54	82
	2	46	15	86	64	83	14	26
	3	73	74	62	33	225	63	42

16. –3,–3
- **a.** 24
- **b.** 35
- **c.** 42
- **d.** 73
- **e.** 82

17. 2,2
- **a.** 14
- **b.** 53
- **c.** 34
- **d.** 23
- **e.** 13

18. –2,3
- **a.** 12
- **b.** 17
- **c.** 35
- **d.** 74
- **e.** 76

19. –1,0
- **a.** 22
- **b.** 48
- **c.** 34
- **d.** 52
- **e.** 43

20. 0,2
- **a.** 12
- **b.** 45
- **c.** 64
- **d.** 93
- **e.** 97

Use the following table to determine the correct value for the X and Y values given in questions 21 through 25.

		X VALUE						
		–3	–2	–1	0	1	2	3
Y VALUE	–3	12	92	69	63	29	43	13
	–2	99	31	72	42	91	82	41
	–1	33	97	39	28	18	42	53
	0	49	52	23	21	51	32	23
	1	81	73	58	93	68	59	38
	2	78	89	61	79	98	22	19
	3	83	71	88	48	62	11	34

21. 2,–3

a. 82
b. 43
c. 11
d. 92
e. 71

22. –1,3

a. 69
b. 88
c. 29
d. 62
e. 53

21. 2,2

a. 13
b. 22
c. 82
d. 89
e. 91

24. –3,1

a. 53
b. 69
c. 81
d. 88
e. 93

25. 2,3

a. 19
b. 92
c. 71
d. 11
e. 99

Use the following table to determine the correct value for the X and Y values given in questions 26 through 40.

	X VALUE																		
Y VALUE	–9	–8	–7	–6	–5	–4	–3	–2	–1	0	1	2	3	4	5	6	7	8	9
–9	48	57	52	13	86	91	54	82	52	87	46	68	92	47	53	38	52	45	78
–8	78	58	26	90	54	77	50	41	24	18	12	32	54	16	39	28	59	83	57
–7	54	43	77	23	49	54	45	81	64	21	54	87	56	10	15	50	35	68	99
–6	52	56	21	42	25	62	70	88	28	55	15	48	56	15	85	52	87	74	62
–5	19	23	58	98	38	58	47	56	74	21	99	84	28	48	24	56	65	11	56
–4	25	82	54	12	33	76	25	43	93	53	31	10	20	34	76	92	28	33	52
–3	43	65	21	45	21	58	86	96	35	71	70	80	45	85	43	23	51	52	14
–2	58	87	26	65	52	55	43	76	55	26	29	96	54	19	14	87	74	55	92
–1	82	73	34	52	95	42	26	74	49	83	75	96	28	21	31	78	46	39	76
0	21	85	58	43	74	38	72	81	11	18	84	73	52	66	62	81	12	43	17
1	50	26	54	45	25	84	95	31	18	45	76	61	41	30	24	46	66	83	73
2	86	52	64	25	21	17	64	23	71	13	90	56	44	70	12	27	48	87	33
3	74	13	75	17	85	56	50	43	68	10	37	85	71	16	52	49	18	66	95
4	32	69	78	68	73	54	15	61	42	78	91	28	93	85	34	70	59	46	35
5	15	55	90	33	91	12	99	23	53	62	79	81	64	40	38	26	69	73	13
6	64	38	62	54	18	22	36	28	93	38	61	98	14	30	49	63	88	12	41
7	84	56	53	56	76	45	64	11	83	47	23	74	31	89	57	38	32	78	19
8	56	84	21	86	21	18	29	31	12	25	59	40	72	98	53	22	45	88	74
9	46	19	64	47	54	53	75	82	69	45	80	13	22	15	70	18	49	59	16

26. 9,–4

a. 14
b. 35
c. 52
d. 25
e. 32

27. –5,9

a. 54
b. 90
c. 32
d. 53
e. 56

28. –1,–4
- **a.** 14
- **b.** 93
- **c.** 28
- **d.** 91
- **e.** 42

29. –3,8
- **a.** 29
- **b.** 75
- **c.** 50
- **d.** 72
- **e.** 52

30. 5,–3
- **a.** 99
- **b.** 64
- **c.** 47
- **d.** 28
- **e.** 43

31. 0,–7
- **a.** 74
- **b.** 47
- **c.** 58
- **d.** 12
- **e.** 21

32. 4,–4
- **a.** 85
- **b.** 48
- **c.** 20
- **d.** 76
- **e.** 34

33. 7,–3
- **a.** 32
- **b.** 21
- **c.** 52
- **d.** 31
- **e.** 51

34. –9,3
- **a.** 43
- **b.** 74
- **c.** 54
- **d.** 92
- **e.** 47

35. 1,–8
- **a.** 34
- **b.** 74
- **c.** 24
- **d.** 12
- **e.** 73

36. 0,0
- **a.** 84
- **b.** 11
- **c.** 18
- **d.** 87
- **e.** 80

37. –5,0
- **a.** 62
- **b.** 74
- **c.** 21
- **d.** 26
- **e.** 58

38. –2,7
- **a.** 81
- **b.** 87
- **c.** 11
- **d.** 74
- **e.** 14

39. –8,5
- **a.** 55
- **b.** 23
- **c.** 39
- **d.** 54
- **e.** 83

40. –6,4
- **a.** 26
- **b.** 68
- **c.** 23
- **d.** 74
- **e.** 92

Subtest 8: Aviation Information

Directions: This subtest measures your knowledge of aviation. This portion is common to all three service selection tests, although the number of questions varies from one service to another. Each of the questions or incomplete statements is followed by several choices. You must decide which one of the choices best completes the statement or answers the question. Eliminating any obviously incorrect choices first will increase your chances of selecting the correct answer. You have eight (8) minutes to complete this subtest.

Questions: 20
Time: 8 minutes

1. If the rudder of an aircraft is deflected, the aircraft will move about the _____ axis.
- **a.** centroid
- **b.** pitch
- **c.** roll
- **d.** yaw
- **e.** none of the above

2. If the elevator is deflected, the aircraft will move about the _____ axis.
- **a.** centroid
- **b.** pitch
- **c.** roll
- **d.** yaw
- **e.** none of the above

3. If the aileron is deflected, the aircraft will move about the _____ axis.
- **a.** centroid
- **b.** pitch
- **c.** roll
- **d.** yaw
- **e.** none of the above

4. Pushing the right rudder pedal in causes the rudder to deflect to the right of center, causing which movement of the aircraft?
- **a.** Pushes the tail of the aircraft right, and the nose of the aircraft left.
- **b.** Pushes the tail of the aircraft left, and the nose of the aircraft right.
- **c.** Pushes the tail of the aircraft left, and the nose of the aircraft left.
- **d.** Pushes the tail of the aircraft right and the nose of the aircraft right.
- **e.** None of the above.

