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THE SCHOLARLY UNICORN'S SAT MATH QUESTION BANK

DR. STEVE WARNER

STUDENT WORKBOOK WITH 1000 PROBLEMS

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The Scholarly Unicorn's SAT Math Question Bank

Student Workbook with 1000 Problems

Dr. Steve Warner

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Actions to Complete Before You Read This Book

1. Purchase a TI-84 or equivalent calculator

It is recommended that you use a TI-84 or comparable calculator for the SAT. Answer explanations (available for free download – see 3 below) will always assume you are using such a calculator.

2. Take a practice SAT from the Official Guide to get your preliminary SAT math score

You can use the Get 800 Diagnostic Math Test (see 3 below), your last PSAT/SAT math score, or an official College Board practice SAT for this. Use this score to help you determine the problems you should be focusing on. Students scoring below 500 should work on only Level 1, 2, and 3 problems. Students scoring between 500 and 600 should work on Level 1, 2, 3, and 4 problems. Students scoring above 600 should work on all problems.

3. Claim your FREE bonuses

See page 248 for details on how to receive solutions to all the problems in this book and other materials, including a diagnostic SAT math test and 2 SAT math practice tests.

4. 'Like' my Facebook page

This page is updated regularly with SAT prep advice, tips, tricks, strategies, and practice problems. Visit the following webpage and click the 'like' button.

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LESSON 1 – HEART OF ALGEBRA
SOLVING LINEAR EQUATIONS

Full solutions to all problems in this book are available for free download. See page 248 for details.
Problems marked with an asterisk (*) require a calculator.

LEVEL 1

1. If $5 + x + x = 1 + x + x + x$, what is the value of x ?

   A) 1
   B) 2
   C) 3
   D) 4

$$x + x + 6x - 6 = 5 + 4 + 2x + x + x + x$$

2. In the equation above, what is the value of x ?

   A) 5
   B) $\frac{15}{4}$
   C) $-\frac{2}{3}$
   D) -5

3. If $2j = \frac{x-4}{3}$ and $j = 6$, what is the value of x ?

   A) 10
   B) 20
   C) 30
   D) 40

4. For what value of x is $\frac{5x}{2} - 7 = 23$?

$$\frac{3}{7}x = \frac{4}{3}$$

5. What value of x is the solution of the equation above?

   A) $\frac{4}{7}$
   B) $\frac{9}{7}$
   C) $\frac{28}{9}$
   D) $\frac{28}{3}$

LEVEL 2

$$L = 11 + 1.6M$$

6. One end of an elastic band is taped to the bottom of a ceiling fan. When an object of mass M kilograms is attached to the other end of the elastic band, the band stretches to a length of L centimeters as shown in the equation above. What is M when $L = 13$?

7. If $4x - 5 = 53$, what is the value of $12x - 2$?

LEVEL 3

8. If $15x = 73$, what is the value of $3(x + \frac{4}{5})$?

   A) 17
   B) 15
   C) $\frac{73}{15}$
   D) $\frac{77}{15}$

9. On Sunday, Janice studied 3 more hours than Chris. If they studied for a combined total of 13 hours, how many hours did Chris study for on Sunday?

   A) 5
   B) 6
   C) 7
   D) 8

LEVEL 4

10. A gymnast's final score is determined by the sum of the difficulty score and execution score, less any deductions for neutral errors. Jackie had a difficulty score of p points and an execution score of q points. Assuming that Jackie lost $\frac{1}{8}$ of a point for each of her 20 neutral errors and had a final score of 6.5, what is the value of $p + q$?

