SAT Mathematics Workbook 2018 - 2019

A Comprehensive Review and Step-by-Step Guide to Preparing for the SAT Math Test

Reza Nazari & Ava Ross

www.EffortlessMath.com

… So Much More Online!

- ✓ FREE Math lessons
- ✓ More Math learning books!
- ✓ Mathematics Worksheets
- ✓ Online Math Tutors

Need a PDF version of this book?

Visit www.EffortlessMath.com

SAT Math Workbook 2018 - 2019

A Comprehensive Review and Step-By-Step Guide to Preparing for the SAT Math

By

Reza Nazari & Ava Ross

Copyright © 2018

Reza Nazari & Ava Ross

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning, or otherwise, except as permitted under Section 107 or 108 of the 1976 United States Copyright Ac, without permission of the author.

All inquiries should be addressed to:

info@effortlessMath.com

www.EffortlessMath.com

Published by: Effortless Math Education

www.EffortlessMath.com

Description

SAT Math Workbook is full of specific and detailed material that will be key to succeeding on the SAT Math. It's filled with the critical math concepts a student will need in order to do well on the test. Math concepts in this book break down the topics, so the material can be quickly grasped. Examples are worked step–by–step, so you learn exactly what to do.

This comprehensive SAT Math workbook brings together everything a student needs to know for the Mathematics section of the SAT test. It is designed to address the needs of SAT test takers who must have a working knowledge of basic Math. It contains most common sample questions that are most likely to appear in the Mathematics section of the SAT. This book leaves no stones unturned!

SAT Math Workbook with over 2,500 sample questions and 2 complete SAT Math tests is all a student needs to fully prepare for the SAT Math test. It will help the student learns everything they need to ace the math section of the test.

This workbook includes practice test questions. It contains easy–to–read essential summaries that highlight the key areas of the SAT Math test. Effortless Math test study guide reviews the most important components of the SAT Math test. Anyone planning to take the SAT test should take advantage of the review material and practice test questions contained in this study guide.

Inside the pages of this comprehensive book, students can learn basic math operations in a structured manner with a complete study program to help them understand essential math skills. It also has many exciting features, including:

- Dynamic design and easy–to–follow activities
- Step–by–step guide for all Math topics
- Targeted, skill–building practices
- A fun, interactive and concrete learning process
- Math topics are grouped by category, so you can focus on the topics you struggle on

- All solutions for the exercises are included, so you will always find the answers
- 2 Complete SAT Math Practice Tests that reflect the format and question types on SAT

SAT Math Workbook is the ideal prep solution for any student who wants to prepare for the SAT test. It efficiently and effectively reinforces learning outcomes through engaging questions and repeated practice, helping students to quickly master basic Math skills.

Effortless Math books have helped thousands of students prepare for standardized tests and achieve their education and career goals. This is done by setting high standards and preparing the best quality Mathematics learning books, and this book is no exception. It is the perfect study aid for the SAT Math test. The student will definitely be well prepared for the test with this comprehensive workbook!

About the Author

Reza Nazari is the author of more than 100 Math learning books including:
– Math and Critical Thinking Challenges: For the Middle and High School Student
– ACT Math in 30 Days
– ASVAB Math Workbook 2018 – 2019
– Effortless Math Education Workbooks
– and many more Mathematics books …

Reza is also an experienced Math instructor and a test–prep expert who has been tutoring students since 2008. Reza is the founder of Effortless Math Education, a tutoring company that has helped many students raise their standardized test scores—and attend the colleges of their dreams. Reza provides an individualized custom learning plan and the personalized attention that makes a difference in how students view math.

You can contact Reza via email at:
reza@EffortlessMath.com

Find Reza's professional profile at:
goo.gl/zoC9rJ

Contents

Chapter 1: Fractions and Decimals 13
Simplifying Fractions 14
Adding and Subtracting Fractions 15
Multiplying and Dividing Fractions 16
Adding Mixed Numbers 17
Subtract Mixed Numbers 18
Multiplying Mixed Numbers 19
Dividing Mixed Numbers 20
Comparing Decimals 21
Rounding Decimals 22
Adding and Subtracting Decimals 23
Multiplying and Dividing Decimals 24
Converting Between Fractions, Decimals and Mixed Numbers 25
Factoring Numbers 26
Greatest Common Factor 27
Least Common Multiple 28
Test Preparation 29
Answers of Worksheets – Chapter 1 31
Chapter 2: Real Numbers and Integers 37
Adding and Subtracting Integers 38
Multiplying and Dividing Integers 39
Ordering Integers and Numbers 40
Arrange, Order, and Comparing Integers 41
Order of Operations 42
Mixed Integer Computations 43
Integers and Absolute Value 44
Test Preparation 45
Answers of Worksheets – Chapter 2 46
Chapter 3: Proportions and Ratios 50
Writing Ratios 51
Simplifying Ratios 52