5. What is the angle of attack?
- **a.** the angle between airfoil chord and relative direction of motion
- **b.** the angle between blade center and angle of incidence
- **c.** the angle between airfoil chord and angle of incidence
- **d.** the angle between induced air flow and relative direction of motion
- **e.** none of the above

6. What do we call the force acting rearward on an aircraft caused by air friction and lift?
- **a.** lift
- **b.** thrust
- **c.** drag
- **d.** weight
- **e.** none of the above

7. The shape of a wing's cross-section, which causes lift, is described using what term?
- **a.** camber
- **b.** delta
- **c.** swept
- **d.** straight
- **e.** none of the above

8. Pulling back on the aircraft controls will deflect which control surface on the aircraft?
- **a.** rudder
- **b.** trim tabs
- **c.** ailerons
- **d.** flaps
- **e.** elevators

9. Increasing which parameter will eventually cause a stall of the aircraft?
- **a.** air density
- **b.** angle of attack
- **c.** airspeed
- **d.** pitch angle
- **e.** none of the above

10. Aviation speeds are generally measured in nautical miles per hour (knots). Which statement is true about knots?
- **a.** 100 knots is identical to 100 miles per hour (mph).
- **b.** 100 knots is faster than 100 mph.
- **c.** 100 knots is slower than 100 mph.
- **d.** 100 knots has no relationship to mph.
- **e.** None of the above.

11. The transponder codes for loss of communication and for emergency, respectively, are?
- **a.** 7600 and 7500
- **b.** 7700 and 7600
- **c.** 7600 and 7700
- **d.** 7500 and 7600
- **e.** 7500 and 7700

12. Used in aviation, *Zulu time* refers to what?
- **a.** Eastern Standard Time
- **b.** Eastern Daylight Saving Time
- **c.** Time at International Date Line
- **d.** Greenwich Mean Time
- **e.** Pacific Standard Time

13. What does the Pitot Static system in an aircraft measure?
- **a.** airspeed and altitude
- **b.** fuel quantity and fuel weight
- **c.** manifold pressure and air pressure
- **d.** cabin pressure and manifold pressure
- **e.** none of the above

14. Pitch angle is the angle between the fuselage of the aircraft and what?
- **a.** relative wind
- **b.** horizon
- **c.** runway threshold
- **d.** propeller
- **e.** none of the above

15. In general, which statement is true when an aircraft fully extends its flaps and does not change other parameters?
- **a.** Wing produces more lift and more drag.
- **b.** Wing produces more lift, but less drag.
- **c.** Wing produces same amount of lift, but more drag.
- **d.** Wing produces less lift and less drag.
- **e.** Wing produces less lift, but more drag.

16. In relation to the air flowing beneath the wing, how does the air flowing over the top of a wing, producing lift, move?
- **a.** same speed
- **b.** slower
- **c.** stops
- **d.** faster
- **e.** none of the above

17. Airport runways are numbered according to
- **a.** length and width.
- **b.** wind direction.
- **c.** the first two digits of compass direction.
- **d.** order of construction.
- **e.** aircraft type.

18. What causes wake turbulence?
- **a.** wind from thunderstorms blowing across runways
- **b.** microburst
- **c.** vortices off wings of aircraft caused by generating lift
- **d.** dust devils
- **e.** solar bursts

19. What are the colors of the port and starboard running lights?
- **a.** white/white
- **b.** red/green
- **c.** green/red
- **d.** red/white
- **e.** green/white

20. Mach 1 refers to what in aviation?
- **a.** speed of light
- **b.** speed of sound
- **c.** speed of heat
- **d.** speed of any jet
- **e.** none of the above

Subtest 9: General Science

Directions: This subtest measures your knowledge in the area of science. Each of the questions or incomplete statements is followed by five choices. You must decide which one of the choices best answers the question or completes the statement. Again, if you are unsure of an answer, use the process of elimination. Remember, there are no penalties for guessing. You have ten (10) minutes to complete this subtest.

Questions: 20
Time: 10 minutes

1. The element _____ is the most abundant component of air.
- **a.** helium
- **b.** hydrogen
- **c.** nitrogen
- **d.** oxygen
- **e.** carbon

2. According to Boyle's law, if the pressure of a fixed mass of gas is kept constant but the temperature is allowed to increase, the volume of gas will
- **a.** not increase.
- **b.** decrease in proportion to the change in temperature.
- **c.** increase in proportion to the change in temperature.
- **d.** increase at twice the rate of change in temperature.
- **e.** There is not enough information to complete the statement.

3. Ohm's law describes how, if voltage is kept constant, an increase in current results in
- **a.** an increase in resistance.
- **b.** a decrease in resistance.
- **c.** an increase or a decrease in resistance.
- **d.** no change in resistance.
- **e.** There is not enough information to complete the statement.

4. _____ wavelengths are longer than visible light and therefore have lower frequencies.
- **a.** Infrared
- **b.** Ultraviolet
- **c.** X-ray
- **d.** Gamma ray
- **e.** None of the above

5. If a substance has a pH of 1.0, it can be classified as a(n)
- **a.** acid.
- **b.** base.
- **c.** solvent.
- **d.** neutral compound.
- **e.** There is not enough information to complete the statement.

6. _____ in an atom's nucleus have a positive electrical charge.
- **a.** Electrons
- **b.** Neutrons
- **c.** Ions
- **d.** Photons
- **e.** Protons

7. A vector is defined by
- **a.** length.
- **b.** direction.
- **c.** neither length or direction.
- **d.** both length and direction.
- **e.** none of the above.

8. The organ that is responsible for the production of insulin is the
- **a.** spleen.
- **b.** kidney.
- **c.** pancreas.
- **d.** liver.
- **e.** intestine.

9. The four planets in the solar system that are considered the gas giants are
- **a.** Mercury, Venus, Jupiter, Saturn.
- **b.** Jupiter, Saturn, Uranus, Neptune.
- **c.** Venus, Saturn, Uranus, Neptune.
- **d.** Jupiter, Saturn, Neptune, Pluto.
- **e.** Saturn, Uranus, Neptune, Pluto.

10. Carbon dioxide is made up of
- **a.** carbon.
- **b.** oxygen.
- **c.** both carbon and oxygen.
- **d.** both carbon and nitrogen.
- **e.** none of the above.

11. What is a solution called when it can dissolve no more solutes?
- **a.** unsaturated
- **b.** supersaturated
- **c.** saturated
- **d.** volatile
- **e.** stable

12. What is the total number of atoms present in the molecule CH_3NH_2?
- **a.** 4
- **b.** 5
- **c.** 6
- **d.** 7
- **e.** 8

13. On the Celsius temperature scale, at what temperatures does water freeze and boil?
- **a.** It freezes at –10° and boils at 100°.
- **b.** It freezes at 32° and boils at 100°.
- **c.** It freezes at 0° and boils at 212°.
- **d.** It freezes at 32° and boils at 212°.
- **e.** It freezes at 0° and boils at 100°.

14. It is harder to stop a car moving at 60 miles per hour than a car moving at 15 miles per hour because the car moving at 60 miles per hour has more
- **a.** momentum.
- **b.** deceleration.
- **c.** mass.
- **d.** velocity.
- **e.** density.

15. What is the scientific notation for 617,000?
- **a.** 6.17×10^{-5}
- **b.** $.617 \times 10^{2}$
- **c.** $.617 \times 10^{3}$
- **d.** $.617 \times 10^{4}$
- **e.** 6.17×10^{5}

16. If you throw a baseball forward, it will accelerate downward because of
- **a.** orbital motion.
- **b.** terminal velocity.
- **c.** increase in resistance.
- **d.** Newton's third law of motion.
- **e.** gravity.

