Math tests

SAT° March ,2019 US

IMPORTANT REMINDERS

1

A No. 2 pencil is required for the test.
Do not use a mechanical pencil or pen.

2

Sharing any questions with anyone
is a violation of Test Security
and Fairness policies and may result
in your scores being canceled.

This cover is representative of what you'll see on test day.

Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

Turn to Section 3 of your answer sheet to answer the questions in this section.

DIRECTIONS

For questions 1-15, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 16-20,** solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 16 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

NOTES

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2. All variables and expressions used represent real numbers unless otherwise indicated.

3. Figures provided in this test are drawn to scale unless otherwise indicated.

4. All figures lie in a plane unless otherwise indicated.

5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.
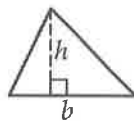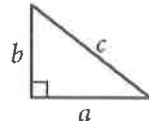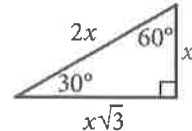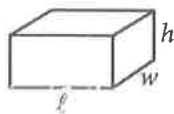
REFERENCE

$A = \pi r^2$
$C = 2\pi r$

$A = \ell w$
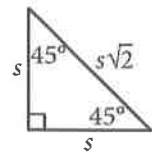
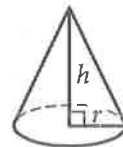$A = \frac{1}{2} bh$
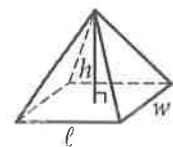
$c^2 = a^2 + b^2$

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.

CONTINUE ▶

1

Tony spends $80 per month on public transportation. A 10-ride pass costs $12.50, and a single-ride pass costs $1.50. If g represents the number of 10-ride passes Tony buys in a month and t represents the number of single-ride passes Tony buys in a month, which of the following equations best represents the relationship between g and t?

A) $g + t = 80$

B) $g + t = 1.50 + 12.50$

C) $1.50g + 12.50t = 80$

D) $12.50g + 1.50t = 80$

2

$$T = 1,000 + 18h$$

In the equation above, T represents Brittany's total take-home pay, in dollars, for her first week of work, where h represents the number of hours she worked that week and 1,000 represents a sign-on bonus. If Brittany's total take-home pay was $1,576, for how many hours was Brittany paid for her first week of work?

A)   16

B)   32

C)   55

D)   88

3

A clothing store is having a sale on shirts and pants. During the sale, the cost of each shirt is $15 and the cost of each pair of pants is $25. Geoff can spend at most $120 at the store. If Geoff buys s shirts and p pairs of pants, which of the following must be true?

A) $15s + 25p \leq 120$

B) $15s + 25p \geq 120$

C) $25s + 15p \leq 120$

D) $25s + 15p \geq 120$

4

What is the solution to $-3(x - 5) = -2x + 4$?

A)   11

B) $\dfrac{19}{5}$

C) -9

D) -19

CONTINUE

5

$$f(x) = x^3 + 3x^2 - 6x - 1$$

For the function f defined above, what is the value of $f(-1)$?

A) -11

B) -7

C) 7

D) 11

6

Triangle ABC and triangle DEF are similar triangles, where $\overline{AB}$ and $\overline{DE}$ are corresponding sides. If $DE = 2AB$ and the perimeter of triangle ABC is 20, what is the perimeter of triangle DEF?

A) 10

B) 40

C) 80

D) 120

7

There were no jackrabbits in Australia before 1788 when 24 jackrabbits were introduced. By 1920 the population of jackrabbits had reached 10 billion. If the population had grown exponentially, this would correspond to a 16.2% increase, on average, in the population each year. Which of the following functions best models the population $p(t)$ of jackrabbits t years after 1788?

A) $p(t) = 1.162(24)^t$

B) $p(t) = 24(2)^{1.162t}$

C) $p(t) = 24(1.162)^t$

D) $p(t) = (24 \cdot 1.162)^t$

CONTINUE

8

Which of the following is equivalent to the sum of $3x^4 + 2x^3$ and $4x^4 + 7x^3$?
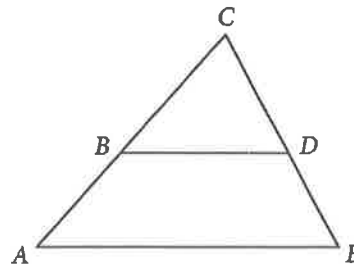
A) $16x^4$

B) $7x^8 + 9x^6$

C) $12x^4 + 14x^3$

D) $7x^4 + 9x^3$

9

The function f is defined by $f(x) = x^2$, and the function g is defined by $g(x) = x^2 + 3$. Which of the following translations of the graph of f in the xy-plane results in the graph of g?

A) A translation 3 units downward

B) A translation 3 units upward

C) A translation 3 units to the left

D) A translation 3 units to the right

10

Note: Figure not drawn to scale.

In the figure above, segments AE and BD are parallel. If angle BDC measures 58° and angle ACE measures 62°, what is the measure of angle CAE?

A) 58°
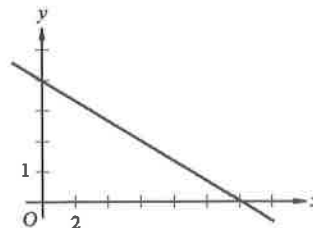
B) 60°

C) 62°

D) 120°

CONTINUE

11

An oceanographer uses the equation $s = \frac{3}{2}p$ to model the speed s, in knots, of an ocean wave, where p represents the period of the wave, in seconds. Which of the following represents the period of the wave in terms of the speed of the wave?

A) $p = \frac{2}{3}s$

B) $p = \frac{3}{2}s$

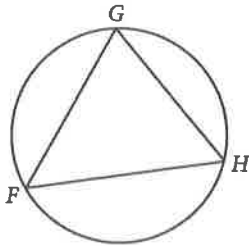C) $p = \frac{2}{3} + s$

D) $p = \frac{3}{2} + s$

12

Which of the following could be an equation for the graph shown in the xy-plane above?

A) $y = -\frac{2}{3}x + 8$

B) $y = -\frac{3}{2}x + 4$

C) $y = -\frac{1}{3}x + 4$

D) $y = -\frac{4}{3}x + 8$

13

Note: Figure not drawn to scale.