Create a Proportion 53
Similar Figures 54
Ratio and Rates Word Problems 55
Test Preparation 56
Answers of Worksheets – Chapter 3 57
Chapter 4: Percent 60
Percentage Calculations 61
Converting Between Percent, Fractions, and Decimals 62
Percent Problems 63
Markup, Discount, and Tax 64
Simple Interest 65
Test Preparation 67
Answers of Worksheets – Chapter 4 68
Chapter 5: Algebraic Expressions 71
Expressions and Variables 72
Simplifying Variable Expressions 73
Simplifying Polynomial Expressions 74
Translate Phrases into an Algebraic Statement 75
The Distributive Property 76
Evaluating One Variable 77
Evaluating Two Variables 78
Combining like Terms 79
Test Preparation 80
Answers of Worksheets – Chapter 5 81
Chapter 6: Equations 84
One–Step Equations 85
Two–Step Equations 86
Multi–Step Equations 87
Test Preparation 88
Answers of Worksheets – Chapter 6 89
Chapter 7: Inequalities 91
Graphing Single–Variable Inequalities 92

One–Step Inequalities 93
Two–Step Inequalities 94
Multi–Step Inequalities 95
Test Preparation 96
Answers of Worksheets – Chapter 7 97
Chapter 8: Linear Functions 100
Finding Slope 101
Graphing Lines Using Slope–Intercept Form 102
Graphing Lines Using Standard Form 103
Writing Linear Equations 104
Graphing Linear Inequalities 105
Finding Midpoint 106
Finding Distance of Two Points 107
Test Preparation 108
Answers of Worksheets – Chapter 8 109
Chapter 9: Polynomials 114
Classifying Polynomials 115
Writing Polynomials in Standard Form 116
Simplifying Polynomials 117
Adding and Subtracting Polynomials 118
Multiplying Monomials 119
Multiplying and Dividing Monomials 120
Multiplying a Polynomial and a Monomial 121
Multiplying Binomials 122
Factoring Trinomials 123
Operations with Polynomials 124
Test Preparation 125
Answers of Worksheets – Chapter 9 127
Chapter 10: Quadratic and System of Equations 132
Solve a Quadratic Equation 133
Solving Systems of Equations by Substitution 134
Solving Systems of Equations by Elimination 135

Systems of Equations Word Problems 136
Test Preparation 137
Answers of Worksheets – Chapter 10 138
Chapter 11: Quadratic Functions 140
Graphing Quadratic Functions 141
Solving Quadratic Equations 142
Use the Quadratic Formula and the Discriminant 143
Solve Quadratic Inequalities 144
Test Preparation 145
Answers of Worksheets – Chapter 11 146
Chapter 12: Complex numbers 150
Adding and Subtracting Complex Numbers 151
Multiplying and Dividing Complex Numbers 152
Graphing Complex Numbers 153
Rationalizing Imaginary Denominators 154
Test Preparation 155
Answers of Worksheets – Chapter 12 156
Chapter 13: Exponents and Radicals 158
Multiplication Property of Exponents 159
Division Property of Exponents 160
Powers of Products and Quotients 161
Zero and Negative Exponents 162
Negative Exponents and Negative Bases 163
Writing Scientific Notation 164
Square Roots 165
Test Preparation 166
Answers of Worksheets – Chapter 13 167
Chapter 14: Statistics and Probability 170
Mean, Median, Mode, and Range of the Given Data 171
Box and Whisker Plots 172
Bar Graph 173
Stem–And–Leaf Plot 174

The Pie Graph or Circle Graph 175
Scatter Plots 176
Probability 177
Factorials 178
Permutations 179
Combination 180
Test Preparation 181
Answers of Worksheets – Chapter 14 183
Chapter 15: Geometry 189
The Pythagorean Theorem 190
Area of Triangles 191
Perimeter of Polygons 192
Area and Circumference of Circles 193
Area of Squares, Rectangles, and Parallelograms 194
Area of Trapezoids 195
Test Preparation 196
Answers of Worksheets – Chapter 15 198
Chapter 16: Solid Figures 201
Volume of Cubes 202
Volume of Rectangle Prisms 203
Surface Area of Cubes 204
Surface Area of a Rectangle Prism 205
Volume of a Cylinder 206
Surface Area of a Cylinder 207
Test Preparation 208
Answers of Worksheets – Chapter 16 209
Chapter 17: Logarithms 211
Rewriting Logarithms 212
Evaluating Logarithms 213
Properties of Logarithms 214
Natural Logarithms 215
Solving Exponential Equations Requiring Logarithms 216

