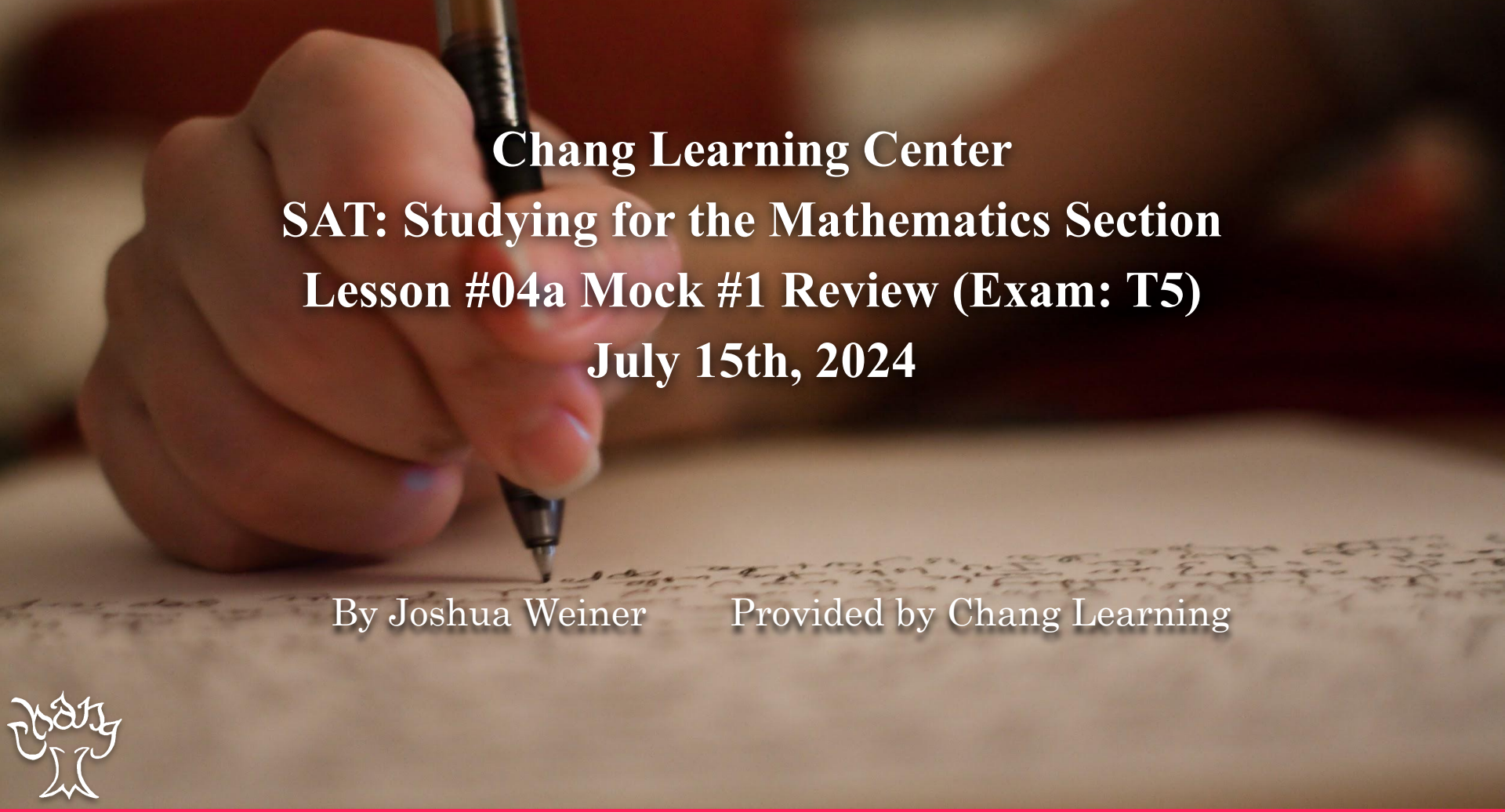


Chang Learning Center
SAT: Studying for the Mathematics Section
Lesson #04a Mock #1 Review (Exam: T5)
July 15th, 2024

By Joshua Weiner Provided by Chang Learning

SAT Math Sections Overview

- The mathematics questions on the SAT will focus on:
-
    - Algebra
    - Geometry
    - Coordinate Planes
    - Charts and Graphs
    - Probability and Statistics
    - Other Mathematics Topics

- SAT Section 3 - Math Test - No calculator: 25 minutes, 20 Questions
- SAT Section 4 - Math Test - Use your calculator: 55 minutes, 38 Questions

SAT Mathematics
2 Modules 27 Questions
54 Questions Total

(1) Algebra
(2) Geometry
(3) Probability & Statistics

SAT Overview

Name: Date:

Chang Learning	SAT Lesson 1: SAT Overview, Basic Algebra Review

Scholastic Achievement Test (SAT)