Triangle FGH is inscribed in the circle above. If arc $\overset{\frown}{FG}$ is congruent to arc $\overset{\frown}{GH}$, and the measure of $\angle G$ is 30°, what is the measure of $\angle H$?
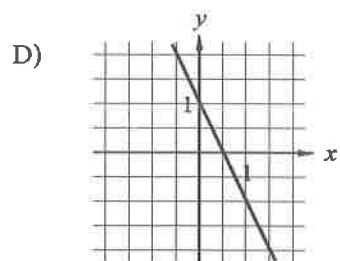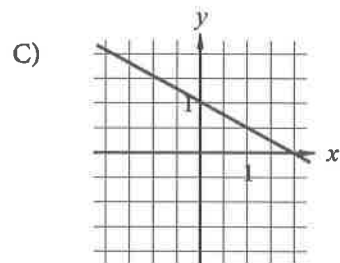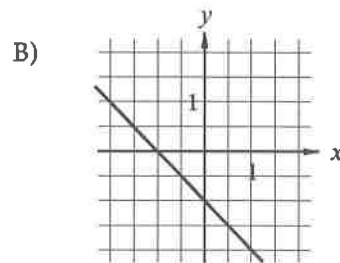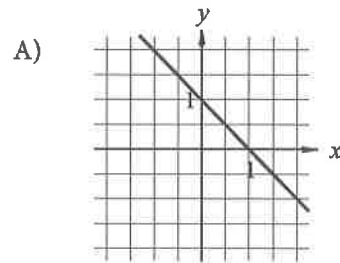
A) 30°

B) 60°

C) 75°

D) 120°

14

Which of the following is equivalent to $\sqrt[4]{x^2+8x+16}$, where $x > 0$?
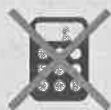
A) $(x+4)^4$

B) $(x+4)^2$

C) $(x+4)$

D) $(x+4)^{\frac{1}{2}}$

15

$$ax + by = b$$

In the equation above, a and b are constants and' $0 < a < b$. Which of the following could represent the graph of the equation in the xy-plane?

A)

B)

C)

D)

CONTINUE ➤

DIRECTIONS

For questions 16–20, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If $3\,1\,/\,2$ is entered into the grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
6. **Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.

Answer: $\frac{7}{12}$

Write answer in boxes.
Grid in result.
← Fraction line

Answer: 2.5
← Decimal point

Acceptable ways to grid $\frac{2}{3}$ are:

Answer: 201 – either position is correct

NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

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40

CONTINUE ▶

16

$$x + x = 9$$

What value of x satisfies the equation given?

17

$$\frac{11x - 33}{x - 3} = x$$

What is the solution to the equation above?

18

$$2x + 3y = 31$$
$$3x - y = 30$$

If (x,y) is the solution to the system of equations above, what is the value of $100x + 40y$?

19

If $t > 0$ and $(3t)^2 - 5(3t) - 14 = 0$, what is the value of t?

20

$$h(x) = x^3 + ax^2 + bx + c$$

The function h is defined above, where a, b, and c are integer constants. If the zeros of the function are −5, 6, and 7, what is the value of c?

STOP

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

CONTINUE

Math Test – Calculator

55 MINUTES, 38 QUESTIONS

Turn to Section 4 of your answer sheet to answer the questions in this section.

DIRECTIONS

For questions 1-30, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 31-38,** solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 31 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

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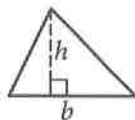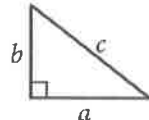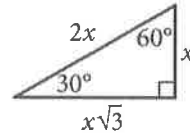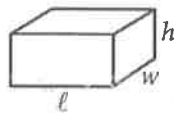
REFERENCE
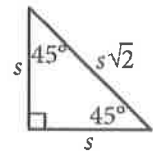

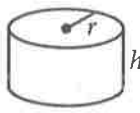$A = \pi r^2$ $A = \ell w$ $A = \frac{1}{2} bh$ $c^2 = a^2 + b^2$ Special Right Triangles
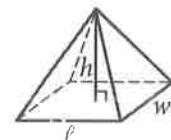$C = 2\pi r$

$V = \ell wh$ $V = \pi r^2 h$ $V = \frac{4}{3}\pi r^3$ $V = \frac{1}{3}\pi r^2 h$ $V = \frac{1}{3}\ell wh$

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.
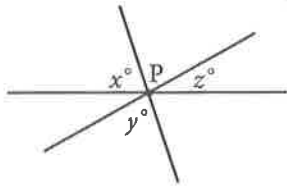

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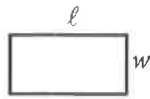
1

Makayla is planning an event in a 5,400-square-foot room. If there should be at least 8 square feet per person, what is the maximum number of people that could attend this event?

A) 588

B) 675

C) 15,274

D) 43,200

2

Note: Figure not drawn to scale.

In the figure, three lines intersect at point P. If $x=65$ and $y=75$, what is the value of z?
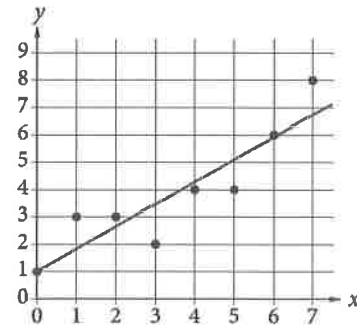
A) 140

B) 80

C) 40

D) 20

3

If $\frac{1}{2}x - \frac{1}{6}x = 1$, what is the value of x?

A) -4

B) $\frac{1}{3}$

C) 3

D) 6

4

The scatterplot above shows eight data points in the xy-plane. A line of best fit is also shown for the data. If each data point is shifted 3 units upward and a new line of best fit for the shifted points is drawn, how will the value of the y-intercept of the new line compare with that of the line shown?

A) It will increase.

B) It will decrease.

C) It will remain the same.

D) There will no longer be a y-intercept.

CONTINUE

5
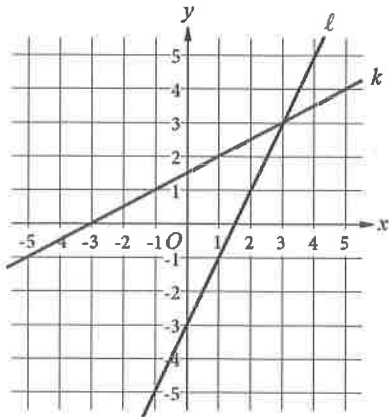
Lines ℓ and k in the xy-plane above are the graphs of the equations in a system. How many solutions does the system of equations have?

A) None

B) One

C) Two

D) More than two

6

Gerardo has 3 blue shirts and w white shirts in his closet, and these are the only shirts in his closet. If Gerardo selects a shirt at random from his closet, which of the following gives the probability that Gerardo will select a white shirt?

