SAT Math Practice Test (Calculator)

Time – 55 minutes
37 Questions

Download and print an answer sheet available at ivyglobal.com/study.

**Directions:** For these questions, determine the solution to each problem presented and choose the best answer choices of those provided. Be sure to fill in the respective circle on your answer sheet. Any free space may be used to work out any problems, should you need space for scratchwork.

1. A biochemist is counting the number of cells in a sample using a square grid. If he counts 15 cells in one square, which of the following is the best estimate for the total number of cells in \( n \) squares?
   (A) \( \frac{15}{n} \)
   (B) \( 15n \)
   (C) \( 225n \)
   (D) \( 15n^2 \)

2. Which graph could represent the function \( y = -2x + 1 \)?
   (A) \[\text{Graph A}\]
   (B) \[\text{Graph B}\]
   (C) \[\text{Graph C}\]
   (D) \[\text{Graph D}\]

There are 360° in a circle.
The sum of the angles in a triangle is 180°.

Special Triangles
- \( A = \frac{1}{2} bh \)
- \( a^2 + b^2 = c^2 \)

Reference

There are 360° in a circle.
The sum of the angles in a triangle is 180°.
3. If \( f(x) = \frac{1000}{x - 20} \), what is \( f(10) \)?

(A) \(-100\)  
(B) \(-102\)  
(C) \(-120\)  
(D) \(-1200\)

4. In the equation above, what is the value of \( x \) if \( y \) is equal to 10?

(A) 0  
(B) 7.5  
(C) 10  
(D) 17.5

5. There are 6 blue marbles, 3 yellow marbles, and 4 red marbles in a jar. John randomly draws 2 marbles without replacing them. What is the probability that both of these marbles are blue?

(A) \(\frac{30}{169}\)  
(B) \(\frac{3}{13}\)  
(C) \(\frac{5}{26}\)  
(D) \(\frac{12}{13}\)

6. Which of the following describes the solution set for the system of equations above?

\[
\begin{align*}
10x - 2y + 3 &= 11 \\
y &= 5x - 4
\end{align*}
\]

(A) There are zero solutions.  
(B) There is one solution.  
(C) There are two solutions.  
(D) There are infinite solutions.
7. If \((x + 20)^2 = (70 - x)^2\), what is the value of \(x\)?

(A) 5  
(B) 25  
(C) 45  
(D) 90

8. The scatterplot above shows the cumulative distances travelled by two truck drivers over a 10-hour period. What is the difference between the average speeds of the two drivers over this time period?

(A) 10 miles per hour  
(B) 20 miles per hour  
(C) 30 miles per hour  
(D) 50 miles per hour

9. Which of the following is equal to \((3x - 5)^2\)?

(A) \(9x^2 - 25\)  
(B) \(9x^2 - 15x + 25\)  
(C) \(9x^2 - 30x - 25\)  
(D) \(9x^2 - 30x + 25\)

10. The element palladium has a density of \(12 \text{ g/cm}^3\). What is the volume in cubic centimeters of 2.4 kilograms of palladium? (Density is equal to mass divided by volume.)

(A) \(0.2 \text{ cm}^3\)  
(B) \(28.8 \text{ cm}^3\)  
(C) \(200 \text{ cm}^3\)  
(D) \(2880 \text{ cm}^3\)
11. If $1.5x + 2y = 58$ and $x + y = 34$, what is the value of $x$?

(A) 10
(B) 20
(C) 30
(D) 58

12. A group of scientists in an observatory catch, tag, and then release 50 butterflies. The next day, they catch 100 butterflies and observe that 10 of them are tagged. Which of the following is the best estimate for the total number of butterflies at the observatory?

(A) 140
(B) 150
(C) 200
(D) 500

13. If $a^7 \times a^x = (a^2)^4$, what is the value of $x$?

(A) -1
(B) 1
(C) 6
(D) $\frac{6}{7}$

14. How many times faster is the top speed of a cheetah than the top speed of a seahorse, according to the table above?

(A) 48
(B) 800
(C) 80,000
(D) 480,000
15. Which of the following could be a value for $x$ in the equation above?

(A) $-4$
(B) $0$
(C) $2$
(D) $4$

16. What is the distance between the points $(-2, 5)$ and $(5, 12)$ in the $xy$-plane?

(A) $7$
(B) $7\sqrt{2}$
(C) $\sqrt{58}$
(D) $14$

17. A chemist has an experiment that requires a solution made of 80 μL of hydrochloric acid and 10 mg of magnesium oxide. If the chemist uses 300 mg of magnesium oxide, how many milliliters of the hydrochloric acid solution does she need? (1 L = 1,000,000 μL).

(A) 2.4 mL
(B) 24 mL
(C) 240 mL
(D) 2,400 mL

18. A car is travelling at an average speed of 50 miles per hour, and the distance from its starting point to its destination is 600 miles. Which function models the remaining distance, in miles, to be travelled after $t$ hours of travel?

