



SAT® MATHEMATICS

Practice Test 01

MODULE 1

22 Q • 35 min

MODULE 2

22 Q • 35 min

CALCULATOR

Desmos graphing

Anyone who decides to reach 800 can get there.

Don't memorize problems — understand why they work.

Take this examination under timed conditions and without interruption. Score it immediately, find the weaknesses it reveals, and repair them one by one until you can explain every missed question in your own words. What you set out to achieve, you will achieve.

MODULE 1

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

Mathematics

35 minutes · 22 questions

MODULE 1 OF 2

DIRECTIONS

For multiple-choice questions, select the best answer. For student-produced response (SPR) questions, write your answer in the box provided. Use of the **Desmos graphing calculator** is permitted throughout. Take Module 1 first, score it, then continue into Module 2.

STUDENT-PRODUCED RESPONSE

- If your answer is a fraction that does not fit, enter the decimal equivalent.
- If your answer is a repeating decimal, fill as many digits as fit ($\frac{2}{3}$ as $\frac{2}{3}$, .6666, or .6667).
- Do not enter symbols such as %, \$, or commas.
- A negative sign counts as one character. Answers may be entered as positive values up to 5 characters, or negative values up to 6 characters.

TIMING

Module 1 (35 minutes) · 10-minute break · Module 2 (35 minutes). Do not return to a module once its time has been called.

MODULE 1

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

Reference

AVAILABLE FOR BOTH MODULES

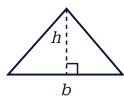


$$A = \pi r^2$$

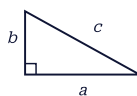
$$C = 2\pi r$$



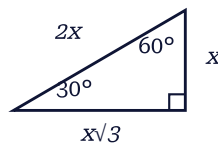
$$A = \ell w$$



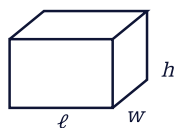
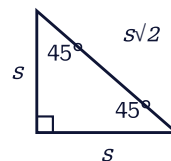
$$A = \frac{1}{2}bh$$



$$c^2 = a^2 + b^2$$



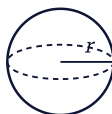
Special right triangles



$$V = \ell wh$$



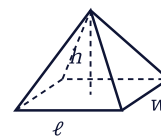
$$V = \pi r^2 h$$



$$V = \frac{4}{3}\pi r^3$$



$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}\ell wh$$

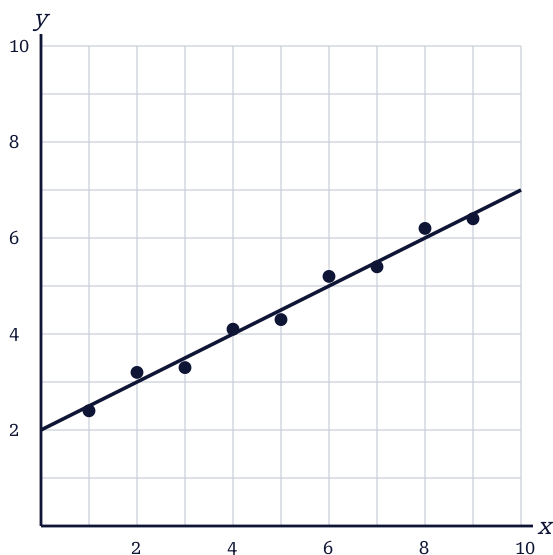
- The number of degrees of arc in a circle is 360.
- The number of radians of arc in a circle is 2π .
- The sum of the measures in degrees of the angles of a triangle is 180.

MODULE 1

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

1

The scatterplot shows the relationship between x and y . A line of best fit is also shown. At $x = 8$, which of the following is closest to the y -value predicted by the line of best fit?



- ☐ A 4
- ☐ B 5
- ☐ C 6
- ☐ D 8

2

5 less than 3 times a number x is 31. Which equation represents this situation?

- ☐ A $3x - 5 = 31$
- ☐ B $5 - 3x = 31$
- ☐ C $3(x - 5) = 31$
- ☐ D $5x - 3 = 31$

3

Which expression is equivalent to $(2x^3)(4x^5)$?

- ☐ A $6x^8$
- ☐ B $6x^{15}$
- ☐ C $8x^8$
- ☐ D $8x^{15}$

4

$$7x - 2y = 33$$

In the given equation, when $x = 6$, what is the value of y ?

ANSWER

5

For $x > 0$, which of the following is equivalent to $\sqrt[4]{x^6}$?