A) $\dfrac{w}{3+w}$

B) $\dfrac{3}{3+w}$

C) $\dfrac{w}{3}$

D) $\dfrac{3}{w}$

7

$$f(x) = -0.001160(x - 251.5)^2 + 73.37$$

The vertical height, in meters, of the upper arch of the Harbor Bridge in Sydney, Australia, above the roadway of the bridge can be modeled by the function above, where x is the horizontal distance along the roadway, in meters, from the entry to the bridge. The graph of $y=f(x)$ is shown in the xy-plane below.

Distance from entry to bridge (meters)
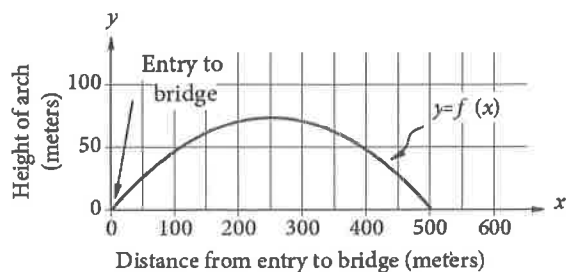
In the graph, the point (0, 0) represents the entry to the bridge. Which of the following points represents the exit from the bridge on the opposite end?

A) (0, 73.37)

B) (0, 503.0)

C) (73.37, 0)

D) (503.0, 0)

8

The graph of $y=f(x)$ is a line in the xy-plane that passes through the point (0, 2) and has a slope of 5. Which of the following equations could define the function f?
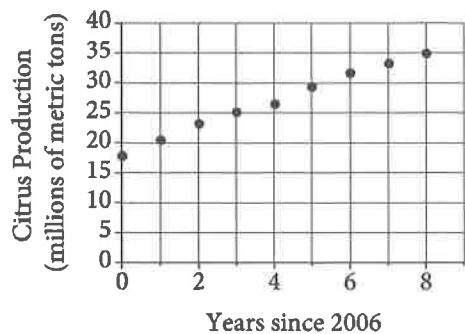
A) $f(x) = -\dfrac{1}{2}x + 5$

B) $f(x) = -\dfrac{1}{5}x + 2$

C) $f(x) = 2x + 5$

D) $f(x) = 5x + 2$

CONTINUE

9

Citrus Production in China (2006-2014)

The scatterplot above shows the citrus production, in millions of metric tons, in China from 2006 through 2014. Which of the following could be the slope of a line of best fit for these data?

A) 2.12

B) 5.25

C) 7.80

D) 10.29

10

$$f(x)=(x+4)(x-1)(2x-3)$$

The function f is defined above. Which of the following is NOT an x-intercept of the graph of the function in the xy-plane?

A) $-4,0$

B) $\left(-\dfrac{2}{3},0\right)$

C) $(1,0)$

D) $\left(\dfrac{3}{2},0\right)$

CONTINUE

Questions 11 and 12 refer to the following information

t	C(t)
1	8.5
2	11
3	13.5
4	16

The length C(t), in inches, of a channel catfish in an Iowa river t years after the first year of life can be approximated by the linear function C. Some values of C(t) are given in the table above.

$$F(t) = 3t + 4$$

The length F(t), in inches, of a flathead catfish in the same Iowa river t years after the first year of life can be approximated by the linear function F, defined by the equation above.

11

According to the model, which of the following is closest to the expected age, to the nearest whole year, of a flathead catfish that is 31 inches long?

A) 10 years old

B) 13 years old

C) 98 years old

D) 106 years old

12

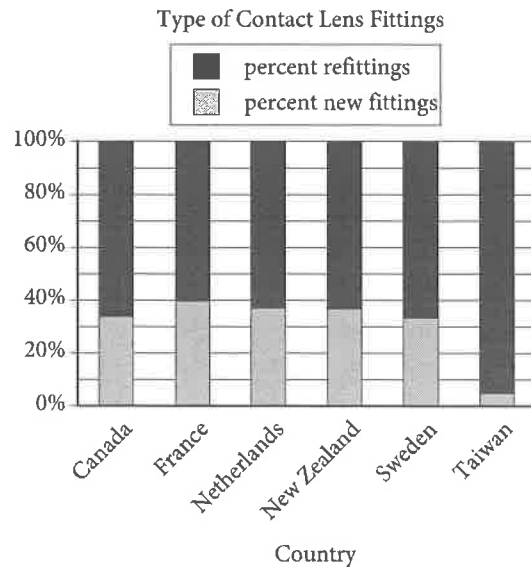Which of the following equations could define C as a function of t?

A) $C(t) = 2.5t + 6$

B) $C(t) = \frac{2}{5}t + 8.5$

C) $C(t) = 2.5t + 8.5$

D) $C(t) = \frac{2}{5}t + 8.1$

CONTINUE

Country	Total fittings	Mean age
Canada	936	34.6
France	1,470	34.9
Netherlands	943	35.0
New Zealand	721	36.3
Sweden	436	36.3
Taiwan	1,574	26.6

Type of Contact Lens Fittings

The results of an international survey of contact lens fittings during a given time period are summarized in the table and bar graph above. The table shows the number of total fittings and the mean age, in years, of the patients who were fitted for contact lenses during the time period. The total fittings consisted of new contact lens fittings and refittings. The bar graph shows the percent of the patients who received new fittings and the percent who received refittings.

13

What is the range, in years, of the mean ages of the patients surveyed who had contact lens fittings in the countries shown?

A) 8.0

B) 8.4

C) 9.7

D) 10.3

14

Of the following, which best approximates the number of patients surveyed who received refittings in New Zealand?

A) 274

B) 358

C) 447

D) 585

CONTINUE

15

A park ranger asked a random sample of visitors how far they hiked during their visit. Based on the responses, the estimated mean was found to be 4.5 miles, with an associated margin of error of 0.5 miles. Which of the following is the best conclusion from these data?

A) · It is likely that all visitors hiked between 4 and 5 miles.

B) It is likely that most visitors hiked exactly 4.5 miles.

C) It is not possible that any visitor hiked less than 3 miles.

D) It is plausible that the mean distance hiked for all visitors is between 4 and 5 miles.

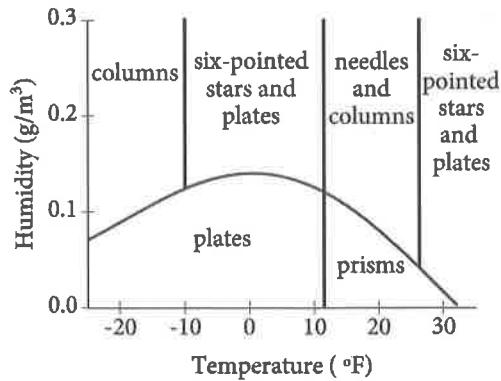## 16

Observed Matings among Fruit Flies

| | | Female fruit fly group | | |
		Female raised on starch	Female raised on maltose	Total
Male fruit fly group	Male raised on starch	22	9	31
	Male raised on maltose	8	20	28
	Total	30	29	59

The table above shows the observed mating frequencies among a group of fruit flies raised on either a starch medium or a maltose medium. What fraction of the observed matings were between fruit flies that were raised on the same medium?