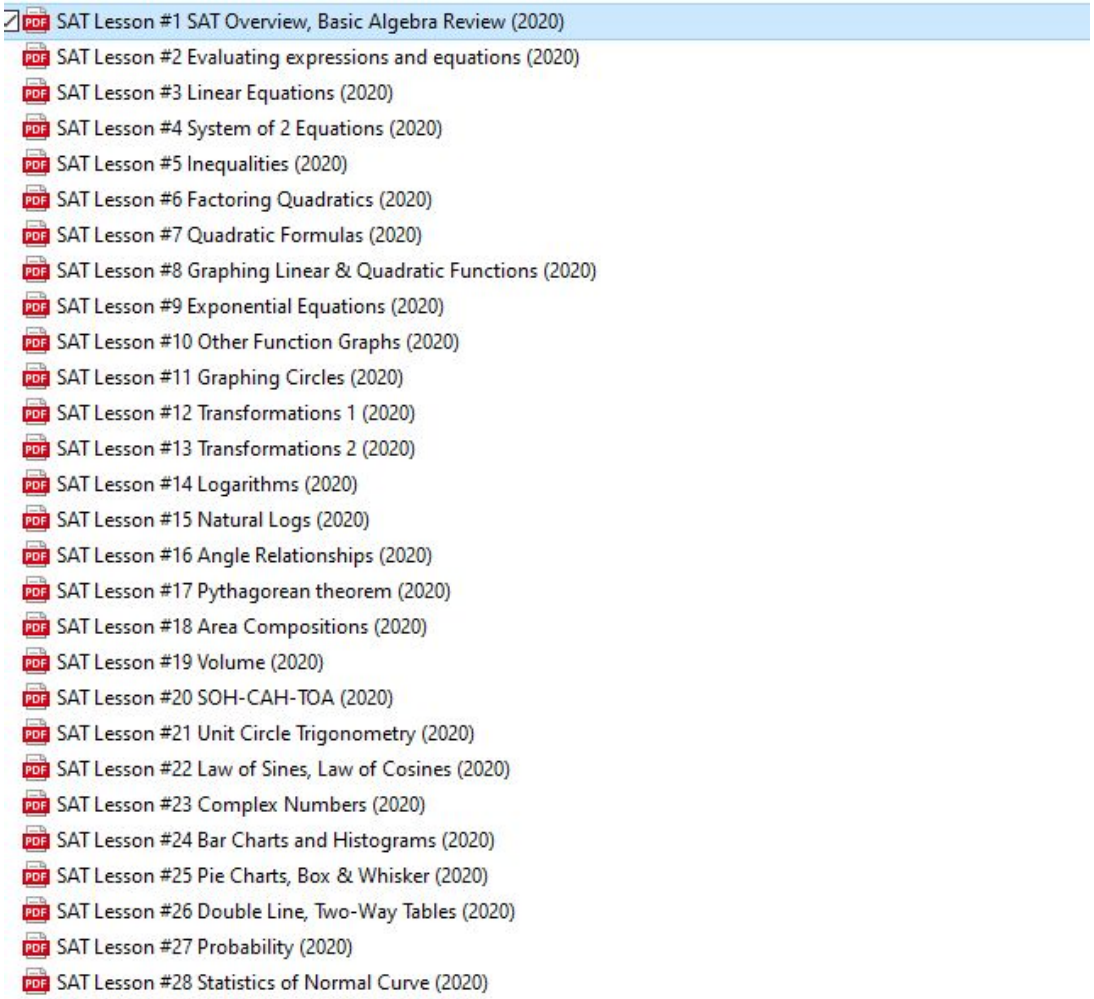
For those interested in pursuing higher education, the SAT is still considered to be the benchmark exam as a metric for student academic progress. In the past few years, the number of seniors taking the SAT in the United States has increased from 1 to over 1.7 million. The mathematics questions on the SAT are contained in two sections:

Section 3	Section 4
20 Questions	38 Questions
25 Minutes	55 Minutes
No Calculator	Calculator
15 Multiple Choice	30 Multiple Choice
5 Grid In Questions	8 Grid In Questions

According to most sources, the SAT contains the following topics in the 58 test questions:

Topic	Subtopic	3	4
Algebra	Linear Equations	40%	30%
	Systems of Equations		
	Linear Inequalities		
Problem Solving & Data Analysis	Ratios & Proportions	0%	45%
	Representing Quantitative Data		
	Probability		
Passport to Advanced Mathematics	Equivalent Algebraic Expressions	45%	15%
	Quadratic & Nonlinear Functions		
Geometry	Area & Volume	15%	10%
	Polygons, Circles		

SAT Mathematics Preparation Course

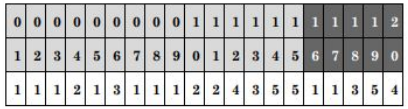


Name: **Date:**

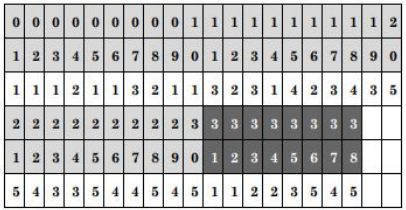
Chang Learning	SAT Lesson 1: SAT Overview, Basic Algebra Review

The test questions are a combination of algebraic expressions, algebraic equations, word problems and graphics. Each section follows an "easy to hard" level of difficulty. The MULTIPLE CHOICE questions and GRID-IN questions are grouped from easy to hard (below ranked as question types "level 1 to 5".

