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Digital SAT Prep Manual

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by Kimani Williams, PhD

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Note From The Author

Kimani Williams, PhD

Ever since I have known myself, I have been tutoring my friends and fellow students in academia. I have been blessed with a knack for simplifying what seems complicated to students. After high school, I left my home country of Jamaica to go to Macalester College, a small liberal arts college in Minnesota. After four wonderful years of Minnesota in the frigid tundra, it was time to return to a climate more favorable to a Jamaican, so I decided to further my studies by joining the PhD program in Electrical Engineering at the University of California, Santa Barbara. While working on my doctorate, I started tutoring part-time for a large test prep company. It so happens, that I am phenomenal at dramatically improving students' test scores. Soon, I was tutoring so many students that I began to feel more like a part-time PhD student and a full-time tutor.

After completing my PhD in Electrical Engineering, I decided to fully devote myself to my passion for teaching and tutoring, which led me to start my own company, Tutoring Machines, LLC. In my own microcosmic way, I am changing the world, one student at a time as I help students reach their goals through higher education.

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1.4

Finding the Purpose Homework



Finding the Purpose Drill 1

The following text is adapted from F. Scott Fitzgerald's 1925 novel *The Great Gatsby*. Nick Carraway, Gatsby's neighbor, is reminiscing about Saturday nights.

I spent my Saturday nights in New York because those gleaming, dazzling parties of his were with me so vividly that I could still hear the music and the laughter faint and incessant from his garden and the cars going up and down his drive. One night I did hear a material car there and saw its lights stop at his front steps. But I didn't investigate. Probably it was some final guest who had been away at the ends of the earth and didn't know that the party was over.

The following text is adapted from Herman Melville's 1851 novel *Moby-Dick*. Ishmael is introducing himself to the reader.

Call me Ishmael. Some years ago—never mind how long precisely—having little or no money in my purse, and nothing particular to interest me on shore, I thought I would sail about a little and see the watery part of the world. It is a way I have of driving off the spleen and regulating the circulation.

In 1969, during the height of the Cold War, the United States and the Soviet Union engaged in an unexpected display of cooperation. The Apollo-Soyuz Test Project marked the first international human spaceflight mission, where American astronauts and Soviet cosmonauts rendezvoused in orbit, symbolizing a brief thaw in superpower tensions. This historic event showcased the potential for collaboration in space exploration, laying the groundwork for future international missions and fostering peaceful relations amid a turbulent era.

1

Which choice best states the main idea of the text?

- A. Carraway has a vivid imagination.
- B. Carraway avoided attending the parties because of his shyness.
- C. Carraway was an avid music lover.
- D. Carraway stayed in New York because of the extravagant parties.

2

Which choice best states the main purpose of the text?

- A. To explain why Ishmael is going off to sea.
- B. To show Ishmael's interest in money.
- C. To show that Ishmael is easily bored.
- D. To explain the importance of traveling.

3

Which choice best describes the overall structure of the text?

- A. It introduces a project, then dismisses it.
- B. It provides historical context of an event, then discusses its implications.
- C. It explains the reason for the countries' cooperation, then expands on their demise.
- D. It shows the importance of cooperation, then explains the roles of astronauts.

The following text is from William Wordsworth's 1807 poem "I Wandered Lonely as a Cloud."

For oft, when on my couch I lie
In vacant or in pensive mood,
They flash upon that inward eye
Which is the bliss of solitude;
And then my heart with pleasure fills,
And dances with daffodils.

1984 is a 1949 novel by George Orwell. In the novel, Orwell depicts the government, led by the Party, as exercising absolute control over every aspect of people's lives: _____

4

Which choice best describes the function of the underlined portion in the text as a whole?

- A. It highlights the speaker's obsession with nature.
- B. It portrays the surroundings as a serene scene.
- C. It conveys the speaker's ability to lift his mood as he refers to the daffodils.
- D. It draws a contrast between the speaker's dancing and the daffodils' dancing.

5

Which quotation from *1984* most effectively illustrates the claim?