A) $\dfrac{9}{31}$

B) $\dfrac{17}{59}$

C) $\dfrac{31}{59}$

D) $\dfrac{42}{59}$

CONTINUE

49

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17

The figure above shows a graph with six regions that correspond to temperature, in degrees Fahrenheit (°F), and humidity conditions, in grams of water vapor per cubic meter of air (g/m^3), that will result in different snow crystal shapes when the crystals are grown in a laboratory. Based on the graph, which of the following is a combination of temperature and humidity at which prisms will be formed?

A) 5°F and 0.15 g/m^3

B) 15°F and 0.18 g/m^3

C) 20°F and 0.02 g/m^3

D) 30°F and 0.08 g/m^3

18

WA sample of 40 fourth-grade students was selected at random from a certain school. The 40 students completed a survey about the morning announcements, and 32 thought the announcements were helpful. Which of the following is the largest population to which the results of the survey can be applied?

A) The 40 students who were surveyed

B) All fourth-grade students at the school

C) All students at the school

D) All fourth-grade students in the county in which the school is located

CONTINUE

Questions 19 and 20 refer to the following information

Ryan is comparing five different hay balers (machines that make bales of hay). The bales made are all in the shape of a cylinder, as shown below.
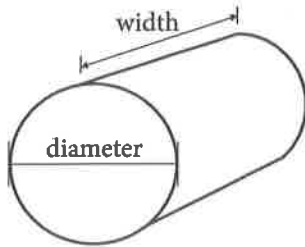
The price of each hay baler and the dimensions of the bales of hay it makes are shown in the table below.

Hay baler	Bale diameter range	Bale width	Price
A	32-51 in	46 in	$19,800
B	35-60 in	46 in	$27,900
C	35-72 in	46 in	$32,000
D	35-65 in	62 in	$37,500
E	32-72 in	62 in	$46,900

19

Of the following, which ratio is closest to the width of bales made by hay baler A to the width of bales made by hay baler D?

A) 0.74:1

B) 1.35:1

C) 1.74:1

D) 17:1

20

Which of the following is closest to the percent by which the price of hay baler E exceeds the price of hay baler C?

A) 18.9%

B) 31.8%

C) 40.5%

D) 46.6%

CONTINUE

21

$$x - y = 1$$
$$x + y = x^2 - 3$$

Which ordered pair is a solution to the system of equations above?

A) $\left(1 + \sqrt{3}, \sqrt{3}\right)$

B) $\left(\sqrt{3}, -\sqrt{3}\right)$

C) $\left(1 + \sqrt{5}, \sqrt{5}\right)$

D) $\left(\sqrt{5}, -1 + \sqrt{5}\right)$

22

The graph of the exponential function g in the xy-plane passes through the points $(0, 1)$, $(1, 4)$, and $(2, 16)$. Which of the following is NOT true?

A) A line can be drawn that does not intersect the graph of g.

B) A line can be drawn that intersects the graph of g at exactly one point.

C) A line can be drawn that intersects the graph of g at exactly two points.

D) A line can be drawn that intersects the graph of g at exactly three points.

23

In a right triangle, the tangent of one of the two acute angles is $\dfrac{\sqrt{3}}{3}$. What is the tangent of the other acute angle?

A) $-\dfrac{\sqrt{3}}{3}$

B) $-\dfrac{3}{\sqrt{3}}$
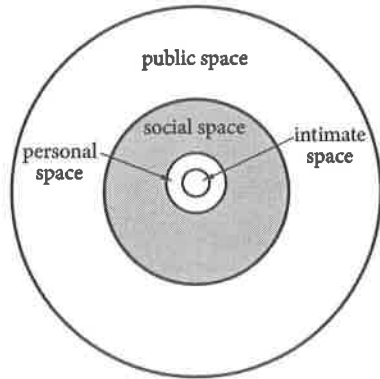
C) $\dfrac{\sqrt{3}}{3}$

D) $\dfrac{3}{\sqrt{3}}$

24

In the xy-plane, line ℓ has a slope of 2. If line k is perpendicular to line ℓ, which of the following could be an equation of line k?

A) $-10x - 5y = 20$

B) $3x - 6y = 14$

C) $4x - 2y = 17$

D) $6x + 12y = 36$

CONTINUE

25

public space

social space

personal space

intimate space

Note: Figure not drawn to scale.

The diagram above represents Edward T. Hall's concept of space surrounding a person defined by four nonoverlapping regions. Intimate space is the region inside a circle of radius 1 foot. Personal space is the region within a circle of radius 4 feet but outside intimate space. Social space is the region within a circle of radius 12 feet but outside personal space. Public space is the region within a circle of radius 25 feet but outside social space. What is the area, in square feet, of the shaded region representing a person's social space?

A) 127π

B) 128π

C) 144π

D) 625π

26

Anita created a batch of green paint by mixing 2 ounces of blue paint with 3 ounces of yellow paint. She must mix a second batch using the same ratio of blue and yellow paint as the first batch. If she uses 5 ounces of blue paint for the second batch, how much yellow paint should Anita use?

A) Exactly 5 ounces

B) 3 ounces more than the amount of yellow paint used in the first batch

C) 1.5 times the amount of yellow paint used in the first batch

D) 1.5times the amount of blue paint used in the second batch

27

$$ax - 4(3 + 2x) = -12$$

In the equation above, a is a constant. For what value of a does the equation have infinitely many solutions?

A) -8

B) -2

C) 2

D) 8

CONTINUE

28

The wholesale price of a kilogram of lentils decreased by 1% from the previous month for six consecutive months. If x is the number of months since the price began to drop and y is the cost of a kilogram of lentils, which of the following equations could model the cost of lentils over this time period?

A) $y = 0.99x + 1.65$

B) $y = 1.01x + 1.65$

C) $y = 1.65(0.99)^x$

D) $y = 1.65(1.01)^x$

29

$$\frac{2}{x-2} + \frac{3}{x+5} = \frac{rx+t}{(x-2)(x+5)}$$

The equation above is true for all $x > 2$, where r and t are positive constants. What is the value of rt?