Section 3
1 = *easy level*
5 = *difficult*



Section 4
1 = *easy level*
5 = *difficult*



This is important for time management on the SAT. If you are short on time, then it is important to answer as many SAT questions as possible. You can SKIP the end subsection questions and jump to the first GRID-IN questions and complete them first. Then, if time permits, go and complete the hard level questions at the end of each subsection.

The breakdown of the SAT Mathematics Sections

	Easy	Difficult	Easy	Difficult
Section 3	#1 to 10	#11 to 15	#16 to 17	#18 to 20
Section 4	#1 to 20	#21 to 30	#31 to 34	#35 to 38

SAT Mathematics Questions:

A Practical Beginner Strategy:

Complete Section 3: #1-10 and #16-18 (13 Questions)
Complete Section 4: #1-20 and #31-34 (24 Questions)

These are 37 of the 58 total Mathematics Questions.

A raw score of 24-40 correct usually earns a mathematics SAT score of 500-600.

Algebra
Geometry
Statistics

SAT Mathematics
Your Vote Matters!!
Pick 15 Challenge Questions

Section 2: Module 1

Section 2: Module 2

SAT Mathematics

Section 2: Module 1

20 Multiple Choice

7 Grid In

27 Questions Total

Math

27 QUESTIONS

DIRECTIONS

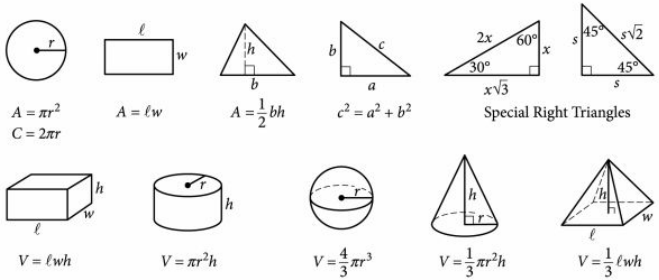
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- 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.

For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find **more than one correct answer**, write and circle only one answer.
- Your answer can be up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer, but no more.
- If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.
- If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.
- If your answer is a **mixed number** (such as $3\frac{1}{2}$), write it as an improper fraction (7/2) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

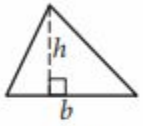
SAT Formula Sheet

REFERENCE

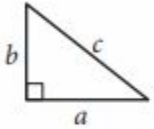
$A = \pi r^2$

$C = 2\pi r$

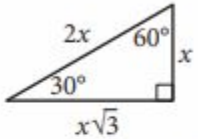
$A = \ell w$

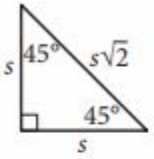


$A = \frac{1}{2}bh$

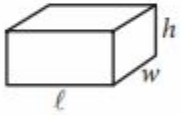


$c^2 = a^2 + b^2$

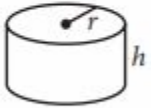




Special Right Triangles

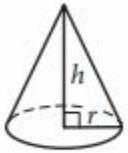


$V = \ell wh$

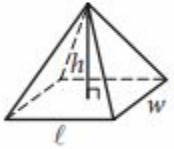


$V = \pi r^2 h$

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



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



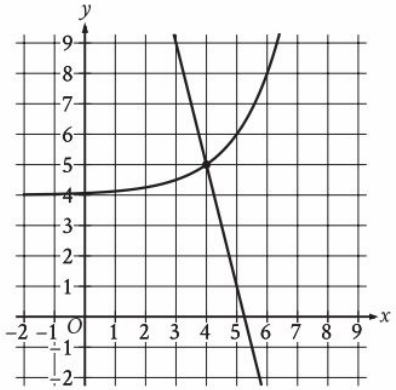
$V = \frac{1}{3}\ell wh$

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.

1



The graph of a system of a linear equation and a nonlinear equation is shown. What is the solution (x, y) to this system?

A) (0, 0)

B) (0, 4)

C) (4, 5)

D) (5, 0)

2

On the first day of a semester, a film club has 90 members. Each day after the first day of the semester, 10 new members join the film club. If no members leave the film club, how many total members will the film club have 4 days after the first day of the semester?

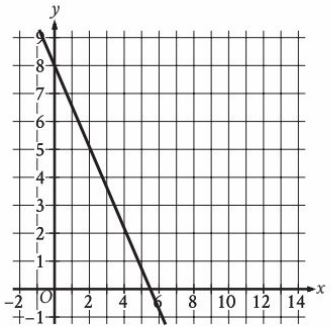
A) 400

B) 130

C) 94

D) 90

3



The graph of the linear function f is shown, where $y = f(x)$. What is the y-intercept of the graph of f?