- A. "Who controls the past controls the future. Who controls the present controls the past."
- B. "The Party seeks power entirely for its own sake. We are not interested in the good of others; we are interested solely in power, pure power."
- C. "The Party, which had come into power by promising to bring liberty and equality to all, had ended by establishing a monolithic dictatorship that existed for its own sake."
- D. "The telescreen received and transmitted simultaneously. Any sound that Winston made, above the level of a very low whisper, would be picked up by it; moreover, so long as he remained within the field of vision which the metal plaque commanded, he could be seen as well as heard (by the Party)."

In 1897, the British physicist J.J. Thomson introduced the concept of the “plum pudding” model of the atom, suggesting that electrons were scattered throughout a positively charged sphere like plums in a pudding. This notion laid the foundation for our understanding of atomic structure but remained theoretical for decades. It wasn’t until 1911 when Ernest Rutherford conducted his famous gold foil experiment that we gained experimental evidence for the existence of a small, dense nucleus at the center of the atom.

The following text is adapted from Louisa May Alcott’s 1868 novel *Little Women*. Four sisters are talking amongst themselves.

“Christmas won’t be Christmas without any presents,” grumbled Jo, lying on the rug. “It’s so dreadful to be poor!” sighed Meg, looking down at her old dress. “I don’t think it’s fair for some girls to have plenty of pretty things, and other girls nothing at all,” added little Amy, with an injured sniff. “We’ve got Father and Mother, and each other,” said Beth contentedly from her corner.

The following text is from Edgar Allan Poe’s 1845 poem “The Raven.”

But the Raven, sitting lonely on the placid bust, spoke only
That one word, as if his soul in that one word he did outpour.
Nothing farther then he uttered—not a feather then he fluttered—
Till I scarcely more than muttered “Other friends have flown
before—
On the morrow he will leave me, as my Hopes have flown before.”
Then the bird said “Nevermore.”

6

Which choice best states the main idea of the text?

- A. Other scientists were skeptical about J.J. Thomson’s “plum pudding” model of the atom, even though it was widely accepted.
- B. The discovery of the nucleus was made in the late 19th century, earlier than 1911.
- C. Although there was an understanding of the atom, it was later proven experimentally by Rutherford.
- D. J.J. Thomson was not only a scientist but also a baker.

7

Which choice best states the main purpose of the text?

- A. To express disappointment about the family’s financial situation.
- B. To show that girls are materialistic.
- C. To assert that the sisters wish other girls not have pretty things.
- D. To establish that the sisters have conflicting wishes.

8

Which choice best describes the overall structure of the text?

- A. The speaker engages a raven, then receives an ominous message from the bird.
- B. The speaker describes the raven, then reveals his excitement for the visitor.
- C. The speaker questions the presence of the raven, then wishes it gone.
- D. The speaker discovers he is lonely, then speaks to a bird.



2.4

Punctuation and Sentence Structure Homework



Punctuation and Sentence Structure Drill 1

The two immigrant authors were not pleased with the lack of character diversity in children’s books. These authors decided to establish an online library with a catalog of _____ specializes in stories that are told from diverse perspectives suitable for children.

American novelist Toni Morrison won the National Book Critics Circle Award for her critically acclaimed *Song of Solomon* _____ her contribution to the literary world, Ohio’s governor Mike Dewine signed into law a legislative bill that declared February 18, her birthday, as Toni Morrison Day.

The author Ernest Hemingway began as a writer of short stories. This allowed him to develop a minimalistic style of writing that he coined the Iceberg Theory—a writing technique that focuses on surface elements without explicitly discussing underlying themes. His 1952 novel _____ tells the story of Santiago, a Cuban fisherman who struggles with a giant marlin off the coast of Cuba. This novel highlighted his writing style and won the Pulitzer Prize for Fiction in 1953.

1

Which choice completes the text so that it conforms to the conventions of Standard English?

- A. books,
- B. books that
- C. books
- D. books, that

2

Which choice completes the text so that it conforms to the conventions of Standard English?

- A. novel, recognizing
- B. novel and recognizing
- C. novel recognizing
- D. novel. Recognizing

3

Which choice completes the text so that it conforms to the conventions of Standard English?