A) −20

B) 15

C) 20

D) 60

30

If $ax + a = 3$, where a is a nonzero constant, which of the following must be equal to $x+1$?

A) 3

B) a

C) $3a$

D) $\dfrac{3}{a}$

CONTINUE

DIRECTIONS

For questions 31–38, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If $3|1|/|2$ is entered into the grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
6. **Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.

Answer: $\frac{7}{12}$

Write answer in boxes. ← Fraction line

Grid in result.

Answer: 2.5

← Decimal point

Acceptable ways to grid $\frac{2}{3}$ are:

Answer: 201 – either position is correct

NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.
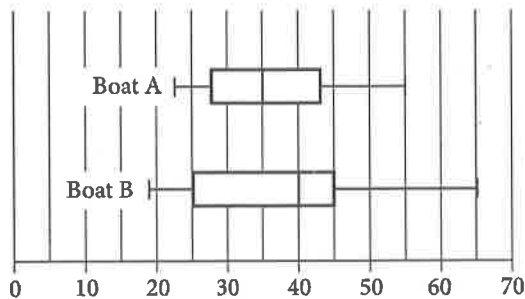
31

$$\sqrt{x+4}=11$$

What value of x satisfies the equation above?

32

Number of fish caught

The box plots above summarize the distribution of the number of fish caught each day on two commercial fishing boats for a season. By how many fish does the median number of fish caught each day on Boat B exceed the median number on Boat A?

33

If a is the mean and b is the median of nine consecutive integers, what is the value of $|a-b|$?

34

$$y=-16t^2+64t+80$$

The equation above gives the height of an object above the ground, y, in feet, t seconds after it is launched from a platform. How many seconds after it is launched does the object reach the ground?

35

$$I = \frac{V}{R}$$

The formula above is Ohm's law for an electric circuit with current I, in amperes, potential difference V, in volts, and resistance R, in ohms. A circuit has a resistance of 500 ohms, and its potential difference will be generated by n six-volt batteries that produce a total potential difference of $6n$ volts. If the circuit is to have a current of no more than 0.25 ampere, what is the greatest number, n, of six-volt batteries that can be used?

36

In the xy-plane, line k intersects the y-axis at the point $(0, -6)$ and passes through the point $(2 , 2)$. If the point $(20, w)$ lies on line k, what is the value of w?

37

In a science classroom, when labs are performed, students are seated at lab tables. If the teacher assigns 2 students to each lab table, 4 additional lab tables will be needed to seat all of the students. If the teacher assigns 4 students to each lab table, 4 lab tables will not be used. How many students are in the science class?

38

The number y is 20% greater than the number x. The number z is 20% less than y. The number z is how many times x?

STOP

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

CONTINUE

The SAT®

Question-and-Answer Service Student Guide

Ideas for using the QAS report

The answer key for the test you took

Instructions for scoring your test

CollegeBoard

Answer Key – Determine Raw Scores

Reading Test Answers

Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer
1	A	14	D	27	C	40	A
2	B	15	B	28	A	41	B
3	C	16	A	29	D	42	D
4	B	17	C	30	B	43	C
5	A	18	C	31	D	44	C
6	A	19	B	32	A	45	D
7	D	20	D	33	B	46	A
8	C	21	B	34	C	47	B
9	D	22	A	35	C	48	A
10	D	23	D	36	A	49	D
11	C	24	C	37	A	50	D
12	D	25	B	38	D	51	C
13	A	26	A	39	B	52	D

Reading Test Raw Score
(Number of Correct Answers)

Writing and Language Test Answers

Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer	Question #	Correct Answer
1	A	12	A	23	C	34	D
2	D	13	B	24	D	35	C
3	B	14	B	25	A	36	C
4	C	15	B	26	C	37	C
5	D	16	D	27	D	38	D
6	C	17	A	28	B	39	A
7	C	18	B	29	B	40	D
8	A	19	D	30	A	41	D
9	B	20	A	31	B	42	B
10	C	21	C	32	D	43	A
11	D	22	B	33	A	44	B

Writing and Language Test Raw Score
(Number of Correct Answers)

"U" indicates a question that did not perform as expected and has been removed from scoring.

On test day you may have answered questions in a different order than what you see above. Use the questions and answers online to determine specific answers.

Answer Key – Determine Raw Scores (continued)

Math Test – No Calculator Answers

Question #	Correct Answer		Question #	Correct Answer		Question #	Correct Answer		Question #	Correct Answer
1	D		5	C		9	B		13	C
2	B		6	B		10	B		14	D
3	A		7	C		11	A		15	C
4	A		8	D		12	C			

Question #	Correct Answer
16	4.5,9/2
17	11
18	1220
19	7/3,2.33
20	210

<div style="border:1px solid #000; width:300px; height:80px;"></div>

**Math Test – No Calculator
Raw Score**
(Number of Correct Answers)

Math Test – Calculator Answers

Question #	Correct Answer		Question #	Correct Answer		Question #	Correct Answer		Question #	Correct Answer
1	B		9	A		17	C		25	B
2	C		10	B		18	B		26	D
3	C		11	A		19	A		27	D
4	A		12	A		20	D		28	C
5	B		13	C		21	A		29	C
6	A		14	C		22	D		30	D
7	D		15	D		23	D			
8	D		16	D		24	D			

Question #	Correct Answer
31	117
32	5
33	0
34	5
35	20
36	74
37	32
38	.96,24/25

<div style="border:1px solid #000; width:300px; height:80px;"></div>

**Math Test – Calculator
Raw Score**
(Number of Correct Answers)

"U" indicates a question that did not perform as expected and has been removed from scoring.

On test day you may have answered questions in a different order than what you see above. Use the questions and answers online to determine specific answers.

GET CROSS-TEST SCORES

The SAT also reports two cross-test scores: Analysis in History/Social Studies and Analysis in Science. These scores are based on questions in the Reading, Writing and Language, and Math Tests that ask you to think analytically about texts and questions in these subject areas.

Cross-test scores are reported on a scale of 10–40.

Calculating Your Cross-Test Scores

You can use the cross-test score tables beginning on the next page to calculate your cross-test scores as follows:

1. Find the questions in each section that count toward each cross-test score. These are shown with a "Y" next to the question number in the tables. Refer to your QAS report to see which of those questions you answered correctly on the test, and then check the box for each correct answer.

2. Count the number of correct answers for each cross-test area and record that as your raw score for that area.

3. Use the conversion table on page 12 to determine your scaled score (10–40) for each area.

Cross-Test Scores Tables – Determine Cross-Test Raw Scores

Y = Counts toward Cross-Test score. On your QAS report, look up every question marked "Y" below to see if you answered it correctly. If so, check off the box for that question below.