17. What type of rock is formed by the cooling of lava? (An example is granite.)
- **a.** metamorphic
- **b.** sedimentary
- **c.** igneous
- **d.** salt
- **e.** sandstone

18. One hundred centimeters equals how many kilometers?
- **a.** 0.001
- **b.** 0.01
- **c.** 0.1
- **d.** 1.0
- **e.** 10

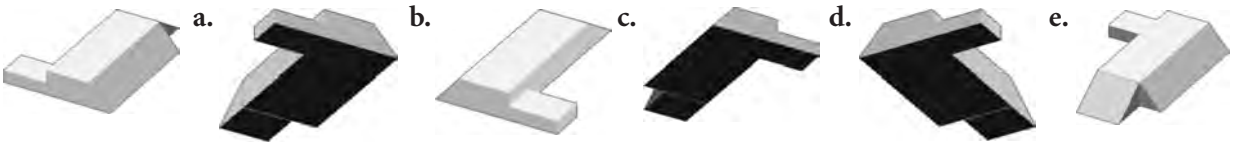
19. Which of the following contains fiber?
- **a.** chicken breast
- **b.** raspberries
- **c.** steak
- **d.** butter
- **e.** yogurt

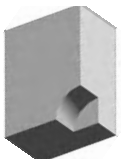
20. Which of the following ecosystems could be described as having a temperate climate and many leaf-shedding trees?
- **a.** a deciduous forest
- **b.** a tropical rain forest
- **c.** a tundra
- **d.** a taiga
- **e.** a prairie

Subtest 10: Rotated Blocks

Directions: This subtest measures your ability to visualize and manipulate objects in space. For each question in this test, you will be shown a picture of a block. You must find a second block that is identical to the first. You have thirteen (13) minutes to complete this subtest.

Questions: 15
Time: 13 minutes

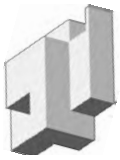
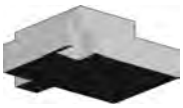
1. 

2.  a.  b.  c.  d.  e. 

3.  a.  b.  c.  d.  e. 

4.  a.  b.  c.  d.  e. 

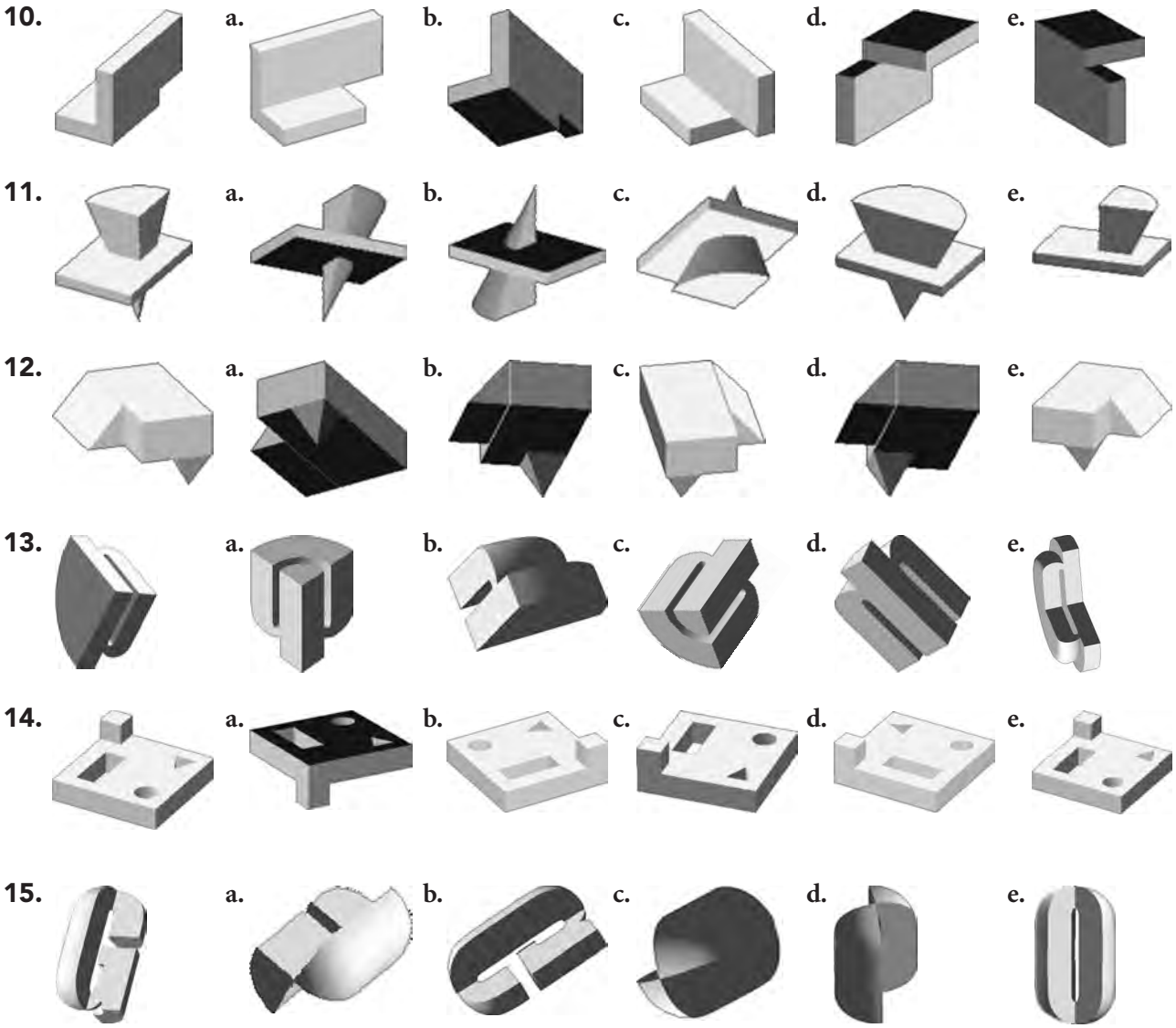
5.  a.  b.  c.  d.  e. 

6.  a.  b.  c.  d.  e. 

7.  a.  b.  c.  d.  e. 

8.  a.  b.  c.  d.  e. 

9.  a.  b.  c.  d.  e. 

