

PSAT MATH

PSAT / NMSQT FACTS

Sub Section 1:

45 minute Calculator optional section

Sub Section 2:

25 minute No-Calculator section

-THERE ARE 48 QUESTIONS IN THESE TWO SECTIONS-

40 Multiple-Choice & 8 Student-Produced Responses ("Grid-In" Questions).

The multiple-choice questions provide four possible answer where students determine which of the choices is the correct solution to each question.

For the Grid-In questions, you must calculate and grid the correct answers. No answer choices are given. Some Grid-In questions can have more than one answer.



GRID-IN QUESTIONS

Although most of the questions on the Math section are multiple-choice, 17 percent are student-produced response questions, also known as grid-ins.

Instead of choosing a correct answer from a list of options, you'll need to Solve Problems and Enter your answer in the grids provided on the answer sheet.

Only answers indicated by filling in the circle will be scored (you won't receive credit for anything written in the boxes located above the circles).

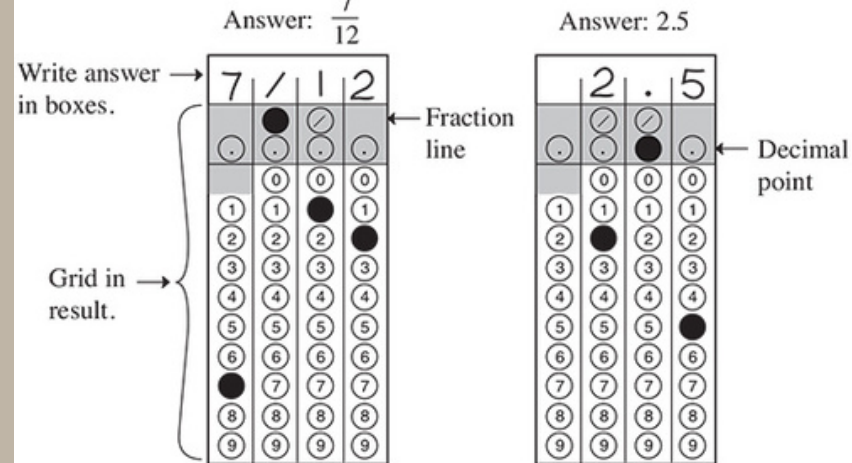
It doesn't matter in which column you begin entering the answers, as long as the responses are recorded within the grid area, you'll receive credit.

The grid can hold only four decimal places and can only accommodate positive numbers and zero.

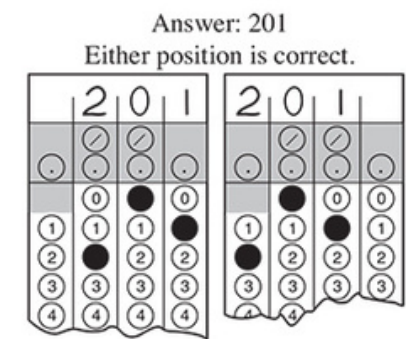
Fractions like 3 over 24 do not need to be reduced to their lowest terms.

All mixed numbers need to be converted to improper fractions before being recorded in the grid. Unless a problem indicates otherwise, answers can be entered on the grid as a decimal or a fraction.

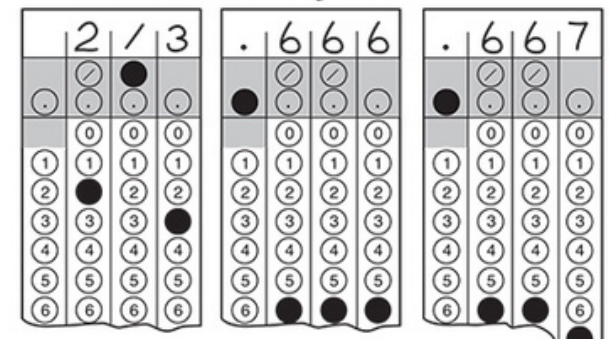
If the answer is a repeating decimal, you must grid the most accurate value the grid will accommodate.



Mark NO more than one circle in any column.



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



There are Four Areas in the PSAT Math Section

- **Heart of Algebra**

Analyzing and fluently solving equations and systems of equations, Creating Expressions, Equations, and Inequalities to represent relationships between quantities and to solve problems, rearranging and interpreting formulas

- **Problem Solving & Data Analysis**

Substitution and simplifying algebraic expressions, properties of exponents, Algebraic word problems, Linear Equations and Inequalities, Systems of Equations and Inequalities, Rational and Radical Equations, Equations of Lines, Absolute Value, Direct and Inverse Variation, Quadratic Equations, Algebraic Functions

- **Passport to Advanced Math**

Area and Perimeter of a Polygon; Area and Circumference of a Circle; Volume, Pythagorean Theorem, Equilateral, and Right Triangles, Parallel and Perpendicular Lines, Coordinate Geometry, Slope, Transformations.