Analysis in History/Social Studies (HSS)

Reading		Writing and Language		Math Test – Calculator		Math Test – No Calculator	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7	Y ☐	7	
8		8		8		8	
9		9		9	Y ☐	9	
10		10		10		10	
11	Y ☐	11		11		11	
12	Y ☐	12		12		12	
13	Y ☐	13		13	Y ☐	13	
14	Y ☐	14		14	Y ☐	14	
15	Y ☐	15		15		15	
16	Y ☐	16		16		16	
17	Y ☐	17		17		17	
18	Y ☐	18		18	Y ☐	18	
19	Y ☐	19		19	Y ☐	19	
20	Y ☐	20		20		20	
21	Y ☐	21		21			
22		22		22			
23		23	Y ☐	23			
24		24		24			
25		25		25	Y ☐		
26		26	Y ☐	26			
27		27		27			
28		28		28	Y ☐		
29		29	Y ☐	29			
30		30	Y ☐	30			
31		31	Y ☐	31			
32	Y ☐	32		32			
33	Y ☐	33	Y ☐	33			
34	Y ☐	34		34			
35	Y ☐	35		35			
36	Y ☐	36		36			
37	Y ☐	37		37			
38	Y ☐	38		38			
39	Y ☐	39					
40	Y ☐	40					
41	Y ☐	41					
42		42					
43		43					
44		44					
45							
46							
47							
48							
49							
50							
51							
52							

HSS Raw Score

Analysis in Science (SCI)

Reading		Writing and Language		Math Test – Calculator		Math Test – No Calculator	
1		1	Y ☐	1		1	
2		2	Y ☐	2		2	
3		3		3		3	
4		4		4		4	
5		5	Y ☐	5		5	
6		6	Y ☐	6		6	
7		7		7		7	Y ☐
8		8		8		8	
9		9		9		9	
10		10	Y ☐	10		10	
11		11	Y ☐	11		11	Y ☐
12		12		12	Y ☐	12	
13		13		13		13	
14		14		14		14	
15		15		15	Y ☐	15	
16		16		16	Y ☐	16	
17		17		17	Y ☐	17	
18		18		18		18	
19		19		19		19	
20		20		20		20	
21		21		21			
22	Y ☐	22		22			
23	Y ☐	23		23			
24	Y ☐	24		24			
25	Y ☐	25		25			
26	Y ☐	26		26			
27	Y ☐	27		27			
28	Y ☐	28		28			
29	Y ☐	29		29			
30	Y ☐	30		30			
31	Y ☐	31		31			
32		32		32	Y ☐		
33		33		33			
34		34		34	Y ☐		
35		35		35			
36		36		36			
37		37		37			
38		38		38			
39		39					
40		40					
41		41					
42	Y ☐	42					
43	Y ☐	43					
44	Y ☐	44					
45	Y ☐						
46	Y ☐						
47	Y ☐						
48	Y ☐						
49	Y ☐						
50	Y ☐						
51	Y ☐						
52	Y ☐						

SCI Raw Score

GET SUBSCORES

Subscores provide more detailed information about your strengths in specific areas within literacy and math.

Subscores are reported on a scale of 1–15.

▸ The **Command of Evidence** subscore is based on questions from both the Reading Test and the Writing and Language Test that ask you to interpret and use evidence found in a wide range of passages and informational graphics, such as graphs, tables, and charts.

▸ The **Expression of Ideas** subscore is based on questions from the Writing and Language Test that focus on topic development, organization, and rhetorically effective use of language.

▸ The **Words in Context** subscore is based on questions from both the Reading Test and the Writing and Language Test that address the meaning in context of words/phrases and rhetorical word choice.

▸ The **Standard English Conventions** subscore is based on questions from the Writing and Language Test that focus on sentence structure, usage, and punctuation.

▸ The **Heart of Algebra** subscore is based on questions from the Math Test that focus on linear equations and inequalities.

▸ The **Problem Solving and Data Analysis** subscore is based on questions from the Math Test that focus on quantitative reasoning, the interpretation and synthesis of data, and solving problems in rich and varied contexts.

▸ The **Passport to Advanced Math** subscore is based on questions from the Math Test that focus on topics central to the ability of students to progress to more advanced mathematics, such as understanding the structure of expressions, reasoning with more complex equations, and interpreting and building functions.

Calculating Your Subscores

You can use the subscore tables beginning on the next page to calculate your subscores as follows:

1. Find the questions that count toward each subscore. These are shown with a "Y" next to the question number in the tables. Refer to your QAS report to see which of those questions you answered correctly on the test, and then check the box for each correct answer.

2. Count the number of correct answers for each area and record that as your raw score for that area.

3. Finally, use the conversion table on page 13 to determine your scaled score (1–15) for each area.

Subscores Tables – Determine Subscore Raw Scores

Y = Counts toward subscore. On your QAS report, look up every question marked "Y" to see if you answered it correctly. If so, check off the box for that question.