LESSON 2 – PASSPORT TO ADVANCED MATH
FACTORING

LEVEL 1

1. Which of the following is equivalent to the expression $35b + 40bk$?

   A) $(7 + 8k)b$
   B) $(35 + 40k)b$
   C) $75(b + 2k)$
   D) $75b^2k$

$$7x(y + 4z)$$

2. Which of the following is equivalent to the expression above?

   A) $xy + 11xz$
   B) $7xy + 11xz$
   C) $7xy + 4z$
   D) $7xy + 28xz$

LEVEL 2

$$3x^2 - 7 = (ax + b)(ax - b)$$

3. In the equation above, a and b are constants. Which of the following could be the value of a ?

   A) 1.5
   B) $\sqrt{3}$
   C) 3
   D) 9

4. The length of a rectangular garden is k meters, and the width of the garden is 10 meters longer than its length. Which of the following expresses the area, in meters, of the garden in terms of k ?

   A) $2k + 10$
   B) $4k + 20$
   C) $k^2 + 10$
   D) $k^2 + 10k$

LEVEL 3

$$4x^4 + 16x^2y^2 + 16y^4$$

5. Which of the following is equivalent to the expression shown above?

   A) $(2x + 4y)^4$
   B) $(2x^2 + 4y^2)^2$
   C) $(4x + 16y)^4$
   D) $(4x^2 + 16y^2)^2$

6. Which of the following is equivalent to the expression $x^3y + x^2y^3 + 3x + 3y^2$?

A) $x^2y(x + 1) + 3x(x + y^2)$
B) $(xy + 3)(x^2 + y^2)$
C) $(x^2y + 3)(x + y^2)$
D) $x^2y(x + 3 + y)$

$$7(a + b) = 2(b - a)$$

7. If (a, b) is a solution to the equation above and $a \neq 0$, what is the ratio $\frac{b}{a}$?

A) $-\frac{9}{5}$
B) $-\frac{8}{5}$
C) 8
D) 11

8. Which of the following is equivalent to $(\frac{ab}{c})(cb - a)$?

A) $ab^2 - \frac{b}{c}$
B) $ab^2 - \frac{a^2b}{c}$
C) $\frac{ab}{c} - \frac{a^2b}{c}$
D) $\frac{ab}{c} - a^2bc$

LEVEL 4

9. If $x - y = \frac{27}{2}$ and $x + y = \frac{4}{9}$, what is the value of $x^2 - y^2$?

10. Let $m = 2x + 7$ and $k = 2x - 7$, and write $km = cx^2 + d$, where c and d are constants. What is the value of $c - d$?

LESSON 3 – PROBLEM SOLVING
RATIOS

LEVEL 1

1. At an adoption center, 4 guinea pigs are selected at random from each group of 15. At this rate, how many guinea pigs will be selected in total if the adoption center has 90 guinea pigs?

2. * In a random sample of 125 light bulbs, 4 are found to be broken. At this rate, how many of 9,750 light bulbs will be broken?

   A) 250
   B) 268
   C) 300
   D) 312

3. * The sculpture *Winged Victory of Samothrace* stands 5.57 meters high and has an approximate width of 1.524 meters. If a duplicate of the sculpture is made where each dimension is $\frac{1}{7}$ the corresponding original dimension, what is the height of the duplicate to the nearest tenth of a meter?

LEVEL 2

4. * The tallest giraffe on record was a male that stood 19.3 feet tall. Approximately what is the height of the tallest giraffe on record in meters? (1 meter ≈ 3.28 feet)

   A) 0.17
   B) 2.79
   C) 5.88
   D) 63.3

5. If a standard pallet can carry 60 boxes, then how many boxes can p pallets carry?

   A) $p + 60$
   B) $\frac{60}{p}$
   C) $\frac{p}{60}$
   D) $60p$

6. * Running at a constant speed, a race horse traveled 205 meters in 8.2 seconds. At this rate, what is the distance, in meters, the horse will travel in 2 minutes?

LEVEL 3

$1 \text{ hectometer} = 100 \text{ meters}$

$10 \text{ decimeters} = 1 \text{ meter}$

7. A manager splits his warehouse into equal subdivisions so that each subdivision has a length of 3 hectometers. Based on the information given above, what is the length, in decimeters, of each subdivison of the warehouse?