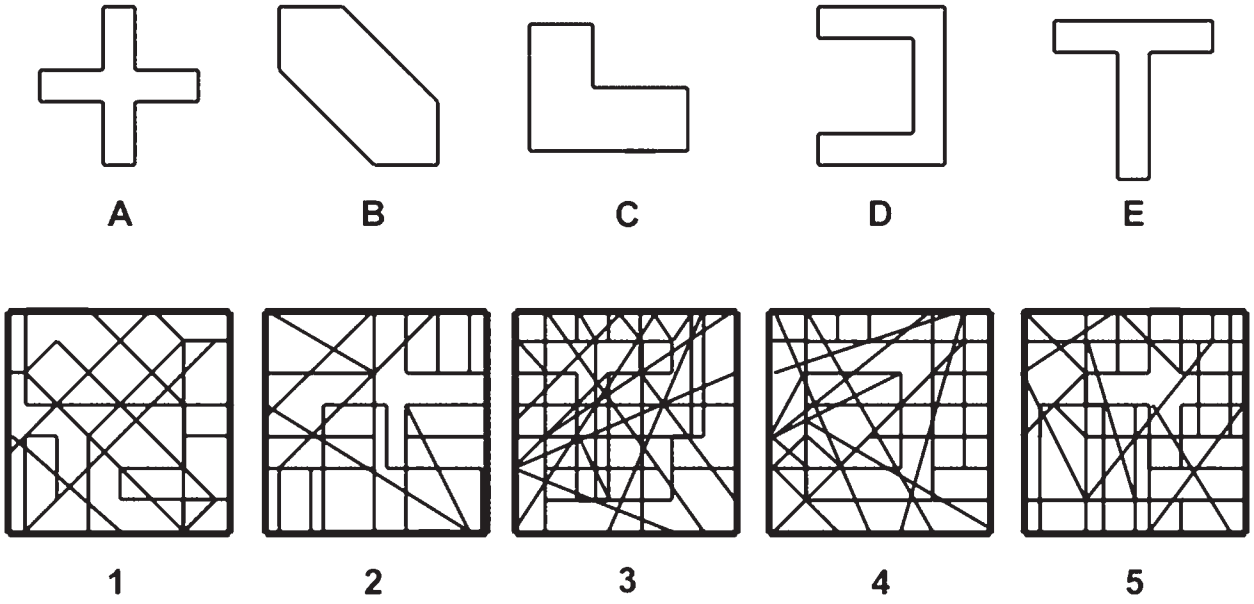


Subtest 11: Hidden Figures

Directions: This subtest measures your ability to see a simple figure in a complex drawing. Above each group of questions are five figures, lettered A, B, C, D, and E. Below this set of figures are several numbered drawings. You are to determine which lettered figure is contained in each of the numbered drawings. Each numbered drawing contains only *one* of the lettered figures. The correct figure in each drawing will always be of the same size and in the same position as it appears in the top set of figures. Look at each numbered drawing and decide which one of the five lettered figures is contained in it. You have eight (8) minutes to complete this subtest.

Questions: 15
Time: 8 minutes

Use the following figure to answer questions 1 through 5.



1. The hidden figure in block 1 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

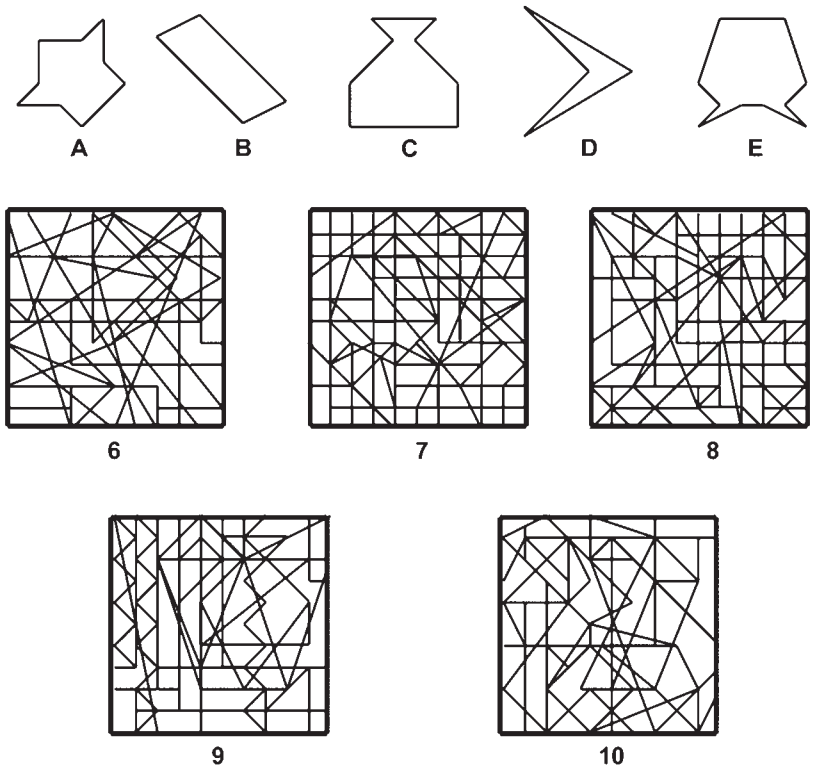
2. The hidden figure in block 2 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

3. The hidden figure in block 3 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

4. The hidden figure in block 4 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

5. The hidden figure in block 5 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

Use the following figure to answer questions 6 through 10.



6. The hidden figure in block 6 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

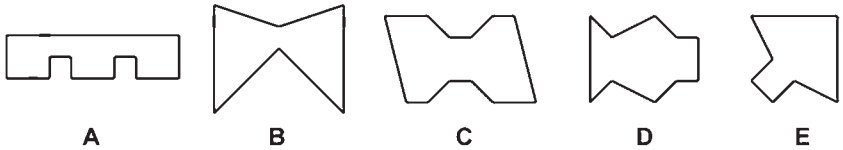
7. The hidden figure in block 7 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

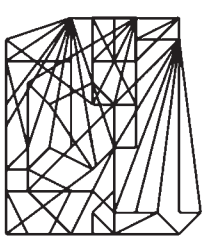
8. The hidden figure in block 8 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

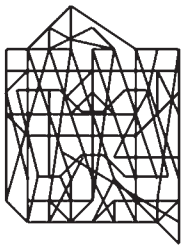
9. The hidden figure in block 9 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

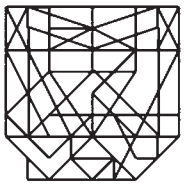
10. The hidden figure in block 10 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

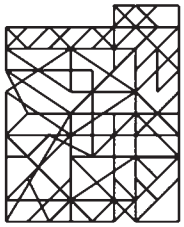
Use the following figure to answer questions 11 through 15.