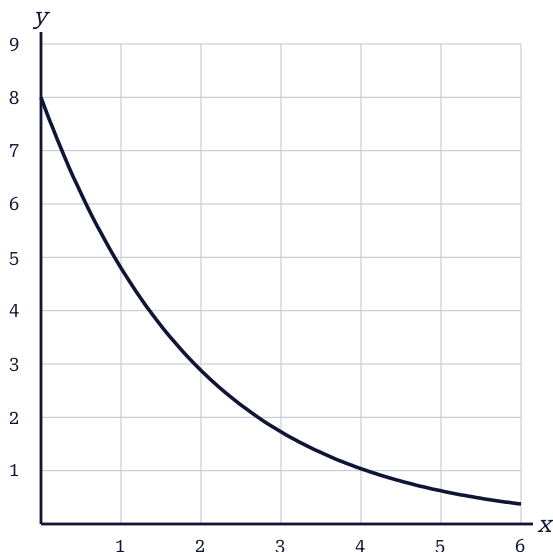
- ☐ A $x^{3/2}$
- ☐ B $x^{2/3}$
- ☐ C x^2
- ☐ D x^{24}

MODULE 1

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

6

The graph of the function f is shown, where $y = f(x)$. Which of the following best describes the function f ?



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

7

The function $f(x) = 12x + 40$ gives the total cost $f(x)$, in dollars, of renting a kayak for x hours. What is the best interpretation of 12 in this context?

- ☐ A The total cost of renting the kayak
- ☐ B The number of hours the kayak was rented
- ☐ C The initial fee, in dollars, for renting the kayak
- ☐ D The cost per hour of renting the kayak

8

The mean of the five numbers 8, 10, 13, 15, and x is 13. What is the value of x ?

ANSWER

9

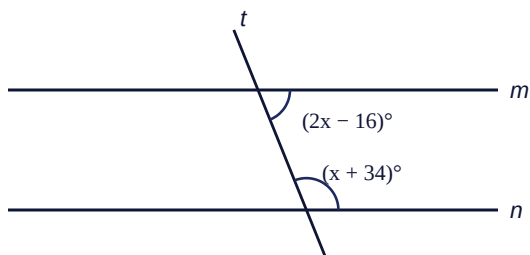
A marine research station tags two species of sea turtle in a coastal bay: green turtles and hawksbill turtles. Every tagged green turtle carries a transmitter that sends 9 signals per day, and every tagged hawksbill turtle carries a transmitter that sends 4 signals per day. A total of 25 turtles in the bay are tagged. During one 24-hour period, every tagged turtle's transmitter sent its full daily number of signals, and the station's receiver logged 170 signals in all. How many more green turtles than hawksbill turtles are tagged?

- ☐ A 3
- ☐ B 11
- ☐ C 14
- ☐ D 25

MODULE 1

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

10



Note: Figure not drawn to scale.

In the figure, line t intersects parallel lines m and n . The angle shown at line m measures $(2x - 16)^\circ$, and the angle shown at line n measures $(x + 34)^\circ$. What is the value of x ?

- ☐ A 50
- ☐ B 54
- ☐ C 88
- ☐ D 92

11

$$y = x^2$$
$$y = 2x + 8$$

How many points of intersection does the graph of the given system have in the xy -plane?

- ☐ A Zero
- ☐ B Exactly one
- ☐ C Exactly two
- ☐ D Infinitely many

12

A snail moves at a constant speed of 0.5 centimeters per second. What is the snail's speed in meters per hour? (1 meter = 100 centimeters)

- ☐ A 1.8
- ☐ B 18
- ☐ C 180
- ☐ D 1,800

13

In the xy -plane, line ℓ passes through the point $(0, -5)$ and is perpendicular to the line with equation $y = \frac{3}{4}x + 2$. Which equation defines line ℓ ?

- ☐ A $y = -\frac{4}{3}x - 5$
- ☐ B $y = -\frac{3}{4}x - 5$
- ☐ C $y = \frac{3}{4}x - 5$
- ☐ D $y = \frac{4}{3}x - 5$

MODULE 1

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

14

The table shows values of x and the corresponding values of the exponential function f . What is the value of $f(5)$?

x	$f(x)$
0	5
1	10
2	20
3	40

ANSWER

15

$$y > 2x + 1$$

$$y < 5x - 2$$

The point $(k, 10)$ is a solution to the given system of inequalities. Which of the following is a possible value of k ?

- ☐ A 1
- ☐ B 2
- ☐ C 4
- ☐ D 6

16

Which expression is equivalent to $\frac{2x^2 - 18}{x^2 - x - 6}$, for $x > 3$?

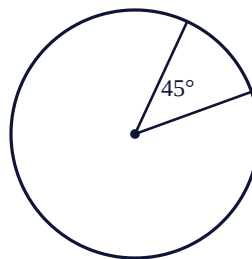
- ☐ A $\frac{2(x+3)}{x+2}$
- ☐ B $\frac{x+3}{x+2}$
- ☐ C $\frac{2x-18}{-x-6}$
- ☐ D $\frac{18}{x+6}$

17

Right triangle A has legs of lengths 20 and 21. Right triangle B is similar to triangle A , and the hypotenuse of triangle B has length 58. What is the perimeter of triangle B ?