   A) 30,000
   B) 3,000
   C) 30
   D) 0.003

8. * Dennis completed a 1600 meter race in 145 seconds. What was his average speed, to the nearest meter, in meters per minute?

LEVEL 4

9. Starting from rest, a cat begins chasing a mouse, traveling d feet in t seconds. For the first ten seconds of the chase, the distance d can be estimated by using the formula $d = 9t^2\sqrt{t}$. Which of the following gives the average speed of the cat, in feet per second, over the first t seconds after the cat begins chasing the mouse, where $0 \leq t \leq 10$.

   A) $9t^2$
   B) $\frac{9t}{\sqrt{t}}$
   C) $9t\sqrt{t}$
   D) $3t\sqrt{t}$

10. The formula $E = \frac{1}{2}mv^2$ gives the kinetic energy E, in joules, of an object with mass m, in kilograms, that is moving with velocity v, in meters per second. A scientist uses the formula to find the kinetic energy of an object moving with velocity w and the kinetic energy of the same object moving with velocity $3.5w$. What is the ratio of the kinetic energy of the faster object to the kinetic energy of the slower object?

About the Author

Dr. Steve Warner, a New York native, earned his Ph.D. at Rutgers University in Pure Mathematics in May 2001. While a graduate student, Dr. Warner won the TA Teaching Excellence Award.

After Rutgers, Dr. Warner joined the Penn State Mathematics Department as an Assistant Professor. In September 2002, Dr. Warner returned to New York to accept an Assistant Professor position at Hofstra University. By September 2007, Dr. Warner had received tenure and was promoted to Associate Professor. He has taught undergraduate and graduate courses in Precalculus, Calculus, Linear Algebra, Differential Equations, Mathematical Logic, Set Theory and Abstract Algebra.

Over that time, Dr. Warner participated in a five-year NSF grant, "The MSTP Project," to study and improve mathematics and science curriculum in poorly performing junior high schools. He also published several articles in scholarly journals, specifically on Mathematical Logic.

Dr. Warner has more than 15 years of experience in general math tutoring and tutoring for standardized tests such as the SAT, ACT and AP Calculus exams. He has tutored students both individually and in group settings.

In February 2010 Dr. Warner released his first SAT prep book "The 32 Most Effective SAT Math Strategies," and in 2012 founded Get 800 Test Prep. Since then Dr. Warner has written books for the SAT, ACT, SAT Math Subject Tests, AP Calculus exams, and GRE.

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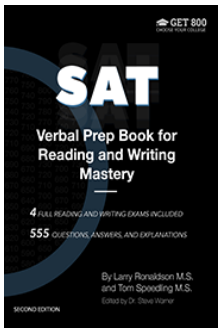
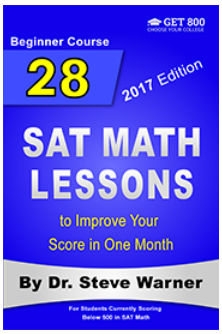
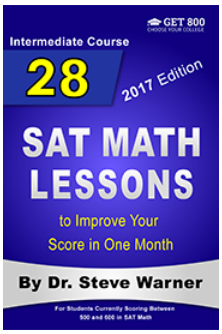
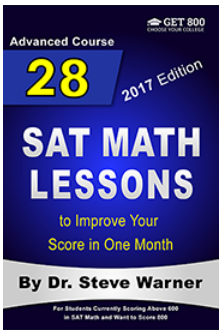
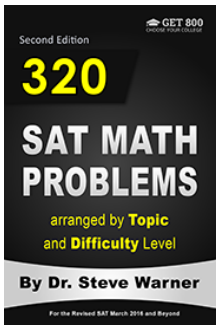
BOOKS BY DR. STEVE WARNER