A) $(0, 0)$

B) $\left(0, -\frac{16}{11}\right)$

C) $(0, -8)$

D) $(0, 8)$

4

$$s + 7r = 27$$
$$r = 3$$

What is the solution (r, s) to the given system of equations?

A) $(6, 3)$

B) $(3, 6)$

C) $(3, 27)$

D) $(27, 3)$

5

The table shows selected values from function f.

x	$f(x)$
−1	16
0	17
1	18
2	19

Which of the following is the best description of function f ?

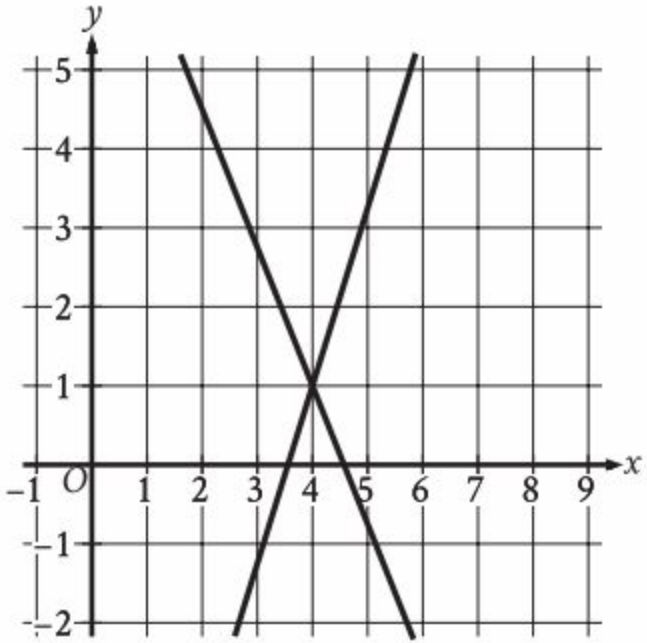
A) Decreasing linear

B) Increasing linear

C) Decreasing exponential

D) Increasing exponential

6



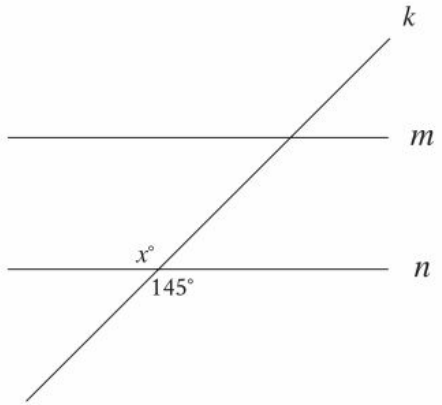
The graph of a system of linear equations is shown. The solution to the system is (x, y). What is the value of x ?

7

23, 27, 27, 32, 35, 36, 52

What is the range of the 7 scores shown?

8



Note: Figure not drawn to scale.

In the figure, line m is parallel to line n, and line k intersects both lines. Which of the following statements is true?

A) The value of x is less than 145.

B) The value of x is greater than 145.

C) The value of x is equal to 145.

D) The value of x cannot be determined.

9

The equation $x + y = 1{,}440$ represents the number of minutes of daylight (between sunrise and sunset), x, and the number of minutes of non-daylight, y, on a particular day in Oak Park, Illinois. If this day has 670 minutes of daylight, how many minutes of non-daylight does it have?

A) 670

B) 770

C) 1,373

D) 1,440

10

Scott selected 20 employees at random from all 400 employees at a company. He found that 16 of the employees in this sample are enrolled in exactly three professional development courses this year. Based on Scott's findings, which of the following is the best estimate of the number of employees at the company who are enrolled in exactly three professional development courses this year?

A) 4

B) 320

C) 380

D) 384

11

If $4x - 28 = -24$, what is the value of $x - 7$?

A) -24

B) -22

C) -6

D) -1

12

For a snowstorm in a certain town, the minimum rate of snowfall recorded was 0.6 inches per hour, and the maximum rate of snowfall recorded was 1.8 inches per hour. Which inequality is true for all values of s, where s represents a rate of snowfall, in inches per hour, recorded for this snowstorm?

A) $s \geq 2.4$

B) $s \geq 1.8$

C) $0 \leq s \leq 0.6$

D) $0.6 \leq s \leq 1.8$

13

$$y = 4x$$

$$y = x^2 - 12$$

A solution to the given system of equations is (x, y), where $x > 0$. What is the value of x ?

14

A store sells two different-sized containers of blueberries. The store's sales of these blueberries totaled 896.86 dollars last month. The equation $4.51x + 6.07y = 896.86$ represents this situation, where x is the number of smaller containers sold and y is the number of larger containers sold. According to the equation, what is the price, in dollars, of each smaller container?

15

A right circular cylinder has a base diameter of 22 centimeters and a height of 6 centimeters. What is the volume, in cubic centimeters, of the cylinder?