Solving Logarithmic Equations 217
Test Preparation 218
Answers of Worksheets – Chapter 17 219
Chapter 18: Matrices 222
Adding and Subtracting Matrices 223
Matrix Multiplication 224
Finding Determinants of a Matrix 225
Finding Inverse of a Matrix 226
Matrix Equations 227
Test Preparation 228
Answers of Worksheets – Chapter 18 229
Chapter 19: Functions Operations 233
Function Notation 234
Adding and Subtracting Functions 235
Multiplying and Dividing Functions 236
Composition of Functions 237
Test Preparation 238
Answers of Worksheets – Chapter 19 239
Chapter 20: Trigonometric Functions 242
Trig ratios of General Angles 243
Sketch Each Angle in Standard Position 244
Finding Co-terminal Angles and Reference Angles 245
Writing Each Measure in Radians 246
Writing Each Measure in Degrees 247
Evaluating Each Trigonometric Function 248
Missing Sides and Angles of a Right Triangle 249
Arc Length and Sector Area 250
Test Preparation 251
Answers of Worksheets – Chapter 20 252
Chapter 21: Radical Expressions 256
Simplifying Radical Expressions 257
Simplifying Radical Expressions Involving Fractions 258

Multiplying Radical Expressions 259
Adding and Subtracting Radical Expressions 260
Domain and Range of Radical Functions 261
Solving Radical Equations 262
Test Preparation 263
Answers of Worksheets – Chapter 21 264
Chapter 22: Sequences and Series 268
Arithmetic Sequences 269
Geometric Sequences 270
Comparing Arithmetic and Geometric Sequences 271
Finite Geometric Series 272
Infinite Geometric Series 273
Test Preparation 274
Answers of Worksheets – Chapter 22 275
SAT Math Test Review 279
SAT Math Practice Tests 281
SAT Math Practice Tests Answers and Explanations 345

Chapter 1: Fractions and Decimals

Topics that you'll learn in this chapter:

- ✓ Simplifying Fractions
- ✓ Adding and Subtracting Fractions
- ✓ Multiplying and Dividing Fractions
- ✓ Adding Mixed Numbers
- ✓ Subtract Mixed Numbers
- ✓ Multiplying Mixed Numbers
- ✓ Dividing Mixed Numbers
- ✓ Comparing Decimals
- ✓ Rounding Decimals
- ✓ Adding and Subtracting Decimals
- ✓ Multiplying and Dividing Decimals
- ✓ Converting Between Fractions, Decimals and Mixed Numbers
- ✓ Factoring Numbers
- ✓ Greatest Common Factor
- ✓ Least Common Multiple

"A Man is like a fraction whose numerator is what he is and whose denominator is what he thinks of himself. The larger the denominator, the smaller the fraction." –Tolstoy

Simplifying Fractions

Helpful Hints

– Evenly divide both the top and bottom of the fraction by 2, 3, 5, 7, ... etc.
– Continue until you can't go any further.

Example:

$\frac{4}{12} = \frac{2}{6} = \frac{1}{3}$

Simplify the fractions.

1) $\frac{22}{36}$

2) $\frac{8}{10}$

3) $\frac{12}{18}$

4) $\frac{6}{8}$

5) $\frac{13}{39}$

6) $\frac{5}{20}$

7) $\frac{16}{36}$

8) $\frac{18}{36}$

9) $\frac{20}{50}$

10) $\frac{6}{54}$

11) $\frac{45}{81}$

12) $\frac{21}{28}$

13) $\frac{35}{56}$

14) $\frac{52}{64}$

15) $\frac{13}{65}$

16) $\frac{44}{77}$

17) $\frac{21}{42}$

18) $\frac{15}{36}$

19) $\frac{9}{24}$

20) $\frac{20}{80}$

21) $\frac{25}{45}$

Adding and Subtracting Fractions

Helpful Hints

– For "like" fractions (fractions with the same denominator), add or subtract the numerators and write the answer over the common denominator.