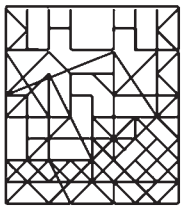



11


12


13


14


15

11. The hidden figure in block 11 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

12. The hidden figure in block 12 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

13. The hidden figure in block 13 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

14. The hidden figure in block 14 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

15. The hidden figure in block 15 is _____.
- **a.** A
- **b.** B
- **c.** C
- **d.** D
- **e.** E

Answer Key

Subtest 1: Verbal Analogies

1. **b.** *Coffee* goes into a *cup* and *soup* goes into a *bowl*. Choices **a**, **c**, and **e** are incorrect because they are other utensils. The answer is not choice **d** because the word *food* is too general.
2. **c.** A *bicycle* is put into motion by means of a *pedal*. A *canoe* is put into motion by means of an *oar*. The answer is not choice **a** or **e** because water does not necessarily put the canoe into motion. Kayak (choice **b**) is incorrect because it is a type of boat similar to a canoe. Choice **d** is incorrect because a fleet is a group of boats.
3. **d.** A *window* is made up of *panes*, and a *book* is made up of *pages*. The answer is not choice **a**, because a novel is a type of book. The answer is not choice **b**, because glass has no relationship to a book. Choices **c** and **e** are incorrect because a book is not made up of covers or indexes.
4. **b.** An *actor* performs in a *play*. A *musician* performs at a *concert*. Choices **a**, **c**, **d**, and **e** are incorrect because none include people who perform.
5. **e.** A group of *lions* is called a *pride*. A group of *fish* swim in a *school*. Teacher (choice **a**) and student (choice **b**) refer to another meaning of the word *school*. The answer is not choice **c** or **d** because self-respect and learning have no obvious relationship to this particular meaning of school.
6. **b.** *Elated* is the opposite of *despondent*; *enlightened* is the opposite of *ignorant*.
7. **a.** If someone has been *humiliated*, they have been greatly *embarrassed*. If someone is *terrified*, they are extremely *frightened*. Choice **e** may be related to a feeling of fright, but it is not an extreme emotion and therefore is not as good a match as choice **a**. The answer is not choice **b** because an agitated person is not necessarily frightened. Choices **c** and **d** are incorrect because neither word expresses a state of being frightened.
8. **d.** An *odometer* is an instrument used to measure *mileage*. A *compass* is an instrument used to determine *direction*. Choices **a**, **b**, **c**, and **e** are incorrect because none is an instrument.
9. **c.** *Fray* and *ravel* are synonyms, as are *jolt* and *shake*.
10. **c.** An *elephant* is a *pachyderm*; a *kangaroo* is a *marsupial*.
11. **a.** A *psychologist* treats a *neurosis*; an *ophthalmologist* treats a *cataract*.
12. **c.** Upon harvesting, *cotton* is gathered into *bales*; *grain* is gathered into *shocks*.
13. **a.** *Division* and *section* are synonyms; *layer* and *tier* are synonyms.
14. **d.** A *mechanic* works in a *garage*; a *surgeon* works in a *hospital*.
15. **c.** A *chickadee* is a type of *bird*; a *Siamese* is a type of *cat*.
16. **e.** To *saunter* is to *walk* slowly; to *drizzle* is to *rain* slowly.
17. **b.** To *tailor* a suit is to *alter* it; to *edit* a manuscript is to *alter* it.
18. **a.** *Jaundice* is an indication of a *liver* problem; *rash* is an indication of a *skin* problem.
19. **c.** *Obsession* is a greater degree of *interest*; *fantasy* is a greater degree of *dream*.
20. **e.** *Slapstick* results in *laughter*; *horror* results in *fear*.
21. **b.** *Verve* and *enthusiasm* are synonyms; *devotion* and *reverence* are synonyms.

22. a. A *conviction* results in *incarceration*; a *reduction* results in *diminution*.

23. b. Being *erudite* is a trait of a *professor*; being *imaginative* is a trait of an *inventor*.

24. d. *Dependable* and *capricious* are antonyms; *capable* and *inept* are antonyms.

25. c. *Hegemony* means *dominance*; *autonomy* means *independence*.

Subtest 2: Arithmetic Reasoning

1. c. Round 157 to 200 and round 817 to 800: $200 \times 800 = 160{,}000$.

2. d. It is important to remember to include all three telephone sets ($375 total), both computers ($2,600 total), and both monitors ($1,900 total) in the total value.

3. e. To solve this problem, you must convert $3\frac{1}{2}$ to $\frac{7}{2}$ and then divide $\frac{7}{2}$ by $\frac{1}{4}$. The answer, $\frac{28}{4}$, is then reduced to the number 14.

4. a. Cancel factors that are common to the numerator and denominator, then multiply: $\frac{5}{8} \times \frac{4}{7} = \frac{5}{(\cancel{4})(2)} \times \frac{\cancel{4}}{7} = \frac{5}{14}$

5. b. You cannot simply take 25% off the original price, because the 10% discount after three years of service is taken off the price that has already been reduced by 15%. Figure the problem in two steps: After the 15% discount, the price is $71.83. Another 10% off that gives you $64.65.

6. c. The problem is solved by dividing 204 by 1,700. The answer, 0.12, is then converted to a percentage—12%.

7. c. Use the equation $.05(1) = .02(x)$, where x is the total amount of water in the resulting 2% solution. Solving for x, you get 2.5. Subtracting the 1 liter of water already present in the 5% solution, you will find that 1.5 liters need to be added.

8. e. Each 9-foot wall has an area of 9(8), or 72 square feet. There are two such walls, so those two walls combined have an area of 144 square feet. Each 11-foot wall has an area of 11(8), or 88 square feet, and again there are two such walls: 88(2) = 176. Finally, add 144 and 176 to get 320 square feet.

9. e. Substituting 40 for C in the equation yields $F = (\frac{9}{5})(40) + 32 = 72 + 32 = 104$.

10. a. The woman will have traveled 3.5 hours at 45 miles per hour for a distance of 157.5 miles. To reach her in 3 hours, the man must travel at 157.5 miles per 3 hours, or 52.5 mph.

11. a. J = 6K. J + 2 = 2(K + 2), so 6K + 2 = 2K + 4, which means K equals $\frac{1}{2}$. J equals 6K, or 3.

12. e. The 827,036 bytes free on the flash drive plus 542,159 bytes freed when the file was deleted equals 1,369,195 bytes: 1,369,195 bytes minus 489,986 bytes put into the new file leaves 879,209 bytes free.

13. d. First, add the number of patients to find the total: 63. Then, divide the number of patients by the number of nursing assistants: 63 divided by 7 is 9.

14. c. Let E = emergency room cost; H = hospice cost, which is $\frac{1}{4}E$; N = home nursing cost, which is $2H$, or $2(\frac{1}{4})E$. The total bill is $E + H + N$, which is $E + \frac{1}{4}E + \frac{2}{4}E = 140{,}000$. Add the left side of the equation to get $\frac{7}{4}E = 140{,}000$. To solve for E, multiply both sides of the equation by $\frac{4}{7}$. $E = 140{,}000(\frac{4}{7})$, or 80,000. $H = \frac{1}{4}E$, or 20,000, and $N = 2H$, or 40,000.

15. b. If half the students are female, then you would expect half of the out-of-state students to be female. One-half of $\frac{1}{12}$ is $\frac{1}{24}$.

16. c. A foot in height makes a difference of 60 pounds, or 5 pounds per inch of height over 5′. A person who is 5′5″ is (5)(5 pounds), or 25 pounds, heavier than the person who is 5′, so add 25 pounds to 110 pounds to get 135 pounds.

17. d. The difference between 220 and this person's age is 190. The maximum heart rate is 90% of this: (0.9)(190) = 171.

18. e. An amount equaling 30 ppm of the pollutant would have to be removed to bring the 50 ppm down to 20 ppm (30 ppm is 60% of 50 ppm).

19. e. Let E = the estimate. One-fifth more than the estimate would be $\frac{6}{5}$, or 120%, of E, so 600,000 = (1.20)(E). Dividing both sides by 1.2 leaves E = 500,000.

20. b. In terms of grams, 250 milligrams is $\frac{250}{1000}$ gram, or 0.250 grams.

21. c. Three tons = 6,000 pounds. At 16 ounces per pound, 6,000 pounds = 96,000 ounces that can be carried by the truck. The total weight of each daily ration is 12 ounces + 18 ounces + 18 ounces = 48 ounces per soldier per day, and $\frac{96{,}000}{48}$ = 2,000. So $\frac{2{,}000}{10 \text{ days}}$ = 200 soldiers supplied.

22. e. Multiply the weight of each recyclable by the best price it will bring and add the amount together: 2,200(0.07) = $154;
$154 + 1,400(0.04) = $210;
$210 + 3,100(0.08) = $458;
$458 + $900(0.03) = $485.