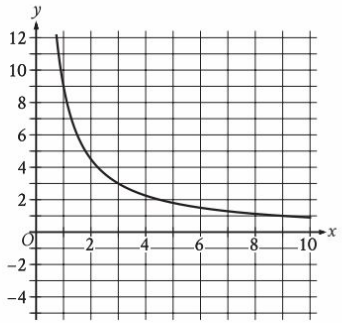
A) 132π

B) 264π

C) 726π

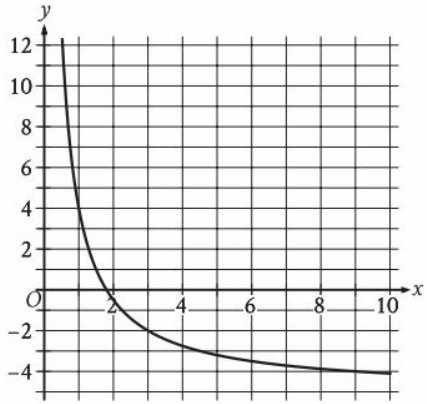
D) $2{,}904\pi$

16

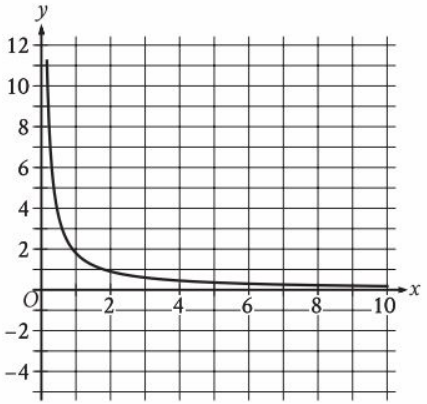


The graph of the rational function f is shown, where $y = f(x)$ and $x \geq 0$. Which of the following is the graph of $y = f(x) + 5$, where $x \geq 0$?

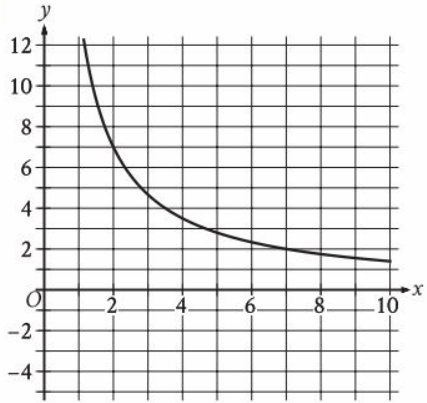
A)



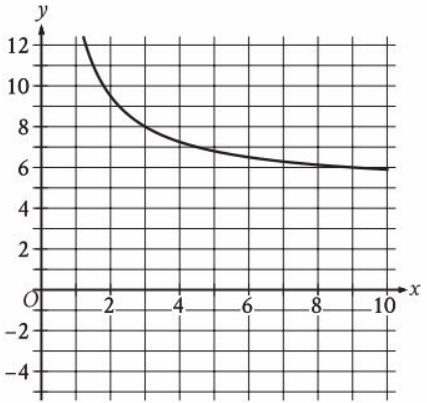
B)



C)



D)



17

At a particular track meet, the ratio of coaches to athletes is 1 to 26. If there are x coaches at the track meet, which of the following expressions represents the number of athletes at the track meet?

A) $\frac{x}{26}$

B) $26x$

C) $x + 26$

D) $\frac{26}{x}$

18

Kaylani used fabric measuring 5 yards in length to make each suit for a men's choir. The relationship between the number of suits that Kaylani made, x, and the total length of fabric that she purchased y, in yards, is represented by the equation $y - 5x = 6$. What is the best interpretation of 6 in this context?

A) Kaylani made 6 suits.

B) Kaylani purchased a total of 6 yards of fabric.

C) Kaylani used a total of 6 yards of fabric to make the suits.

D) Kaylani purchased 6 yards more fabric than she used to make the suits.

19

What is the value of $\tan \frac{92\pi}{3}$?

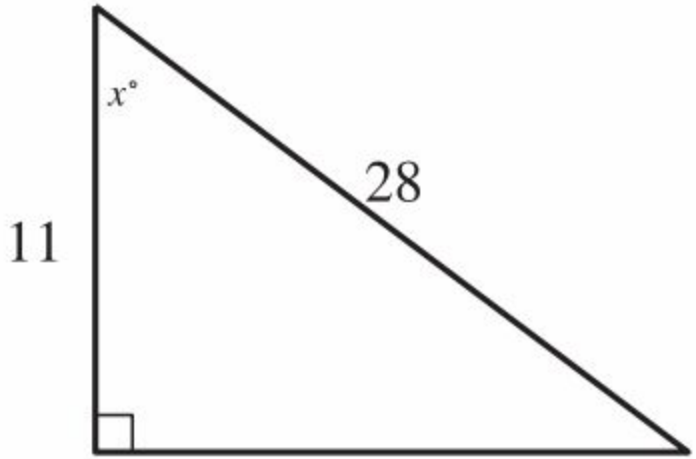
A) $-\sqrt{3}$

B) $-\frac{\sqrt{3}}{3}$

C) $\frac{\sqrt{3}}{3}$

D) $\sqrt{3}$

20



Note: Figure not drawn to scale.