Command of Evidence (COE) Reading	Command of Evidence (COE) Writing and Language	Expression of Ideas (EOI) Reading	Expression of Ideas (EOI) Writing and Language	Words in Context (WIC) Reading	Words in Context (WIC) Writing and Language	Standard English Conventions (SEC) Reading	Standard English Conventions (SEC) Writing and Language
1	1	1	1 Y ☐	1 Y ☐	1 Y ☐	1	1
2	2 Y ☐	2	2 Y ☐	2	2	2	2
3	3	3	3	3 Y ☐	3	3	3 Y ☐
4	4	4	4	4	4	4	4 Y ☐
5	5 Y ☐	5	5 Y ☐	5	5	5	5
6	6	6	6 Y ☐	6	6	6	6
7	7	7	7	7	7	7	7 Y ☐
8	8	8	8	8	8	8	8 Y ☐
9 Y ☐	9	9	9	9	9	9	9 Y ☐
10	10	10	10 Y ☐	10	10 Y ☐	10	10
11	11	11	11 Y ☐	11	11	11	11
12	12	12	12	12 Y ☐	12	12	12 Y ☐
13	13 Y ☐	13	13 Y ☐	13 Y ☐	13	13	13
14	14	14	14	14	14	14	14 Y ☐
15	15	15	15	15	15	15	15 Y ☐
16	16	16	16	16	16	16	16 Y ☐
17 Y ☐	17	17	17 Y ☐	17	17	17	17
18	18	18	18 Y ☐	18	18 Y ☐	18	18
19 Y ☐	19 Y ☐	19	19 Y ☐	19	19	19	19
20 Y ☐	20	20	20	20	20	20	20 Y ☐
21	21	21	21 Y ☐	21	21 Y ☐	21	21
22	22	22	22 Y ☐	22	22	22	22
23	23 Y ☐	23	23 Y ☐	23	23	23	23
24 Y ☐	24	24	24	24	24	24	24 Y ☐
25	25	25	25	25	25	25	25 Y ☐
26	26	26	26 Y ☐	26	26	26	26
27	27	27	27	27 Y ☐	27	27	27 Y ☐
28	28	28	28	28 Y ☐	28	28	28 Y ☐
29	29 Y ☐	29	29 Y ☐	29	29	29	29
30	30	30	30 Y ☐	30	30 Y ☐	30	30
31 Y ☐	31	31	31 Y ☐	31	31	31	31
32	32	32	32	32	32	32	32 Y ☐
33	33	33	33 Y ☐	33 Y ☐	33 Y ☐	33	33
34	34	34	34 Y ☐	34 Y ☐	34	34	34
35	35	35	35	35	35	35	35 Y ☐
36 Y ☐	36	36	36 Y ☐	36	36 Y ☐	36	36
37	37 Y ☐	37	37 Y ☐	37	37	37	37
38 Y ☐	38	38	38	38	38	38	38 Y ☐
39	39	39	39	39	39	39	39 Y ☐
40	40 Y ☐	40	40 Y ☐	40	40	40	40
41	41	41	41	41	41	41	41 Y ☐
42	42	42	42 Y ☐	42	42	42	42
43	43	43	43 Y ☐	43	43 Y ☐	43	43
44	44	44	44	44	44	44	44 Y ☐
45		45		45		45	
46		46		46 Y ☐		46	
47		47		47 Y ☐		47	
48		48		48		48	
49 Y ☐		49		49		49	
50		50		50		50	
51		51		51		51	
52 Y ☐		52		52		52	

COE Raw Score	EOI Raw Score	WIC Raw Score	SEC Raw Score

Subscores Tables – Determine Subscore Raw Scores (continued)

Y = Counts toward Subscore. On your QAS report, look up every question marked "Y" to see if you answered it correctly. If so, check off the box for that question.

Heart of Algebra (HOA)		Problem Solving and Data Analysis (PSD)		Passport to Advanced Math (PAM)	
Math Test – Calculator	Math Test – No Calculator	Math Test – Calculator	Math Test – No Calculator	Math Test – Calculator	Math Test – No Calculator
1	1 Y ☐	1 Y ☐	1	1	1
2	2 Y ☐	2	2	2	2
3 Y ☐	3 Y ☐	3	3	3	3
4	4 Y ☐	4 Y ☐	4	4	4
5 Y ☐	5	5	5	5	5 Y ☐
6	6	6 Y ☐	6	6	6
7	7	7	7	7 Y ☐	7 Y ☐
8 Y ☐	8	8	8	8	8 Y ☐
9	9	9 Y ☐	9	9	9 Y ☐
10	10	10	10	10 Y ☐	10
11 Y ☐	11	11	11	11	11 Y ☐
12 Y ☐	12 Y ☐	12	12	12	12
13	13	13 Y ☐	13	13	13
14	14	14 Y ☐	14	14	14 Y ☐
15	15 Y ☐	15 Y ☐	15	15	15
16	16 Y ☐	16 Y ☐	16	16	16
17	17	17 Y ☐	17	17	17 Y ☐
18	18 Y ☐	18 Y ☐	18	18	18
19	19	19 Y ☐	19	19	19 Y ☐
20	20	20 Y ☐	20	20	20 Y ☐
21		21		21 Y ☐	
22		22 Y ☐		22	
23		23		23	
24 Y ☐		24		24	
25		25		25	
26		26 Y ☐		26	
27 Y ☐		27		27	
28		28		28 Y ☐	
29		29		29 Y ☐	
30 Y ☐		30		30	
31		31		31 Y ☐	
32		32 Y ☐		32	
33		33 Y ☐		33	
34		34		34 Y ☐	
35 Y ☐		35		35	
36 Y ☐		36		36	
37 Y ☐		37		37	
38		38 Y ☐		38	

HOA Raw Score	PSD Raw Score	PAM Raw Score

CONVERSION TABLES

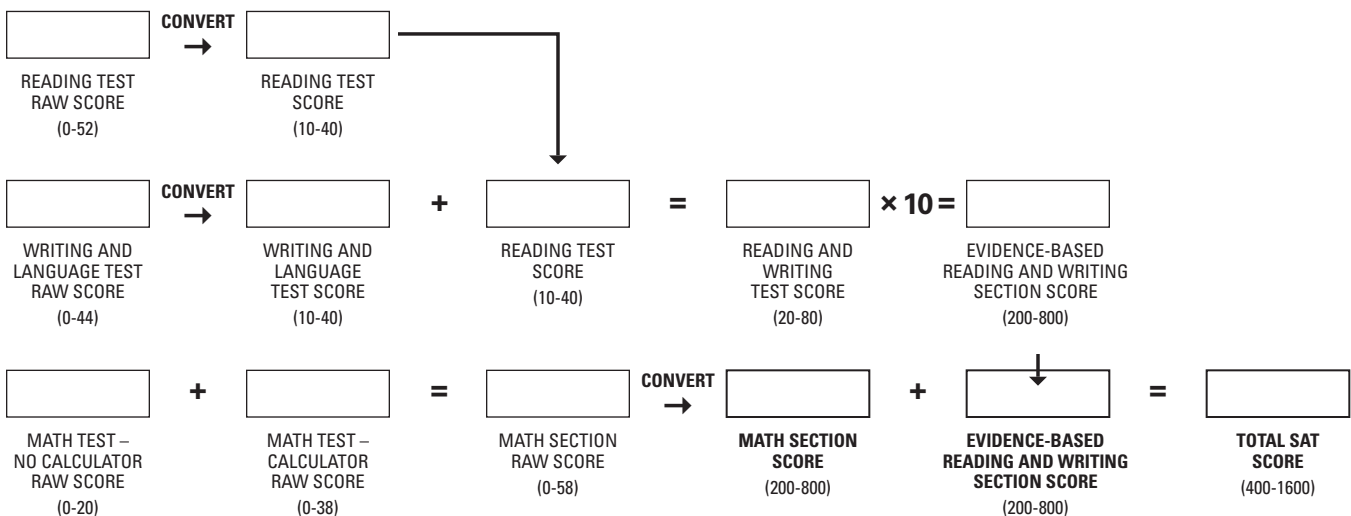## Raw Score Conversion – Section and Test Scores