- A. *The Old Man and the Sea*—
- B. *The Old Man and the Sea*,
- C. *The Old Man and the Sea*
- D. *The Old Man and the Sea*:

During the Victorian Era (1837 to 1901), many writers explored the rapid cultural and technological changes Britain was experiencing: Britain was transforming from a rural, agricultural society into an urban, industrial one. These writers were not the first to explore _____ some of the most prominent writers from the earlier Georgian Era also delved into the influences of industrialization.

Semiconductor technology uses different materials to control the flow of electricity in electronic devices. Researchers have commonly used the chemical _____ for this technology because it has the conductive properties of metal as well as those of an insulator, so silicon dioxide can conduct and block electricity. This feature is essential in the manufacturing of electronic devices.

Evidence of magnetoreception in humans suggests that humans have a subconscious ability to respond to the Earth's magnetic _____ study carried out by geoscientists and neurobiologists at Caltech and the University of Tokyo has proven that the human brain responds to changes in the Earth's magnetic fields on a subconscious level.

4

Which choice completes the text so that it conforms to the conventions of Standard English?

- A. industrialization, however
- B. industrialization, however,
- C. industrialization, however;
- D. industrialization; however,

5

Which choice completes the text so that it conforms to the conventions of Standard English?

- A. compound silicon dioxide
- B. compound, silicon dioxide
- C. compound silicon dioxide,
- D. compound, silicon dioxide,

6

Which choice completes the text so that it conforms to the conventions of Standard English?

- A. field: a
- B. field, a
- C. field while a
- D. field a

Marie Curie, a naturalized French physicist, is remembered mostly for her discovery of the radioactive elements radium and polonium. Curie's subsequent career would involve more than just this _____ during the First World War, she worked to develop small, mobile X-ray units that could be used to diagnose soldiers' injuries near the battlefield. She was credited with saving many lives throughout the war.

Jeffrey Koons is an American artist who is recognized for his sculptures depicting everyday objects. His artworks have been known to sell for substantial amounts of money. In 2013, the sculpture, *Balloon Dog*, sold for over 58 million _____ in 2019, his artwork, *Rabbit*, sold for over 91 million dollars.

In assessing the films of Canadian director James Cameron, _____ have missed his fascination with strong female characters and romantic subplots.

7

Which choice completes the text so that it conforms to the conventions of Standard English?

- A. discovery, though,
- B. discovery, though:
- C. discovery. Though,
- D. discovery though

8

Which choice completes the text so that it conforms to the conventions of Standard English?

- A. dollars later,
- B. dollars;
- C. dollars,
- D. dollars, later

9

Which choice completes the text so that it conforms to the conventions of Standard English?

- A. Cameron's obsession with nature has been the focus of many critics, who
- B. there are many critics who have focused on Cameron's obsession with nature, but they
- C. the focus of many critics has been on Cameron's obsession with nature; they
- D. many critics have focused on Cameron's obsession with nature but



3.7

Advanced Functions Homework



Advanced Functions Drill 1

55

Which of the following is an example of a function whose graph in the xy -plane intersects the x -axis twice?

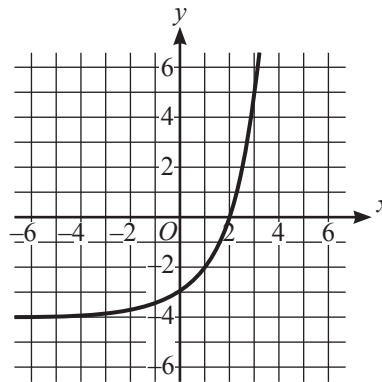
- A. A quadratic function with two real zeros
- B. A quadratic function with one real zero
- C. A quadratic function with no real zeros
- D. A quadratic function with three real zeros

56

The number of bacteria in a solution triples every day. There are 40,000 bacteria in the solution at the start of an observation. Which represents the number of bacteria, y , in the solution t days after the start of the observation?