23. d. The total number of miles, 3,450, divided by 6 days is 575 miles.

24. b. The present number of men, 30, multiplied by 42 square feet of space is 1,260 square feet of space; 1,260 square feet divided by 35 men is 36 square feet, so each man will have 6 square feet of space less.

25. c. Let T = Ted's age; S = Sam's age = $3T$; R = Ron's age = $\frac{S}{2}$, or $\frac{3T}{2}$. The sum of the ages is 55, which means $T + 3T + \frac{3T}{2} = 55$. To find the common denominator (2), you can add to the left side of the equation: T = 10. If Ted is 10, then Sam is 30, and Ron is $\frac{3T}{2}$, which is 15 years old.

Subtest 3: Word Knowledge

1. a. To be gauche is to lack social experience, grace, or aplomb; not tactful.

2. b. To enumerate is to ascertain the number of; to count.

3. c. To be triumphant is to rejoice in celebration of victory.

4. c. To be magnanimous is to be noble of mind or generous.

5. d. To have an aversion to something is to have a feeling of repugnance for it or to dislike it.

6. d. To be poignant means to be keenly distressing.

7. e. An antagonist is an opponent.

8. c. Perseverance means steadfast in one's course, or persistent.

9. a. Homogeneous means of the same or a similar kind; alike.

10. c. To be conspicuous is to be obvious to the eye or the mind.

11. d. A recluse is a person who lives withdrawn from the world; a hermit.

12. e. To tote something is to haul or carry it.

13. e. To be preeminent is to be outstanding or have supreme rank.

14. c. Something that is grotesque is distorted, misshapen, or bizarre.

15. c. To be outmoded is to be out-of-date or obsolete.

16. b. A statement that is garbled is scrambled and confusing, or unintelligible.

17. b. If something is frail, it is easily broken or delicate.

18. e. To be vindictive is to be vengeful or spiteful.

19. c. An oration is a formal speech or an address.

20. b. A glib remark is quick and insincere, or superficial.

21. e. To be eccentric is to be unconventional or peculiar.

22. a. A panacea is a remedy for all ills; a cure-all.

23. a. To be detrimental is to be obviously damaging and harmful.

24. b. To be ostentatious is to be showy or pretentious.

25. a. To be negligible is to be unimportant or insignificant.

Subtest 4: Math Knowledge

1. c. When a number is marked off in groups of two digits each, starting at the decimal point, the square root of the largest square in the left hand group, whether one or two digits, is the first digit of the square root of the number. In this case (11-20-92), 9 is the largest square in 11, and 3 is the square root of 9.

2. b. A proportion can find an unknown side of a figure using known sides of a similar figure; a proportion can also find an unknown side using known perimeters. $\frac{93}{24} = \frac{31}{s}$. Cross-multiply: $93s = (31)(24)$.

3. d. Perimeter uses a single measurement such as an inch to describe the outline of a figure. Area and surface area use square measurements, an inch times an inch, to describe two-dimensional space. Volume uses the largest measurement; it uses the cubic measurement, an inch times an inch times an inch. Volume is three-dimensional; its measurement must account for each dimension.

4. b. The circumference of a circle is two times the radius times pi. So, in this case, the distance is 2 times 49, times 22, divided by 7, or 308 miles.

5. a. First, change (B) and (C) to decimals: 5% = 0.05; $\frac{1}{5} = 0.2$. Then, find out which choice is true.

6. d. (B) and (C) are both equal to $n \times n$.

7. b. You are given the diameter, so use $C = \pi d$. Plug in the diameter and pi and multiply: $(3.14)(10) = 31.4$.

8. e. Obtuse angles are greater than 90°. Only one answer choice, **e**, is greater than 90°.

9. c. When dividing variables with exponents, if the variables are the same, you subtract the exponents to arrive at your answer: $\frac{n^5}{n^2} = \frac{n \cdot n \cdot n \cdot n \cdot n}{n \cdot n} = n^{5-2} = n^3$.

10. a. First, factor the radicand: $\sqrt{3n^2} = \sqrt{3 \cdot n \cdot n}$
Now take out the square root of the perfect square: $\sqrt{3 \cdot n \cdot n} = n\sqrt{3}$
You arrive at $n\sqrt{3}$, choice **a**.

11. c. This is a simple addition series. Each number increases by $\frac{1}{6}$.

12. b. *Volume* = 4.6 cubic feet. This is a square-based pyramid; its volume is a third of a cube's volume with the same base measurements, or $\frac{1}{3}bh$. Plug its measurements into the formula: $\frac{1}{3}$(2.4 ft.)2.4 ft.
Volume of square pyramid = $\frac{1}{3}$(5.76 sq. ft.) 2.4 ft. = $\frac{1}{3}$(13.824 cubic ft.) = 4.608 cubic ft.

13. c. In this question, $\frac{1}{5}$ of 820 = 164; 164 – 42 = 122.

14. e. Simplify the second term of the expression by factoring the radicand: $2\sqrt{7} - 3\sqrt{28} = 2\sqrt{7} - 3\sqrt{4 \cdot 7}$
Now simplify the radicand: $\sqrt{7} - 3\sqrt{4 \cdot 7} = 2\sqrt{7} - 3 \cdot 2\sqrt{7}$
Finally, combine like terms: $2\sqrt{7} - 6\sqrt{7} = -4\sqrt{7}$, choice **e**.

15. d. Divide numerical terms: $\frac{8xy^2}{2xy} = \frac{4xy^2}{xy}$.
When similar factors, or bases, are being divided, subtract the exponent in the denominator from the exponent in the numerator. $\frac{4xy^2}{xy} = 4x^{1-1}y^{2-1}$.
Simplify: $4x^0y^1 = 4(1)y = 4y$.
The answer is $4y$, choice **d**.

16. c. In this question, $\frac{2}{5}$ of 25 = 10; 10 – 6 = 4.

17. a. In this question, 4% of 20 = 0.8; $3 \times 0.8 = 2.4$.

18. c. First, solve for (A), (B), and (C): (A) = 49, (B) = 64, (C) = 15. Then, find out which choice is true.

19. d. The factorial of a positive integer is that integer times each of the integers between it and 1. In this case, 5 times 4 times 3 times 2 equals 120.

20. d. In this question, 15% of 30 = 4.5; 20 – 4.5 = 15.5, choice **d**.

21. a. The reciprocal of a number is that number divided into one. In this case, that is $\frac{1}{10}$, or 0.1.

22. b. First, set up the equation: $n + 2n = 99$. Then, solve: $3n = 99$; $n = 33$.

23. b. First, solve for (A), (B), and (C): (A) = 40, (B) = 40, (C) = 20. Then, find out which choice is true.

24. d. Using a proportion, find x: $\frac{12}{36} = \frac{4.5}{x}$. Cross-multiply: $12x = 36(4.5)$; $x = 13.5$. Polygon *CRXZ* is a rectangle whose sides measure 13.5, 54, 13.5, and 54. To find the perimeter of rectangle *CRXZ*, add the measures of its sides together.

25. a. You are given the radius, so use $C = 2\pi r$. Plug in the radius and pi and multiply: (2)(3.14)(22) = 157. So your answer is 157 cm, or 1.57 m, choice **a**.