In the triangle shown, what is the value of cos $x°$?

21

The function g is defined by $g(x) = (x + 14)(t - x)$, where t is a constant. In the xy-plane, the graph of $y = g(x)$ passes through the point $(24, 0)$. What is the value of $g(0)$?

22

$$(x + 4)^2 + (y - 19)^2 = 121$$

The graph of the given equation is a circle in the xy-plane. The point (a, b) lies on the circle. Which of the following is a possible value for a ?

A) -16

B) -14

C) 11

D) 19

23

A right rectangular prism has a height of 9 inches. The length of the prism's base is x inches, which is 7 inches more than the width of the prism's base. Which function V gives the volume of the prism, in cubic inches, in terms of the length of the prism's base?

A) $V(x) = x(x + 9)(x + 7)$

B) $V(x) = x(x + 9)(x - 7)$

C) $V(x) = 9x(x + 7)$

D) $V(x) = 9x(x - 7)$

24

Which of the following functions has(have) a minimum value at -3 ?

I. $f(x) = -6(3)^x - 3$

II. $g(x) = -3(6)^x$

A) I only

B) II only

C) I and II

D) Neither I nor II

25

The result of increasing the quantity x by 400% is 60. What is the value of x ?

A) 12

B) 15

C) 240

D) 340

26

The function f is defined by $f(x) = ax^2 + bx + c$, where a, b, and c are constants. The graph of $y = f(x)$ in the xy-plane passes through the points $(7, 0)$ and $(-3, 0)$. If a is an integer greater than 1, which of the following could be the value of $a + b$?

A) -6

B) -3

C) 4

D) 5

27

The function g is defined by $g(x) = x(x-2)(x+6)^2$.

The value of $g(7-w)$ is 0, where w is a constant.

What is the sum of all possible values of w ?

SAT Mathematics
Section 2: Module 2
20 Multiple Choice
7 Grid In

27 Questions Total

Math

27 QUESTIONS

DIRECTIONS

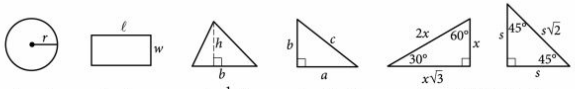
The questions in this section address a number of important math skills.
Use of a calculator is permitted for all questions.

NOTES

Unless otherwise indicated:

- All variables and expressions represent real numbers.
- Figures provided are drawn to scale.
- All figures lie in a plane.
- 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

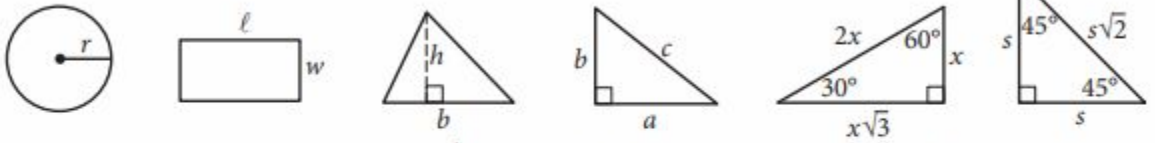
For multiple-choice questions, solve each problem, choose the correct answer from the choices provided, and then circle your answer in this book. Circle only one answer for each question. If you change your mind, completely erase the circle. You will not get credit for questions with more than one answer circled, or for questions with no answers circled.

For student-produced response questions, solve each problem and write your answer next to or under the question in the test book as described below.

- Once you've written your answer, circle it clearly. You will not receive credit for anything written outside the circle, or for any questions with more than one circled answer.
- If you find **more than one correct answer**, write and circle only one answer.
- Your answer can be up to 5 characters for a **positive** answer and up to 6 characters (including the negative sign) for a **negative** answer, but no more.
- If your answer is a **fraction** that is too long (over 5 characters for positive, 6 characters for negative), write the decimal equivalent.
- If your answer is a **decimal** that is too long (over 5 characters for positive, 6 characters for negative), truncate it or round at the fourth digit.
- If your answer is a **mixed number** (such as $3\frac{1}{2}$), write it as an improper fraction (7/2) or its decimal equivalent (3.5).
- Don't include **symbols** such as a percent sign, comma, or dollar sign in your circled answer.

SAT Formula Sheet

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.

1

What is 20% of 440?