- **Plus Additional Topics in Math, including Geometry, Trigonometry, & Pre-Calculus**

Data Interpretation, Statistics, Mean, Median, and Mode; Probability

MATH COMPONENTS YOU SHOULD REVIEW BEFORE THE PSAT

HOW IT ALL BREAKS DOWN

The Heart of Algebra Section

This section will ask you to do one or more of the following:

- Define at least one variable to represent quantities in question.
- Write at least one equation, expression inequality, or function that represents the relationship in question, or solve an equation and interpret the solution in terms of what the question is asking.

Example: In 2014, County X had 783 miles of paved roads. Starting in 2015, the county has been building 8 miles of newly paved roads each year. At this rate, how many miles of paved road will County X have in 2030? (Assume that no paved roads go out of service)

The 1st step in answering this question is to decide what variable or variables you need to define. The question is asking how the number of miles of paved road in County X depends on the year. This can be represented using n , the number of years after 2014. Then, since the question says that County X had 783 miles of paved roads in 2014 and is building 8 miles of newly paved roads each year, **the expression $783 + 8n$** gives the number of miles of paved roads in County X in the year that is **n year after 2014**. The year 2030 is **$2030 - 2014 = 16$ years after 2014**; thus, the year 2030 corresponds to **$n=16$** . Hence, to find the number of miles of paved roads in County X in 2030, substitute **16** for **n** in the expression **$783 + 8n = 783 + 128 = 911$** .

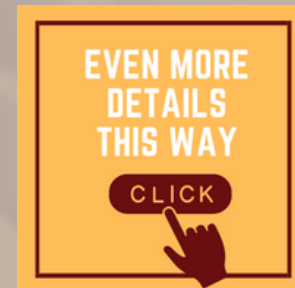
Therefore, at the given rate of building County X will have 911 mile of paved roads in 2030.



**Click
&
Give it a
try**

HOW IT ALL BREAKS DOWN

Problem & Data Analysis



This section of the PSAT gauges your ability to understand and apply Quantitative Reasoning about Ratios, Rates, and Proportional Relationships.

Some questions present information about the relationship between two variables in a graph, scatterplot, or table.

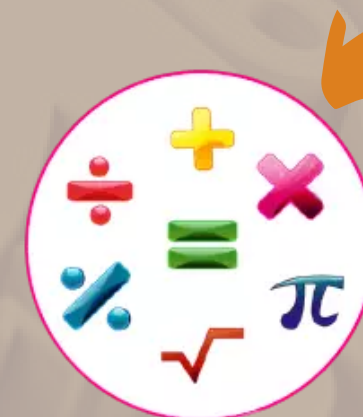
this section will also question you on your understanding of essential concepts in statistics, as well as assessing your conceptual meaning of standard deviation (not to calculate it)

Example: On Thursday, 240 adults and children attended a show. the ratio of adults to children was 5 to 1. How many children attended the show?

- A. 40
- B. 48
- C. 192
- D. 200

Because the ratio of adults to children was 5 to 1, there were **5** adults for every **1** child. Thus, of **every 6 people** who attended the show, **5** were adults and **1** was a child. Converted to fractions, **5/6** of the **240** who attended were adults and **1/6** were children.

Therefore, **$1/6 \times 240 = 40$** children attended the show, **which is choice A.**



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HOW IT ALL BREAKS DOWN

Passport to Advanced Math

According to the College Board, Passport to Advanced Math questions focus on "the ability to work with and analyze more complex equations. The questions may require you to demonstrate procedural skill in adding, subtracting, and multiplying polynomials and in factoring polynomials" (2019). This section of the exam testing topics that are important for students to master prior to studying more complex levels of mathematics.

Some content that may be covered on this section of the exam includes creating a quadratic or exponential function, determining the most suitable form of an expression, creating equivalent expressions involving rational exponents, and creating an equivalent form of an algebraic expression

Example: Which of the following is equivalent to $16s^4 - 4t^2$?