Subtest 5: Instrument Comprehension

QUESTION	ANSWER	HEADING	PITCH	ROLL
1.	D	068° east-northeast	none	right
2.	C	090° east	none	left
3.	B	170° south	down	right
4.	A	235° southwest	up	right
5.	B	045° northeast	up	left
6.	C	270° west	none	none
7.	C	225° southwest	down	left
8.	B	270° west	up	left
9.	B	180° south	down	none
10.	B	270° west	up	left
11.	A	135° southeast	down	left
12.	A	270° west	down	right
13.	C	180° south	down	none
14.	C	255° west-southwest	up	left
15.	A	270° west	up	right
16.	A	045° northeast	up	right

17.	B	090° east	up	none
18.	A	180° south	down	right
19.	C	270° west	up	right
20.	D	180° south	up	left

Subtest 6: Block Counting

1. **b.** Block 1 touches three blocks: one block to the left, one block below, and one block to the right.
2. **b.** Block 2 touches three blocks: two blocks to the right and one block below.
3. **c.** Block 3 touches four blocks: one block above, one block below, and two blocks to the right.
4. **c.** Block 4 touches four blocks: one block above, one block to the left, and two blocks below.
5. **b.** Block 5 touches three blocks: two blocks to the left and one block below.
6. **b.** Block 6 touches three blocks: one block to the left, one block to the right, and one block below.
7. **e.** Block 7 touches four blocks: two blocks below, one block to the right, and one block above.
8. **d.** Block 8 touches five blocks: one block below, two blocks to the left, and one block above.
9. **c.** Block 9 touches four blocks: one block below, one block to the left, one block to the right, and one block above.
10. **d.** Block 10 touches five blocks: four blocks above and one block to the right.
11. **b.** Block 11 touches three blocks: one block below and two blocks to the right.
12. **e.** Block 12 touches six blocks: three blocks above, one block to the left, and two blocks below.
13. **e.** Block 13 touches six blocks: three blocks above, one block to the right, and two blocks below.
14. **d.** Block 14 touches five blocks: two blocks above, one block below, one block to the right, and one block to the left.
15. **b.** Block 15 touches three blocks: one block above and two blocks to the left.
16. **c.** Block 16 touches four blocks: two blocks above, one block to the left, and one block below.
17. **c.** Block 17 touches four blocks: one block above, one block to the left, and two blocks below.
18. **a.** Block 18 touches two blocks: one block to the right and one block below.
19. **a.** Block 19 touches two blocks: one block to the left and one block below.
20. **a.** Block 20 touches two blocks: one block above and one block to the right.

Subtest 7: Table Reading

1. **c.** The intersection of the –3 column with the 2 row yields an answer of 23.
2. **c.** The intersection of the 2 column with the –2 row yields an answer of 48.
3. **a.** The intersection of the –2 column with the 3 row yields an answer of 44.
4. **e.** The intersection of the 0 column with the –1 row yields an answer of 14.
5. **c.** The intersection of the 3 column with the 1 row yields an answer of 32.
6. **e.** The intersection of the 2 column with the –1 row yields an answer of 14.

7. d. The intersection of the 0 column with the 0 row yields an answer of 61.
8. e. The intersection of the –2 column with the –1 row yields an answer of 49.
9. e. The intersection of the –1 column with the 2 row yields an answer of 99.
10. b. The intersection of the 3 column with the 3 row yields an answer of 53.
11. b. The intersection of the –1 column with the –1 row yields an answer of 43.
12. a. The intersection of the –2 column with the 1 row yields an answer of 49.
13. a. The intersection of the –3 column with the 0 row yields an answer of 18.
14. e. The intersection of the 1 column with the 3 row yields an answer of 57.
15. b. The intersection of the –3 column with the –2 row yields an answer of 86.
16. a. The intersection of the –3 column with the –3 row yields an answer of 24.
17. a. The intersection of the 2 column with the 2 row yields an answer of 14.
18. d. The intersection of the –2 column with the 3 row yields an answer of 74.
19. e. The intersection of the –1 column with the 0 row yields an answer of 43.
20. c. The intersection of the 0 column with the 2 row yields an answer of 64.
21. b. The intersection of the 2 column with the –3 row yields an answer of 43.
22. b. The intersection of the –1 column with the 3 row yields an answer of 88.
23. b. The intersection of the 2 column with the 2 row yields an answer of 22.
24. c. The intersection of the –3 column with the 1 row yields an answer of 81.
25. d. The intersection of the 2 column with the 3 row yields an answer of 11.
26. c. The intersection of the 9 column with the –4 row yields an answer of 52.
27. a. The intersection of the –5 column with the 9 row yields an answer of 54.
28. b. The intersection of the –1 column with the –4 row yields an answer of 93.
29. a. The intersection of the –3 column with the 8 row yields an answer of 29.
30. e. The intersection of the 5 column with the –3 row yields an answer of 43.
31. e. The intersection of the 0 column with the 7 row yields an answer of 21.
32. e. The intersection of the 4 column with the –4 row yields an answer of 34.
33. e. The intersection of the 7 column with the –3 row yields an answer of 51.
34. b. The intersection of the –9 column with the 3 row yields an answer of 74.
35. d. The intersection of the 1 column with the –8 row yields an answer of 12.
36. c. The intersection of the 0 column with the 0 row yields an answer of 18.
37. b. The intersection of the –5 column with the 0 row yields an answer of 74.
38. c. The intersection of the –2 column with the 7 row yields an answer of 11.
39. a. The intersection of the –8 column with the 5 row yields an answer of 55.
40. b. The intersection of the –6 column with the 4 row yields an answer of 68.

Subtest 8: Aviation Information

1. d. The rudder is the control surface on the vertical stabilizer or tail. Any deflection of the rudder makes the aircraft move about the yaw, or vertical axis.
2. b. The elevator is the control surface on the horizontal stabilizer. Any deflection of the elevator makes the aircraft move about the pitch axis. The pitch axis runs from one wingtip to the other, passing through the aircraft's center of gravity.

3. c. The aileron is the control surface on the trailing edge of the wings. Any deflection of the aileron makes the aircraft move about the roll axis. The roll axis runs the length of the aircraft from nose to tail, passing through the center of gravity.

4. b. Pushing the right rudder pedal in causes the rudder control surface to move into the windstream to the right, which pushes the tail of the airplane left, and the nose of the airplane right.

5. a. *Angle of attack* is defined as the angle between the airfoil chord and the relative direction of motion.

6. c. *Drag* refers to the rearward force on an aircraft caused by air friction and lift. More specifically, *parasite drag* refers to the component of drag associated with friction, and *induced drag* refers to the component associated with lift.

7. a. *Camber* refers to the side (cross-section) view of a wing's shape. This shape causes the air to travel faster over the top portion of the wing and therefore causes lift.

8. e. Pulling back on the aircraft controls causes the elevators to be deflected up into the airstream, which pushes the tail of the aircraft down and the nose of the aircraft up.

9. b. Increasing the angle of attack of an aircraft will eventually cause a stall as the airflow over the wing detaches from the wing's surface.

10. b. One knot (nautical mile per hour) is equal to approximately $\frac{8}{7}$ of a mph (mile per hour). A nautical mile is approximately 6,080 feet, but a statute mile is approximately 5,280 feet. The ratio of these distances can be approximated with the ratio of 8:7. Therefore 100 knots is a faster speed than 100 mph.