A) 44

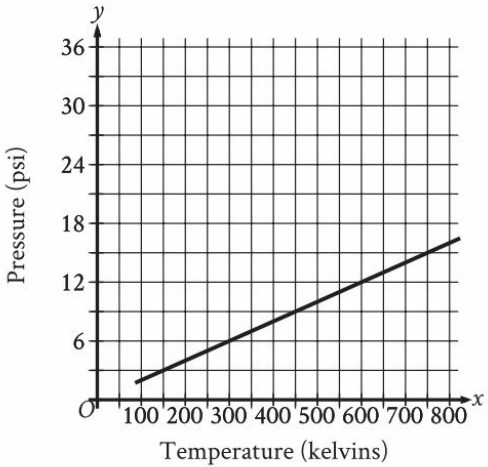
B) 88

C) 880

D) 1,760

2

Argon is placed inside a container with a constant volume. The graph shows the estimated pressure y, in pounds per square inch (psi), of the argon when its temperature is x kelvins.



What is the estimated pressure of the argon, in psi, when the temperature is 600 kelvins?

A) 6

B) 12

C) 300

D) 600

3

The function f is defined by $f(x) = 4x - 3$. What is the value of $f(10)$?

A) -30

B) 37

C) 40

D) 43

4

Which expression is equivalent to $16x^3y^2 + 14xy$?

A) $2xy(8xy + 7)$

B) $2xy(8x^2y + 7)$

C) $14xy(2x^2y + 1)$

D) $14xy(8x^2y + 1)$

5

A veterinarian recommends that each day a certain rabbit should eat 25 calories per pound of the rabbit's weight, plus an additional 11 calories. Which equation represents this situation, where c is the total number of calories the veterinarian recommends the rabbit should eat each day if the rabbit's weight is x pounds?

A) $c = 25x$

B) $c = 36x$

C) $c = 11x + 25$

D) $c = 25x + 11$

6

If $6n = 12$, what is the value of $n + 4$?

7

$$(d - 30)(d + 30) - 7 = -7$$

What is a solution to the given equation?

8

Line r in the xy-plane has a slope of 4 and passes through the point $(0, 6)$. Which equation defines line r ?

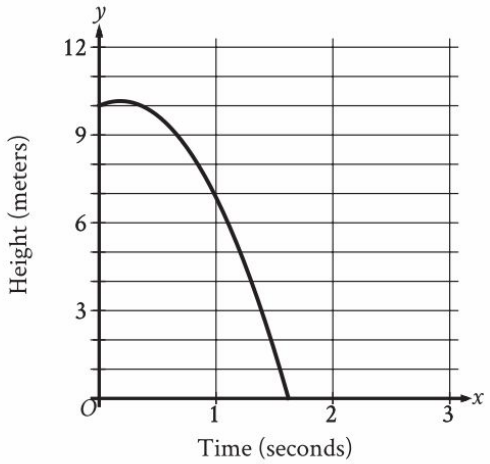
A) $y = -6x + 4$

B) $y = 6x + 4$

C) $y = 4x - 6$

D) $y = 4x + 6$

9



A competitive diver dives from a platform into the water. The graph shown gives the height above the water y, in meters, of the diver x seconds after diving from the platform. What is the best interpretation of the x-intercept of the graph?

A) The diver reaches a maximum height above the water at 1.6 seconds.

B) The diver hits the water at 1.6 seconds.

C) The diver reaches a maximum height above the water at 0.2 seconds.

D) The diver hits the water at 0.2 seconds.

10

The kinetic energy, in joules, of an object with mass 9 kilograms traveling at a speed of v meters per second is given by the function K, where $K(v) = \frac{9}{2}v^2$. Which of the following is the best interpretation of $K(34) = 5{,}202$ in this context?

A) The object traveling at 34 meters per second has a kinetic energy of 5,202 joules.

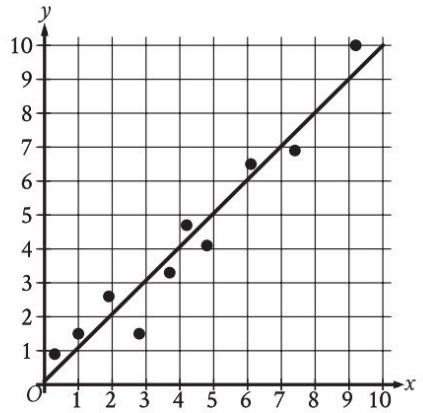
B) The object traveling at 340 meters per second has a kinetic energy of 5,202 joules.

C) The object traveling at 5,202 meters per second has a kinetic energy of 34 joules.

D) The object traveling at 23,409 meters per second has a kinetic energy of 34 joules.

11

The scatterplot shows the relationship between two variables x and y. A line of best fit for the data is also shown.



For how many of the 10 data points is the actual y-value greater than the y-value predicted by the line of best fit?

A) 3

B) 4

C) 6

D) 7

12

At a movie theater, there are a total of 350 customers. Each customer is located in either theater A, theater B, or theater C. If one of these customers is selected at random, the probability of selecting a customer who is located in theater A is 0.48, and the probability of selecting a customer who is located in theater B is 0.24. How many customers are located in theater C?

A) 28

B) 40

C) 84

D) 98

13

What is the slope of the graph of

$y = \frac{1}{3}(29x + 10) + 5x$ in the xy-plane?