- A) $4(s^2 - t)(4s^2 + t)$
- B) $4(s^2 - t)(s^2 + t)$
- C) $4(2s^2 - t)(2s^2 + t)$
- D) $(8s^2 - 2t)(8s^2 + 2t)$

This example appears complex at first, but it is very similar to the equation $x^2 - y^2$, which factors as $(x - y)(x + y)$. The expression $16s^4 - 4t^2$ is also the difference to two squares:

$16s^4 - 4t^2 = (4s^2)^2 - (2t)^2$. Therefore, it can be factored as $(4s^2)^2 - (2t)^2 = (4s^2 - 2t)(4s^2 + 2t)$. This expression can be rewritten as $(4s^2 - 2t)(4s^2 + 2t) = 2(2s^2 - t)(2)(2s^2 + t) = 4(2s^2 - t)(2s^2 + t)$

Which is choice C.

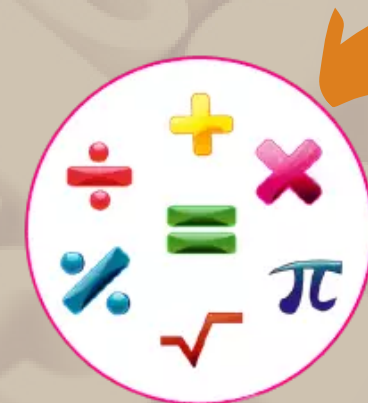
MORE
DETAILS
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EVEN MORE
DETAILS
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HOW IT ALL BREAKS DOWN

Additional Topics in Math, including Geometry, Trigonometry, & Pre-Calculus

Additional Topics in Math questions will ask you to:

Solve problems using volume formulas. You will use given information about figures, such as length of a side, area of the face, or volume of a solid, to calculate missing information. Any required volume formulas will be provided to you either on the formula sheet or within the question.

Use trigonometric ratios and the Pythagorean theorem

To solve applied problems involving right triangles. You will use information about triangle side lengths or angles presented in a context to calculate missing information using the Pythagorean theorem and/or trigonometric ratios. Add, subtract, multiply, divide, and simplify complex numbers.

Use trigonometric ratios and the Pythagorean theorem

To solve applied problems involving right triangles. You will use information about triangle side lengths or angles presented in a context to calculate missing information using the Pythagorean theorem and/or trigonometric ratios.

Convert between degrees and radians and use radians to determine arc length; use trigonometric functions of radian measure

You will convert between angle measures in degrees and radians in order to calculate arc lengths by recognizing the relationship between an angle measured in radians and an arc length, evaluating trigonometric functions of angles in radians.

HOW IT ALL BREAKS DOWN.... CONTINUED

Apply theorems about circles to find arc lengths, angle measures, chord lengths, and areas of sectors.

You will use given information about circles and lines to calculate missing values for radius, diameter, chord length, angle, arc, and sector area.

Use concepts and theorems about congruence and similarity to solve problems about lines angles, and triangles.

You will use theorems about triangles and intersecting lines to determine missing lengths and angle measures of triangles. In addition, you may also be asked to provide a missing length or angle to satisfy a given theorem.

Use the relationship between similarity, right triangles, and trigonometric ratios; use the relationship between sine and cosine of complementary angles.

You will use trigonometry and theorems about triangles and intersecting lines to determine missing lengths and angle measures of right triangles. You may also be asked to provide a missing length or angle that would satisfy a given theorem.

Create or use an equation in two variables to solve a problem about a circle in the coordinate plane

You will create an equation or use properties of an equation of a circle to demonstrate or determine a property of the circle's graph.

MORE
DETAILS
THIS WAY

CLICK



CLICK ON ANY DESCRIPTION FOR THAT FLASH CARD SECTION



PSAT Math Master Flashcard File

Algebraic functions
flashcards

How to find $f(x)$
flashcards

How to use the
quadratic
function
flashcards

Exponential
operations
flashcards

How to find domain
and range of the
inverse of a relation
flashcards

Quadratic
equations
flashcards

Exponents and the
distributive property.
flashcards

How to find the
domain of a
function
flashcards

Linear / rational /
variable equations
flashcards

Complex
numbers
flashcards

Factoring
polynomials
flashcards

How to evaluate a
fraction flashcards

How to find
inverse variation
flashcards

Exponents
flashcards

Exponents
and the
distributive
property.
flashcards

Algebra flashcards

How to simplify
a fraction
flashcards

How to find
the solution
to an
equation
flashcards

Variables flashcards

Algebraic fractions
flashcards

How to find
excluded values
flashcards

How to solve for a
variable as part of a
fraction flashcards

Exponential
ratios and
rational
numbers
flashcards