

SAT Math Skills Diagnostic

20 questions · 35 minutes · Calculator allowed

Form D1 | Student edition

Work independently. You may use a calculator (including Desmos) and scratch paper. Do not use AI, search for solutions, or ask someone for help.

Choose one answer per question. Mark X for any unanswered question so a skipped question is recorded honestly. Stop at 35 minutes; report any extra time or outside help if you used it.

This original, nonadaptive diagnostic emphasizes medium and hard questions. Difficulty labels are editorial estimates, not calibrated College Board ratings. It identifies skills to review; it is not an official SAT test or a predicted 200-800 score.

Your results will help Aaron prioritize course lessons. A single missed question is a signal to investigate, not proof that you have not mastered a topic.

Name / signup email: _____

Start time: _____ End time: _____

Q01

If $3(2x - 5)/4 - (x + 1)/2 = 7$, what is x ?

- A. $7/4$
- B. $45/4$
- C. $23/4$
- D. 15

Q02

The equations $3x + 2y = 34$ and $5x - 2y = 30$ are both true. What is $x - y$?

- A. -3
- B. 5
- C. 3
- D. 8

Q03

For what value of k does the system $4x - 6y = 10$ and $2kx - 9y = 12$ have no solution?

- A. 3
- B. 2
- C. $5/2$
- D. 6

Q04

The function f is linear. If $f(2) = 9$ and $f(8) = -3$, what is $f(-1)$?

- A. 3
- B. 7
- C. 11
- D. 15

Q05

A study center charges a one-time registration fee of \$18 and \$6 for each session. A student can spend at most \$80 in total. What is the greatest number of sessions the student can attend?

- A. 9
- B. 10
- C. 11
- D. 13

Q06

Line l passes through $(2, 7)$ and is parallel to the line $3x - 4y = 8$. What is the x -coordinate of the x -intercept of line l ?

- A. $22/3$
- B. -2
- C. $-11/2$
- D. $-22/3$

Q07

The system $ax + 12y = 18$ and $5x + by = 15$ has infinitely many solutions. What is $a + b$?

- A. 11**
- B. 15**
- C. 16**
- D. 22**

Q08

What is the minimum value of $f(x) = 2x^2 - 12x + 25$?

- A. 7**
- B. 3**
- C. 25**
- D. -11**

Q09

The equation $x^2 + (k - 2)x + 9 = 0$ has exactly one real solution. If $k > 2$, what is k ?

- A. -4
- B. 4
- C. 6
- D. 8

Q10

For x not equal to 3, $(x^2 - 9)/(x - 3) = 2x - 1$. What is x ?

- A. 2
- B. 4
- C. 3
- D. -4

Q11

What is the real solution of $\sqrt{3x + 4} = x$?

- A. -1
- B. 1
- C. 4
- D. Both -1 and 4

Q12

A substance decays exponentially at a constant percentage rate. Its mass is 640 grams at $t = 0$ hours and 80 grams at $t = 3$ hours. Which function gives its mass $M(t)$, in grams?

- A. $640(1/2)^t$
- B. $640(1/8)^t$
- C. $640 - (560/3)t$
- D. $80(1/2)^t$

Q13

The equation $x^2 - 10x + c = 0$ has two positive real solutions that differ by 4. What is c ?

- A. 9
- B. 16
- C. 25
- D. 21

Q14

$P(x) = (x - a)(x + 2)$, where a is a constant. If $P(1) = -12$, what is $P(0)$?

- A. 10
- B. -10
- C. -8
- D. -6

Q15

A container holds 8 liters of a solution that is 30% acid by volume. Only water is added until the solution is 20% acid by volume. Assuming volumes add, how many liters of water were added?

- A. 2**
- B. 2.4**
- C. 4**
- D. 12**

Q16

Data set A has a standard deviation of 4. Data set B is formed by multiplying every value in A by 3 and then adding 7. What is the standard deviation of B?

- A. 4**
- B. 7**
- C. 19**
- D. 12**

Q17

A workshop has 60 morning participants and 60 afternoon participants. Of these, 42 morning participants and 36 afternoon participants pass an assessment. One of the participants who passed is selected at random. What is the probability that this participant attended in the morning?

- A. $\frac{7}{13}$
- B. $\frac{7}{20}$
- C. $\frac{1}{2}$
- D. $\frac{3}{5}$

Q18

A circle in the xy -plane has equation $x^2 + y^2 - 6x + 8y = 11$. What is its radius?

- A. $\sqrt{11}$
- B. 6
- C. 5
- D. 36

Q19

In a right triangle, the altitude from the right-angle vertex to the hypotenuse divides the hypotenuse into segments of lengths 9 and 16. What is the length of the altitude?

- A. 12
- B. 7
- C. 15
- D. 25

Q20

In a right triangle, an acute angle θ has $\tan(\theta) = \frac{3}{4}$. The leg opposite θ has length $x + 4$, and the leg adjacent to θ has length $2x + 1$. What is the length of the hypotenuse?

- A. 13
- B. 17.5
- C. 14
- D. 24.5

Answer record

Enter A, B, C, or D for each question. Use X for unanswered questions.

Question	Answer	Question	Answer
Q01		Q11	
Q02		Q12	
Q03		Q13	
Q04		Q14	
Q05		Q15	
Q06		Q16	
Q07		Q17	
Q08		Q18	
Q09		Q19	
Q10		Q20	

For online submission: combine your 20 letters in question order, with no spaces. Keep X in the position of every unanswered question.

Example format only: ABCDXABCDXABCDXABCDX

Testing conditions: standard 35 minutes / extended time / outside help