Section and Test Scores

`RAW SCORE CONVERSION TABLE 1`

Raw Score (# of correct answers)	Math Section Score	Reading Test Score	Writing and Language Test Score	Raw Score (# of correct answers)	Math Section Score	Reading Test Score	Writing and Language Test Score
0	200	10	10	30	530	27	28
1	200	10	10	31	540	27	29
2	220	10	10	32	540	28	29
3	230	11	11	33	550	28	30
4	240	12	12	34	560	29	31
5	260	13	12	35	570	29	32
6	270	13	13	36	570	30	32
7	290	14	14	37	580	30	33
8	300	15	15	38	590	31	34
9	310	16	16	39	600	31	35
10	320	16	16	40	600	32	35
11	340	17	17	41	610	32	37
12	350	18	18	42	620	33	38
13	360	18	18	43	630	33	39
14	370	18	19	44	640	34	40
15	380	19	19	45	650	35	
16	400	19	20	46	660	35	
17	410	20	21	47	670	36	
18	420	20	21	48	670	37	
19	430	21	22	49	680	38	
20	440	21	22	50	690	39	
21	450	22	23	51	700	39	
22	460	23	23	52	720	40	
23	470	23	24	53	730		
24	480	24	24	54	740		
25	490	24	25	55	760		
26	500	25	26	56	770		
27	510	25	26	57	790		
28	520	26	27	58	800		
29	520	26	28				

Section and Test Scores

`CONVERSION EQUATION 1`

| READING TEST RAW SCORE (0-52) | CONVERT → | READING TEST SCORE (10-40) |

| WRITING AND LANGUAGE TEST RAW SCORE (0-44) | CONVERT → | WRITING AND LANGUAGE TEST SCORE (10-40) | + | READING TEST SCORE (10-40) | = | READING AND WRITING TEST SCORE (20-80) | × 10 = | EVIDENCE-BASED READING AND WRITING SECTION SCORE (200-800) |

| MATH TEST – NO CALCULATOR RAW SCORE (0-20) | + | MATH TEST – CALCULATOR RAW SCORE (0-38) | = | MATH SECTION RAW SCORE (0-58) | CONVERT → | MATH SECTION SCORE (200-800) | + | EVIDENCE-BASED READING AND WRITING SECTION SCORE (200-800) | = | TOTAL SAT SCORE (400-1600) |

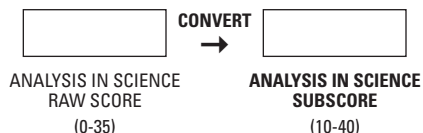# Raw Score Conversion – Cross-Test Scores

Cross-Test Scores

RAW SCORE CONVERSION | TABLE 2

Raw Score (# of correct answers)	Analysis in History/Social Studies Cross-Test Score	Analysis in Science Cross-Test Score	Raw Score (# of correct answers)	Analysis in History/Social Studies Cross-Test Score	Analysis in Science Cross-Test Score
0	10	10	18	26	25
1	10	11	19	27	26
2	11	12	20	28	27
3	12	13	21	28	27
4	13	14	22	29	28
5	14	15	23	30	29
6	16	16	24	30	30
7	17	17	25	31	30
8	18	18	26	32	31
9	19	19	27	32	32
10	20	19	28	33	32
11	21	20	29	34	33
12	22	21	30	35	34
13	23	22	31	36	34
14	24	22	32	36	35
15	24	23	33	37	36
16	25	24	34	39	38
17	26	25	35	40	40

Cross-Test Scores

CONVERSION EQUATION 2

	CONVERT			CONVERT	
ANALYSIS IN HISTORY/ SOCIAL STUDIES RAW SCORE (0-35)	→	**ANALYSIS IN HISTORY/ SOCIAL STUDIES SUBSCORE** (10-40)	ANALYSIS IN SCIENCE RAW SCORE (0-35)	→	**ANALYSIS IN SCIENCE SUBSCORE** (10-40)
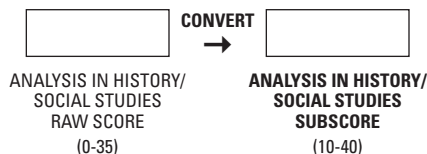
Raw Score Conversion – Subscores

Subscores
RAW SCORE CONVERSION TABLE 3

Raw Score (# of correct answers)	Expression of Ideas	Standard English Conventions	Heart of Algebra	Problem Solving and Data Analysis	Passport to Advanced Math	Words in Context	Command of Evidence
0	1	1	1	1	1	1	1
1	1	1	2	1	2	1	3
2	2	1	3	2	4	1	4
3	2	2	3	3	5	1	5
4	3	3	4	4	6	2	5
5	4	4	5	6	7	3	6
6	4	4	6	7	8	4	6
7	5	5	7	7	8	5	7
8	5	6	7	8	9	5	8
9	6	6	8	9	9	6	8
10	6	7	9	10	10	7	9
11	7	8	9	10	11	8	9
12	7	9	10	11	11	9	10
13	8	9	10	12	12	9	11
14	8	10	11	13	13	10	12
15	9	11	12	14	14	11	12
16	9	12	12	14	15	12	13
17	10	13	13	15		14	14
18	10	14	14			15	15
19	11	15	15				
20	12	15					
21	12						
22	13						
23	14						
24	15						

Subscores
CONVERSION EQUATION 3

	CONVERT →	
COMMAND OF EVIDENCE RAW SCORE (0–18)		**COMMAND OF EVIDENCE SUBSCORE** (1–15)

	CONVERT →	
WORDS IN CONTEXT RAW SCORE (0–18)		**WORDS IN CONTEXT SUBSCORE** (1–15)

	CONVERT →	
EXPRESSION OF IDEAS RAW SCORE (0–24)		**EXPRESSION OF IDEAS SUBSCORE** (1–15)

	CONVERT →	
STANDARD ENGLISH CONVENTIONS RAW SCORE (0–20)		**STANDARD ENGLISH CONVENTIONS SUBSCORE** (1–15)

	CONVERT →	
HEART OF ALGEBRA RAW SCORE (0–19)		**HEART OF ALGEBRA SUBSCORE** (1–15)

	CONVERT →	
PROBLEM SOLVING AND DATA ANALYSIS RAW SCORE (0–17)		**PROBLEM SOLVING AND DATA ANALYSIS SUBSCORE** (1–15)

	CONVERT →	
PASSPORT TO ADVANCED MATH RAW SCORE (0–16)		**PASSPORT TO ADVANCED MATH SUBSCORE** (1–15)