- ☐ A 70
- ☐ B 116
- ☐ C 140
- ☐ D 145

18



Note: Figure not drawn to scale.

A circle has a circumference of 24π . An arc of this circle has a central angle of 45° . What is the length of the arc?

- ☐ A π
- ☐ B 3π
- ☐ C 6π
- ☐ D 8π

MODULE 1

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

19

A plumber charges a fixed call-out fee plus a constant hourly rate. A job that lasts 2 hours costs \$160, and a job that lasts 5 hours costs \$280. A job that costs \$480 lasts how many hours?

- ☐ A 6
- ☐ B 10
- ☐ C 12
- ☐ D 14

20

The function V , defined by $V(t) = 18,500(0.82)^{(t-4)}$ for $t \geq 4$, gives the estimated value, in dollars, of a machine t years after it was purchased. Which of the following is the best interpretation of 18,500 in this context?

- ☐ A The estimated value, in dollars, of the machine when it was purchased.
- ☐ B The estimated decrease, in dollars, in the machine's value each year.
- ☐ C The estimated decrease, in dollars, in the machine's value over the first 4 years.
- ☐ D The estimated value, in dollars, of the machine 4 years after it was purchased.

21

$$kx + 5 = 4x + 9$$

In the given equation, k is a constant. The equation has no solution. What is the value of k ?

ANSWER

22

$$\sqrt{x+a} = x-3$$

In the given equation, a is a constant. For which of the following values of a does the equation have exactly two real solutions?

- ☐ A -4
- ☐ B -3
- ☐ C 0
- ☐ D 5

STOP

If you finish before time is called, you may check your work on this module only. Do not turn to any other module in the test.

MODULE 2

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

Mathematics

35 minutes · 22 questions

MODULE 2 OF 2

DIRECTIONS

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STUDENT-PRODUCED RESPONSE

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MODULE 2

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

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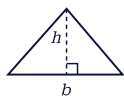


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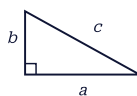
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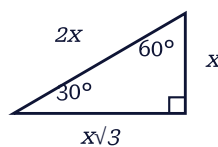
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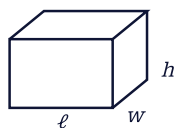
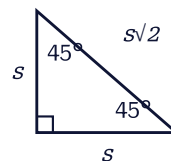
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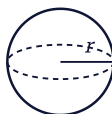
Special right triangles



$$V = \ell wh$$



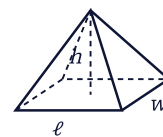
$$V = \pi r^2 h$$



$$V = \frac{4}{3}\pi r^3$$



$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}\ell wh$$

- The number of degrees of arc in a circle is 360.
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- The sum of the measures in degrees of the angles of a triangle is 180.

MODULE 2

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

1

For the linear function f , $f(0) = 8$ and $f(3) = 20$. Which equation defines f ?

- ☐ A $f(x) = 12x + 8$
☐ B $f(x) = 8x + 4$
☐ C $f(x) = 4x + 8$
☐ D $f(x) = 4x + 20$

2

$$4(3x - 5) - 2(x + 6) = 7x - 5$$

What is the solution to the given equation?

ANSWER

3

$$(4x^2 + 3x - 7) - 2(x^2 - 5x + 1) = ax^2 + bx + c$$

The given equation is true for all x , where a , b , and c are constants. What is the value of $a + b + c$?

- ☐ A -6
☐ B 6
☐ C 13
☐ D 15

4

After a 24% decrease, the price of a jacket is \$190. What was the original price of the jacket?

- ☐ A \$144.40
☐ B \$214.00
☐ C \$235.60
☐ D \$250.00

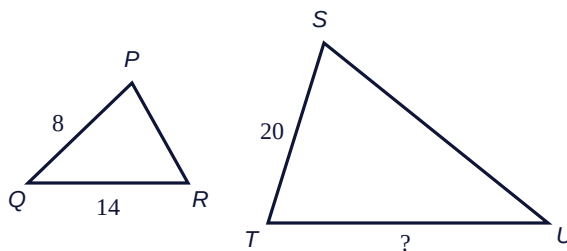
5

$$\frac{3x + a}{2} = 2x - 5$$

In the given equation, a is a constant. If the solution to the equation is $x = 12$, what is the value of a ?

- ☐ A -17
☐ B -8
☐ C 2
☐ D 19

6



Note: Figure not drawn to scale.