– Find equivalent fractions with the same denominator before you can add or subtract fractions with different denominators.

– Adding and Subtracting with the same denominator:

$$\frac{a}{b}+\frac{c}{b}=\frac{a+c}{b}$$
$$\frac{a}{b}-\frac{c}{b}=\frac{a-c}{b}$$

– Adding and Subtracting fractions with different denominators:

$$\frac{a}{b}+\frac{c}{d}=\frac{ad+cb}{bd}$$
$$\frac{a}{b}-\frac{c}{d}=\frac{ad-cb}{bd}$$

Add fractions.

1) $\frac{2}{3}+\frac{1}{2}$

2) $\frac{3}{5}+\frac{1}{3}$

3) $\frac{5}{6}+\frac{1}{2}$

4) $\frac{7}{4}+\frac{5}{9}$

5) $\frac{2}{5}+\frac{1}{5}$

6) $\frac{3}{7}+\frac{1}{2}$

7) $\frac{3}{4}+\frac{2}{5}$

8) $\frac{2}{3}+\frac{1}{5}$

9) $\frac{16}{25}+\frac{3}{5}$

Subtract fractions.

10) $\frac{4}{5}-\frac{2}{5}$

11) $\frac{3}{5}-\frac{2}{7}$

12) $\frac{1}{2}-\frac{1}{3}$

13) $\frac{8}{9}-\frac{3}{5}$

14) $\frac{3}{7}-\frac{3}{14}$

15) $\frac{4}{15}-\frac{1}{10}$

16) $\frac{3}{4}-\frac{13}{18}$

17) $\frac{5}{8}-\frac{2}{5}$

18) $\frac{1}{2}-\frac{1}{9}$

Multiplying and Dividing Fractions

Helpful Hints

– **Multiplying fractions:** multiply the top numbers and multiply the bottom numbers.

– **Dividing fractions:** Keep, Change, Flip

Keep first fraction, change division sign to multiplication, and flip the numerator and denominator of the second fraction. Then, solve!

Example:

$$\frac{a}{b} \times \frac{c}{d} = \frac{a \times c}{b \times \mathrm{d}}$$

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$$

Multiplying fractions. Then simplify.

1) $\frac{1}{5} \times \frac{2}{3}$

2) $\frac{3}{4} \times \frac{2}{3}$

3) $\frac{2}{5} \times \frac{3}{7}$

4) $\frac{3}{8} \times \frac{1}{3}$

5) $\frac{3}{5} \times \frac{2}{5}$

6) $\frac{7}{9} \times \frac{1}{3}$

7) $\frac{2}{3} \times \frac{3}{8}$

8) $\frac{1}{4} \times \frac{1}{3}$

9) $\frac{5}{7} \times \frac{7}{12}$

Dividing fractions.

10) $\frac{2}{9} \div \frac{1}{4}$

11) $\frac{1}{2} \div \frac{1}{3}$

12) $\frac{6}{11} \div \frac{3}{4}$

13) $\frac{11}{14} \div \frac{1}{10}$

14) $\frac{3}{5} \div \frac{5}{9}$

15) $\frac{1}{2} \div \frac{1}{2}$

16) $\frac{3}{5} \div \frac{1}{5}$

17) $\frac{12}{21} \div \frac{3}{7}$

18) $\frac{5}{14} \div \frac{9}{10}$

Adding Mixed Numbers

Helpful Hints

Use the following steps for both adding and subtracting mixed numbers.

– Find the Least Common Denominator (LCD)
– Find the equivalent fractions for each mixed number.
– Add fractions after finding common denominator.
– Write your answer in lowest terms.

Example:

$1\frac{3}{4} + 2\frac{3}{8} = 4\frac{1}{8}$

Add.

1) $4\frac{1}{2} + 5\frac{1}{2}$

2) $2\frac{3}{8} + 3\frac{1}{8}$

3) $6\frac{1}{5} + 3\frac{2}{5}$

4) $1\frac{1}{3} + 2\frac{2}{3}$

5) $5\frac{1}{6} + 5\frac{1}{2}$

6) $3\frac{1}{3} + 1\frac{1}{3}$

7) $1\frac{10}{11} + 1\frac{1}{3}$

8) $2\frac{3}{6} + 1\frac{1}{2}$

9) $5\frac{3}{5} + 5\frac{1}{5}$

10) $7 + \frac{1}{5}$

11) $1\frac{5}{7} + \frac{1}{3}$

12) $2\frac{1}{4} + 1\frac{1}{2}$