14

The length of each edge of a box is 29 inches. Each side of the box is in the shape of a square. The box does not have a lid. What is the exterior surface area, in square inches, of this box without a lid?

15

Five *Eretmochelys imbricata*, a type of sea turtle, each have a nest. The table shows an original data set of the number of eggs that each turtle laid in its nest.

Nest	Number of eggs
A	149
B	144
C	148
D	136
E	139

A sixth nest with 121 eggs is added to create a new data set. Which of the following correctly compares the means of the two data sets?

A) The mean of the original data set is greater than the mean of the new data set.

B) The mean of the original data set is less than the mean of the new data set.

C) The means of both data sets are equal.

D) There is not enough information to compare the means.

16

In $\triangle RST$, the measure of $\angle R$ is $63°$. Which of the following could be the measure, in degrees, of $\angle S$?

A) 116

B) 118

C) 126

D) 180

17

Which expression is equivalent to $(8x^3 + 8) - (x^3 - 2)$?

A) $8x^3 + 6$

B) $7x^3 + 10$

C) $8x^3 + 10$

D) $7x^3 + 6$

18

If $4\sqrt{2x} = 16$, what is the value of $6x$?

A) 24

B) 48

C) 72

D) 96

19

$$2x - y > 883$$

For which of the following tables are all the values of x and their corresponding values of y solutions to the given inequality?

A)

x	y
440	0
441	−2
442	−4

B)

x	y
440	0
442	−2
441	−4

C)

x	y
442	0
440	−2
441	−4

D)

x	y
442	0
441	−2
440	−4

20

$$5y = 10x + 11$$
$$-5y = 5x - 21$$

The solution to the given system of equations is (x, y). What is the value of $30x$?

21

A rectangle is inscribed in a circle, such that each vertex of the rectangle lies on the circumference of the circle. The diagonal of the rectangle is twice the length of the shortest side of the rectangle. The area of the rectangle is $1{,}089\sqrt{3}$ square units. What is the length, in units, of the diameter of the circle?

22

Rectangles *ABCD* and *EFGH* are similar. The length of each side of *EFGH* is 6 times the length of the corresponding side of *ABCD*. The area of *ABCD* is 54 square units. What is the area, in square units, of *EFGH*?

A) 9

B) 36

C) 324

D) 1,944

23

Which expression is equivalent to $\frac{42a}{k} + 42ak$, where $k > 0$?

A) $\frac{84a}{k}$

B) $\frac{84ak^2}{k}$

C) $\frac{42a(k+1)}{k}$

D) $\frac{42a(k^2+1)}{k}$

24

Which quadratic equation has no real solutions?

A) $x^2 + 14x - 49 = 0$

B) $x^2 - 14x + 49 = 0$

C) $5x^2 - 14x - 49 = 0$

D) $5x^2 - 14x + 49 = 0$

25

$$P(t) = 260(1.04)^{\left(\frac{6}{4}\right)t}$$

The function P models the population, in thousands, of a certain city t years after 2003. According to the model, the population is predicted to increase by 4% every n months. What is the value of n ?

A) 8

B) 12

C) 18

D) 72

26

A circle in the xy-plane has its center at $(-1, 1)$. Line t is tangent to this circle at the point $(5, -4)$. Which of the following points also lies on line t ?

A) $\left(0, \frac{6}{5}\right)$

B) $(4, 7)$

C) $(10, 2)$

D) $(11, 1)$

27

For an electric field passing through a flat surface perpendicular to it, the electric flux of the electric field through the surface is the product of the electric field's strength and the area of the surface. A certain flat surface consists of two adjacent squares, where the side length, in meters, of the larger square is 3 times the side length, in meters, of the smaller square. An electric field with strength 29.00 volts per meter passes uniformly through this surface, which is perpendicular to the electric field. If the total electric flux of the electric field through this surface is 4,640 volts · meters, what is the electric flux, in volts · meters, of the electric field through the larger square?

SAT Section 2 - Math Module 1

No calculators allowed

43 minutes to complete 27 questions

SAT Section 2 - Math Module 2

Use your calculator

43 minutes to complete 27 questions

A few Test-Taking Strategies

- Prepare in an organized way: Focus on ALGEBRA, GEOMETRY, COORDINATE PLANE, CHARTS & GRAPHS and STATISTICS lessons from Grades 9-10
- Be comfortable with the SAT Level of questions by exposure to as many practice questions as possible. The SAT is a patterned exam.
- Work on Time Management. Be sure to complete "easy to mid" level questions first.
- Some multiple choice questions can be solved by PLUG IN of the answer choices.
- Some multiple choice questions can be simplified by PLUG IN A VALUE for the variable (Plug in "1,2,3,4 or 5")
- ESTIMATE the answer to save procedural time on questions.
- Study and MEMORIZE FORMULAS and SOLUTION METHODS before the exam.
- Look for SHORTCUTS

Chang Learning Center
SAT Preparation

Mathematics

Quiz
Lesson
Homework