Triangles PQR and STU are similar, where P , Q , and R correspond to S , T , and U , respectively. The length of side PQ is 8 and the length of side ST is 20. If the length of side QR is 14, what is the length of side TU ?

- ☐ A 5.6
☐ B 22
☐ C 26
☐ D 35

MODULE 2

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

7

$$p(x) = 2x^3 - 5x^2 + ax - 24$$

In the given polynomial, a is a constant. If $x - 3$ is a factor of $p(x)$, what is the value of a ?

ANSWER

8

The table below shows the distribution of the 240 employees of a company by work arrangement and by whether the employee is satisfied with that arrangement.

	Satisfied	Not satisfied	Total
Remote	34	26	60
Hybrid	51	39	90
Onsite	35	55	90
Total	120	120	240

If one of the employees who does **not** work onsite is selected at random, what is the probability that the employee is satisfied?

- ☐ A $\frac{17}{48}$
- ☐ B $\frac{1}{2}$
- ☐ C $\frac{17}{30}$
- ☐ D $\frac{17}{24}$

9

$$4x + 3y = 26$$

$$3x + 4y = 30$$

If (x, y) is the solution to the given system of equations, what is the value of $x - y$?

- ☐ A -4
- ☐ B 2
- ☐ C 6
- ☐ D 8

10

The function f is defined by $f(x) = a(2)^{x/3}$, where a is a positive constant. If $f(6) = 36$, what is the value of $f(9)$?

- ☐ A 24
- ☐ B 48
- ☐ C 54
- ☐ D 72

11

The function f is defined by $f(x) = cx + 18$, where c is a constant. In the xy -plane, the graph of $y = f(x)$ crosses the x -axis at $x = 3$. What is the value of $f(5)$?

ANSWER

MODULE 2

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

12

At a fair, a vendor sells small cups of lemonade for \$3 each and large cups for \$5 each. The vendor can sell at most 14 cups in one hour and wants to collect at least \$66 from cup sales in that hour. What is the minimum number of large cups the vendor must sell in that hour to meet both conditions?

- ☐ A 5
☐ B 11
☐ C 12
☐ D 14

13

$$y = x^2 - 2kx + k^2 - 49$$

In the given equation, k is a constant. The graph of the equation in the xy -plane is a parabola with x -intercepts $(a, 0)$ and $(b, 0)$. What is the positive difference between a and b ?

ANSWER

14

55, 55, 70, 76, 80, 88, 94

The seven values above are listed from least to greatest. If a , b , and c are the mean, median, and mode of the values, respectively, which of the following must be true?

- ☐ A $a < b < c$
☐ B $c < a < b$
☐ C $c < b < a$
☐ D $a = b = c$

15

Cylinder A has a radius of r and a height of h , and its volume is 54π . Cylinder B has a radius of $3r$ and a height of $\frac{h}{3}$. What is the volume of cylinder B?

- ☐ A 54π
☐ B 162π
☐ C 486π
☐ D $1,458\pi$

16

$$x^2 - 8x + 3 = 0$$

The solutions to the given equation can be written in the form $p \pm \sqrt{q}$, where p and q are constants. What is the value of $p + q$?

- ☐ A 9
☐ B 17
☐ C 30
☐ D 56

17

In a right triangle, the sine of one of the acute angles is $\frac{4}{5}$, and the length of the hypotenuse is $5k$, where k is a positive constant. Which expression represents the area of the triangle?

- ☐ A $6k^2$
☐ B $10k^2$
☐ C $12k^2$
☐ D $25k^2$

MODULE 2

MATHEMATICS · 22 QUESTIONS · 35 MINUTES

18

$$ax + by = 12$$

$$2x + 5y = 9$$

In the given system of equations, a and b are constants. The system has no solution, and $a + b = 14$. What is the value of a ?

- ☐ A 2
☐ B 4
☐ C 10
☐ D 14

19

In the xy -plane, the graph of the function f has x -intercepts at $x = -6$, $x = 2$, and $x = 10$. The function g is defined by $g(x) = f(x + 4)$. What is the sum of the x -intercepts of the graph of $y = g(x)$?

- ☐ A -6
☐ B 2
☐ C 6
☐ D 18

20

The mean of a list of n numbers is 42. When two of the numbers, 24 and 36, are removed from the list, the mean of the remaining numbers is 45. What is the value of n ?

- ☐ A 8
☐ B 9
☐ C 10
☐ D 12

21

The polynomial $6x^2 + 7x - 20$ can be written in the form $(ax + b)(cx + d)$, where a , b , c , and d are integers. What is the least possible value of $a + b + c + d$?

- ☐ A -6
☐ B -2
☐ C 2
☐ D 6

22

In the xy -plane, a circle has center $(3, -1)$ and radius r . The line $y = x + 5$ is tangent to the circle. What is the value of r^2 ?

ANSWER

STOP

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