(A) $f(t) = 12t$
(B) $f(t) = 50t$
(C) $f(t) = 600 + 50t$
(D) $f(t) = 600 - 50t$
19. Which of the following points in the xy-plane could be a solution to the inequality above?

(A) (−1, −5)
(B) (−1, −2)
(C) (1, −2)
(D) (3,2)

20. Stacey’s recipe can bake 42 cookies with one gallon of milk. Milk costs $2.40 per gallon. How many cookies can Stacey bake with $10 worth of milk?

(A) 100 cookies
(B) 125 cookies
(C) 150 cookies
(D) 175 cookies

21. What is the value of \( g(f(23)) \)?

(A) \( \frac{22}{3} \)
(B) \( \frac{26}{3} \)
(C) 12
(D) 13

22. A random group of people were surveyed about their opinion on building a new bridge in their city, and the results are shown above. If there are a total of 700 people in the city, which of the following is the best estimate for the total number of people in the city who would be in favor of building the new bridge?

(A) 263
(B) 350
(C) 361
(D) 467
23. In the system of equations above, what is the value of \( x + y \)?

(A) 4  
(B) 8  
(C) 9  
(D) 10

24. The function graphed above is defined by the function \( f(x) = (x + 2)(x - 2)(x + a) \). What is the value of \( a \)?

(A) \(-1\)  
(B) \(0\)  
(C) \(1\)  
(D) \(2\)

25. What is the shortest distance between Points \( A \) and \( B \) in the figure above?

(A) \(\frac{200\sqrt{3}}{3}\) m  
(B) \(100\sqrt{3}\) m  
(C) \(200\sqrt{3}\) m  
(D) \(400\) m

26. For what values of \( x \) is \( f(x) \) positive?

(A) \(x < -2\)  
(B) \(x < 7\)  
(C) \(x < -7, x > 2\)  
(D) \(x > -7\)
27. The standard deviation of two groups of data is summarized in the table above. Which of the following statements is true?

(A) Group A has a smaller standard deviation than Group B because there are fewer data points.
(B) The difference in standard deviation between the two groups is not statistically significant.
(C) The data points of Group B are farther from their mean on average than the data points of Group A.
(D) Group B’s data points have a larger range than Group A’s data points.

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Deviation</td>
<td>2.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Number of Data Points</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>

28. If $i^2 = -1$, what is the value of $(2i + 2)(2i - 4)$?

(A) $-12$
(B) $-4i - 12$
(C) $-8$
(D) $-4i - 8$

29. According to the table above, what was the city’s population in the year 2000?

(A) 3,000 people
(B) 4,500 people
(C) 22,222 people
(D) 45,000 people

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP</th>
<th>GDP per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>$120 million</td>
<td>$32,000</td>
</tr>
<tr>
<td>2000</td>
<td>$135 million</td>
<td>$30,000</td>
</tr>
<tr>
<td>2010</td>
<td>$147 million</td>
<td>$28,000</td>
</tr>
</tbody>
</table>

30. What was the city’s percent increase in population between 1990 and 2010?

(A) 1.67%
(B) 16.67%
(C) 30.00%
(D) 40.00%
31. If \( x = 2 \), what is a positive value of \( y \) that satisfies the inequality above?

\[ y + 3x < 10 \]

32. Phone Plan A charges a flat rate of $20 per month plus 40 cents per minute. Phone Plan B charges $10 plus 50 cents per minute. If Tess uses the same number of minutes each month, she pays the same amount of money on either plan. How many minutes does Tess use each month?

33. If \( \frac{p}{3} - 5 = \frac{q}{4} \), what is the value of \( 4p - 3q \)?

34. Adam, Bella, Carlos, Diana, and Eric run a race. If Carlos and Diana finish in the first two places and there are no ties, what is the total number of possible outcomes of the race?
35. In the equation above, what is the value of $m$?

\[
\frac{10 - (m - 2)}{4} = \frac{3(m + 6)}{8}
\]

36. A farmer is creating a rectangular fenced-in pasture for his cattle that is twice as long as it is wide. Fencing costs $4 per meter. If the whole fence costs $2,400, how many meters is the pasture’s longest side?

37. Many countries use progressive tax systems for income like the one summarized in the chart above. Using this chart, a person making $50,000 per year would be taxed at 10% for their first $30,000 and 14% for their next $20,000.

**PART 1**
Liu makes $75,000 per year. According to the progressive system in the chart above, how much income tax would Liu pay per year, in dollars?

**PART 2**
In Kristof’s country, he pays a fixed tax of 14% on his entire income. Kristof makes $80,000 per year. How much more yearly income tax would Kristof pay in his country than in a country that uses the progressive system in the chart above?

**STOP**
If you complete the problem set before time elapses, you may review your responses for this section.

Do not view or begin working on any other sections.