- A. $y = \frac{1}{3}(40,000)^t$
- B. $y = 3(40,000)^t$
- C. $y = 40,000\left(\frac{1}{3}\right)^t$
- D. $y = 40,000(3)^t$

57



The graph of $y = 2^x + b$ is shown, where b is a constant. What is the value of b ?

- A. -4
- B. -3
- C. 3
- D. 4

58

$$x^2 - 4x + c = 0$$

In the given equation, c is a constant. If the equation has exactly one solution, what is the value of c ?

- A. -2
- B. 0
- C. 1
- D. 4

59

The exponential function g is defined by $g(x) = 8(a^x)$, where x is a positive constant. If $g(3) = 1,728$, what is the value of $g(4)$?

60

The function $f(t) = 50,000(2)^{\frac{t}{420}}$, gives the number of bacteria in a population t minutes after an initial observation. How much time, in minutes, does it take for the number of bacteria in the population to double?

61

Each year, the value of an investment increases by 0.29% of its value the previous year. Which of the following functions best models how the value of the investment changes over time?

- A. Decreasing exponential
- B. Decreasing linear
- C. Increasing exponential
- D. Increasing linear

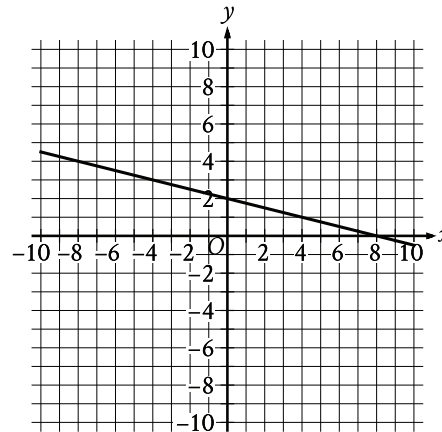
62

$$f(x) = a(x - b)(x - c)$$

For the quadratic function f shown, a , b , and c are constants. For the graph of $y = f(x)$ in the xy -plane, the quadratic function f opens downward, and the coordinates of its vertex are both positive. Which of the following could be true?

- A. $a < 0, b < 0, c < 0$
- B. $a < 0, b > 0, c > 0$
- C. $a > 0, b < 0, c < 0$
- D. $a > 0, b > 0, c > 0$

63



The graph of $y = f(x)$ is shown. Which equation defines function $f(x) + 4$?

- A. $f(x) = -\frac{1}{4}x - 2$
- B. $f(x) = -\frac{1}{4}x + 6$
- C. $f(x) = -\frac{1}{4}x + 2$
- D. $f(x) = -\frac{1}{4}x + 8$



Advanced Functions Drill 2

64

For the function n , the value of $n(x)$ decreases by 35% for every increase in the value of x by 1. If $n(0) = 12$, which equation defines n ?

- A. $n(x) = 0.65(12)^x$
- B. $n(x) = 1.35(12)^x$
- C. $n(x) = 12(0.65)^x$
- D. $n(x) = 12(1.35)^x$

65

The function f is a linear function. The y -intercept of the graph of $y = f(x)$ in the xy -plane is $(0, -10)$. What is the y -intercept of the graph of $y = f(x) + 2$?

- A. $(0, -12)$
- B. $(0, -8)$
- C. $(-2, -10)$
- D. $(2, -10)$

66

In the xy -plane, the graph of function f has x -intercepts at -7 , -5 , and 2 . Which of the following could define f ?

- A. $f(x) = (x + 7)(x + 5)(x - 2)$
- B. $f(x) = (x + 7)(x - 5)(x - 2)$
- C. $f(x) = (x - 7)(x - 5)(x + 2)$
- D. $f(x) = (x - 7)(x + 5)(x + 2)$

67

A scientist initially measures 6,000 bacteria in a growth medium. 3 hours later, the scientist measures 48,000 bacteria. Assuming exponential growth, the formula $G = A(2)^{rt}$ gives the number of bacteria in the growth medium, where r and A are constants and G is the number of bacteria t hours after the initial measurement. What is the value of r ?

- A. 1
- B. 3
- C. 8
- D. 6,000