11. c. Transponder codes are as follows:

Hijacking	7500
Loss of comms	7600
Emergency	7700

12. d. *Zulu time* refers to the time in Greenwich England, commonly known as *Greenwich Mean Time*. Zulu time is commonly used for aviation, especially when several time zones will be crossed.

13. a. The Pitot system measures airspeed by measuring the impact pressure of the relative wind and comparing it to the static pressure. The static system measures static pressure, which indicates altitude.

14. b. Pitch angle of an aircraft refers to the angle between the extended fuselage of the aircraft and the horizon. For example, an aircraft flying straight up would have a pitch angle of 90°.

15. a. A wing with flaps fully extended will generally produce more lift and more drag. The flaps increase the wing's camber, which causes more lift and more induced drag.

16. d. The wind flowing over a wing, which is creating lift, moves faster than the wind flowing beneath the wing. This increased velocity causes a lower air pressure on the top of the wing compared with the air pressure below the wing. This difference in air pressure is lift.

17. c. Airport runways are numbered according to the first two digits of compass heading, with the zero omitted for headings between 010 and 090.

18. c. Wake turbulence is caused by the higher-pressure air under a wing escaping in an outward direction from the wingtip to the lower-pressure air flowing above the wing. This escaping air will swirl upward, causing vortices, known as wake turbulence.

19. b. The port running lights are red; the starboard lights are green. Positional lights are white.

20. b. Mach 1 is the speed of sound for a given air density.

Subtest 9: General Science

1. c. Air consists of 78% nitrogen, 21% oxygen, and the remainder is made up of noble gases and rare earth elements.

2. c. Boyle's law states that for a given pressure, temperature and volume are directly proportional.

3. b. Ohm's law states that current and resistance are inversely proportional. Therefore, any increase in one would result in a corresponding decrease in the other.

4. a. Ultraviolet, x-ray, and gamma ray wavelengths are all shorter than visible light. Infrared wavelengths are slightly longer than visible light on the electromagnetic spectrum.

5. a. The pH scale ranges from 0 to 14. If a substance has a pH of 7.0, it is considered neutral; pH values of less than 7 indicate acids, and values greater than 7 are bases.

6. e. Protons are subatomic particles located in the nucleus of an atom and have positive electrical charges.

7. d. Vectors are defined by both length and direction.

8. c. The pancreas is the organ responsible for insulin production.

9. b. The four planets in our solar system that are considered gas giants are Jupiter, Saturn, Uranus, and Neptune.

10. c. Carbon dioxide, or CO_2, is made up of both carbon and oxygen.

11. c. The dissolved solution is in equilibrium with the undissolved in saturated solutions.

12. d. The molecule CH_3NH_2 contains one atom of carbon, one atom of nitrogen, and five atoms of hydrogen, for a total of seven atoms.

13. e. The Celsius scale is part of the metric system. On the Celsius scale, the freezing point of water is 0°; the boiling point is 100°.

14. a. Momentum equals mass (amount of matter in an object) times velocity (speed in a given direction).

15. e. To express a number in scientific notation, you move the decimal as many places as necessary until there is only one digit to the left of the decimal. For 617,000, you move the decimal to the left by five decimal places. The fact that you had to move it to the left means that the 10 should be raised to a positive power, so the result is 6.17×10^5.

16. e. Gravity pulls the ball downward as it moves forward.

17. c. Igneous rocks make up a group of rocks formed from the crystallization of magma (lava).

18. a. One hundred centimeters equals 1 meter, and 1,000 meters equals 1 kilometer.

19. b. Fiber is found only in plants. Raw vegetables, fruit with seeds, whole cereals, and bread are possible sources of fiber.

20. a. Deciduous forests are characterized by having mild temperatures and many trees that periodically shed leaves.

Subtest 10: Rotated Blocks

1. a.

2. a.

3. e.

4. c.

5. c.

6. d.

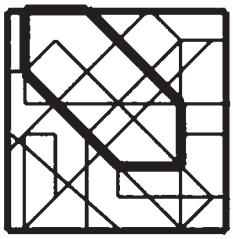
7. b.

8. c.

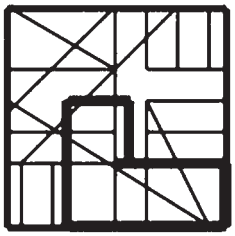
9. a.
10. b.
11. b.
12. a.
13. b.
14. a.
15. c.

Subtest 11: Hidden Figures

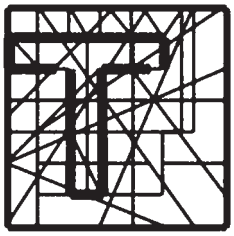
1. b.



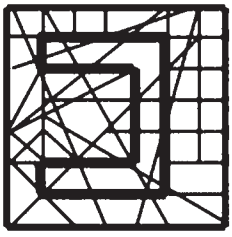
2. c.



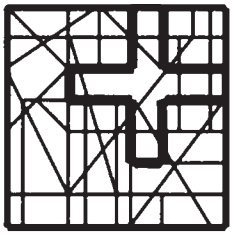
3. e.



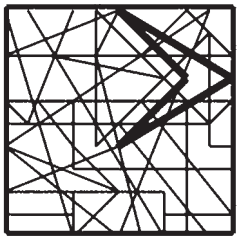
4. d.



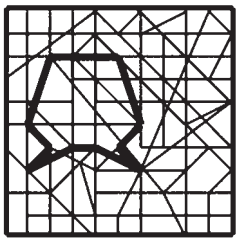
5. a.



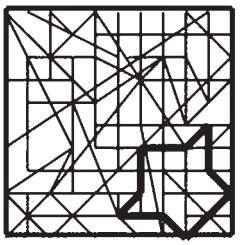
6. d.



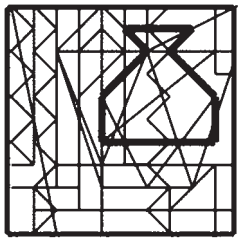
7. e.



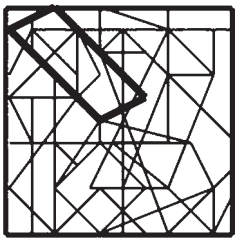
8. a.



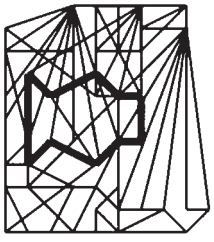
9. c.



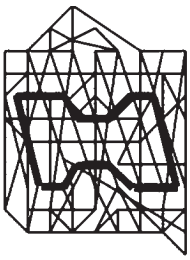
10. b.



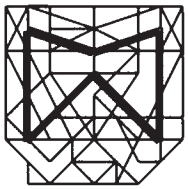
11. d.



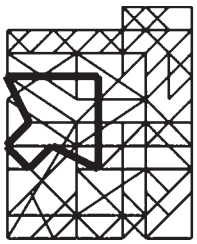
12. **c.**



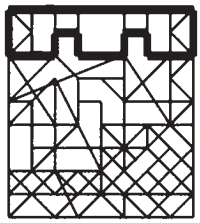
13. **b.**



14. **e.**



15. **a.**



For information on how the official AFOQT is scored, see Chapter 3.