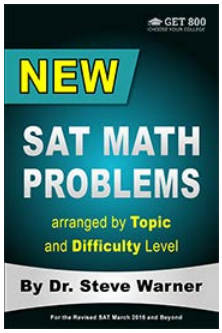


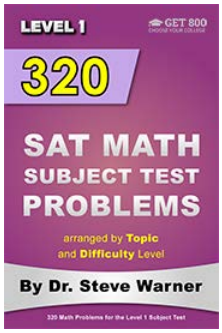


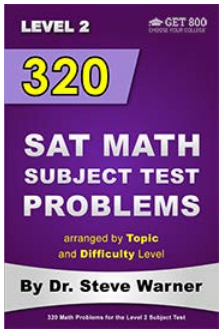


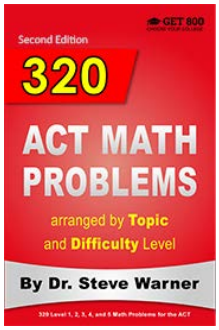


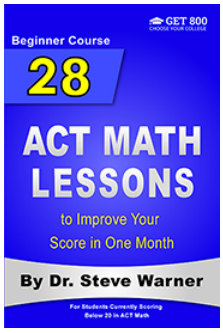


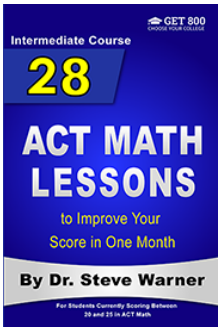


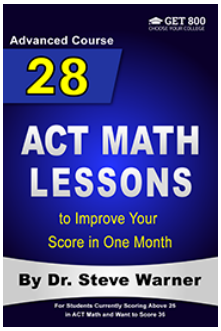


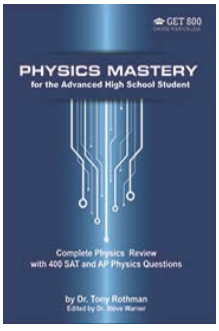


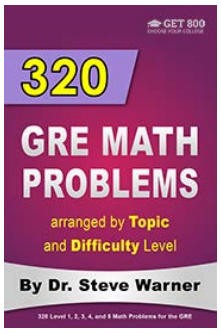


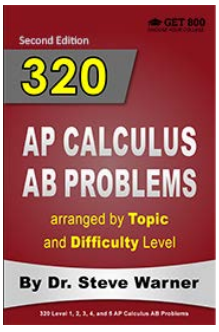


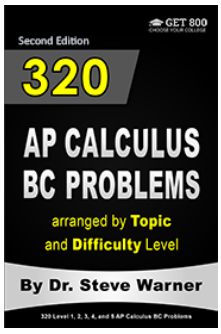












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The Scholarly Unicorn's SAT Math Question Bank was written by Dr. Steve Warner, a Ph.D. in mathematics.

The first part of the book consists of 504 problems organized into 48 groups designed to allow students to review all the concepts, strategies, and problems needed to get a perfect SAT math score.

The second part of the book consists of several larger problem sets organized by topic and difficulty level, making it easy to focus on problem types necessary for your improvement.

Complete explanations to all problems are included as a free download. Each of the 1000 problems in this book comes with at least one complete explanation (and often more) followed by helpful remarks to ensure that you develop a deep understanding of all the material presented.

Here is what customers say about Dr. Warner's previous work:

★★★★★ *"Got an 800 as promised!... I didn't have any outside tutoring,so this book was the only reason I scored so high... It's literally a godsend and I'd give it 6 stars if I could." (A.W., 28 SAT Math Lessons)*

★★★★★ *"My daughter got one wrong only! She received a full scholarship to the University of Miami." (M.L., 28 SAT Math Lessons)*

★★★★★ *"The approach presented by Dr. Steve is exactly what the doctor ordered." (A.M., 28 SAT Math Lessons)*