

Making Math Meaningful®

A 7th Grade Student's
Workbook

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Catherine Douglas was a student at Shining Mountain Waldorf School when she designed the cover to this book. It is an impressive example of how equiangular spirals emerge from nested octagons.



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To the Student (and Parent)

Seventh grade is perhaps the most important year academically. In math, seventh grade is when "real math" begins; up until now, you have been learning mostly just arithmetic. Some of the key themes for this year are measurement, ratios, percents, the Pythagorean Theorem, and algebra. All of this will be needed for studying math in eighth grade, and especially in high school. Remember that struggling can be an important part of learning math. Often, students enter seventh grade feeling weak in math, but with hard work and perseverance, they leave seventh grade strong in math and ready to study many interesting and challenging topics in the coming years.

Here are some tips on how to use this workbook successfully:

- Make sure your work is readable and easy to follow.
- If there isn't enough room on the worksheet, then show your work on a separate sheet, making sure you write down the worksheet number and problem number, so you can easily find it later.
- If you get stuck on one problem, then go on to another problem, and come back later to the one that you were stuck on.
- While working on a problem from one worksheet, it may be helpful to refer back to a problem that you did on a previous worksheet.
- *Fractions.* All answers to fraction problems should be reduced. Don't give answers as improper fractions, but, instead, convert them to mixed numbers (for example, leave your final answer as $3\frac{1}{4}$ instead of $\frac{13}{4}$).
- *Division.* Answers for division problems may be rounded to three significant digits, unless the problem states you should leave your answer as an exact decimal, in which case you must continue until it repeats or ends. For example, $2579 \div 56$ has an exact answer of 46.053571428 . Rounding it to three significant digits means that we go only as far as the fourth digit (which is the second place after the decimal point, and is a 5 in this case), and then round up the previous digit for an answer of 46.1.
- *Answers involving time.* Answers requiring a measure of time should be given in separated units. Examples of this are: 1 day 6 hours instead of 1.25 days and 3 hours 12 minutes instead of 3.2 hours.
- *Math Tricks!* A list of the math tricks can be found at the back of this workbook.
- Above all, homework is for learning! Try your best on every problem. Struggling and overcoming frustration are part of the process of doing math. Even if you don't get a problem correct, you will learn by trying it, and then later seeing how it should be done. Do not fall into the trap of doing the homework just to get it done.
- *Learn from your mistakes!* When you get a problem wrong, make sure you follow up on it; find your mistake, and learn how to do the problem correctly.

Getting Help. The problems in this workbook are based upon the material found in our curriculum book, titled: *A Middle School Math Curriculum for Teachers and Parents*, which can be purchased at www.JamieYorkPress.com. The book has helpful explanations and examples, and is useful for parents (or tutors) who are helping their children with the worksheets in this workbook.

Arithmetic – Sheet #1

Do it in your head

- 1) $400 \cdot 3000$
- 2) $8.46 \div 100$
- 3) $8.46 \cdot 1000$
- 4) $49 \cdot 11$
- 5) $42000 \div 600$
- 6) $3.5 \cdot 4$
- 7) $105 \cdot 108$
- 8) $512 - 497$
- 9) $3 \cdot 999$
- 10) $24 \cdot 99$
- 11) $3.6 \cdot 5$
- 12) $3.6 \div 5$
- 13) $27 - 3.7$
- 14) $0.3 \cdot 0.008$
- 15) $0.4 \div 0.008$
- 16) 13^2
- 17) $25 \cdot 6$
- 18) 3^4
- 19) 5^3
- 20) What is half of $\frac{8}{13}$?
- 21) What is half of $\frac{7}{13}$?

Quickly Estimate.

- 22) $485,036 + 225,672$
- 23) $7364 \cdot 587$
- 24) $55,963 - 42,027$
- 25) $5273 \div 886$

Division. Leave your answers as exact decimals (perhaps repeating). Use short division for single digit divisors.

26) $25,286 \div 47$

27) $4277 \div 25$

28) $0.0073 \div 0.06$

29) $7809 \div 1.37$

Fractions & Decimals

30) Convert fractions to decimals and decimals to fractions.

a) $\frac{93}{100}$

b) $\frac{9}{1000}$

c) $\frac{3}{5}$

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

e) $\frac{8}{11}$

f) $\frac{7}{24}$

g) 0.07

h) 0.043

i) 0.55

j) $0.\bar{3}$

k) 0.875

31) Convert to a mixed number.

$$\frac{45}{7}$$

32) Convert to an improper fraction.

$$6\frac{4}{9}$$

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

34) $\frac{48}{49} \cdot \frac{35}{48}$

35) $5\frac{3}{5} \cdot 1\frac{3}{7}$

36) $5\frac{3}{5} - 1\frac{3}{7}$

37) $5\frac{3}{5} \div 1\frac{3}{7}$

38) $\frac{5\frac{3}{5}}{1\frac{3}{7}}$

39) $(2\frac{1}{3})^2$

40) $48.3 + 1.24$

41) $48.3 - 1.24$

42) $48.3 \cdot 1.24$

Powers & Roots

43) $(8)^2$

44) $(800)^2$

45) $(0.8)^2$

46) $(0.008)^2$

47) $(12)^3$

48) $(0.1)^5$

49) $\sqrt{64}$

50) $\sqrt{9000000}$

Arithmetic – Sheet #2

Do it in your head

- 1) $5.723 \cdot 100$
- 2) $435.7 \div 100$
- 3) $2.6 \cdot 11$
- 4) $0.14 \div 4$
- 5) $21 \div 33$
- 6) 15^2
- 7) $25 \cdot 5$
- 8) 25^2
- 9) 4^3
- 10) 5^4
- 11) $700 \cdot 80$
- 12) $160,000 \div 800$
- 13) What is $\frac{9}{20}$ doubled?
- 14) What is $\frac{9}{19}$ doubled?
- 15) $8.5 \cdot 4$
- 16) $1110 \cdot 1080$
- 17) $6023 - 5996$
- 18) $9999 \cdot 4$
- 19) $999 \cdot 14$
- 20) $6400 \cdot 5$

Divisibility. State whether each number is evenly divisible by anything from 2 to 12 (but not 7).

21) $1,033,857$

22) $1,378,416$

Division. Leave your answers as mixed numbers. Use short division for single digit divisors.

23) $1033857 \div 11$

24) $197400 \div 389$

25) $1378416 \div 9$

Powers & Roots

26) $(600)^2$

27) $(5.42)^2$

28) $(10)^5$

29) $(1)^{31}$

30) $(0.052)^3$

31) $(\frac{3}{4})^2$

32) $(\frac{3}{4})^3$

33) $\sqrt{4900}$

34) $\sqrt{1000000}$

35) $\sqrt[3]{1000000}$

36) $\sqrt[6]{1000000}$

Fractions & Decimals

37) Convert to a fraction.

a) 0.003

b) 0.08

c) 0.0125

d) $0.\overline{5}$

e) $0.\overline{6}$

38) Convert to a decimal.

a) $\frac{4}{5}$

b) $\frac{2}{11}$

c) $\frac{3}{20}$

d) $\frac{13}{99}$

e) $\frac{11}{25}$

f) $\frac{19}{60}$

39) Convert to a mixed number.

$$\frac{67}{12}$$

40) Convert to an improper fraction.

$$10\frac{3}{7}$$

41) Reduce.

a) $\frac{210}{490}$

b) $\frac{12600}{27000}$

c) $\frac{27000}{43875}$

42) $\frac{5}{6} - \frac{1}{4}$

43) $\frac{5}{9} + \frac{21}{25}$

44) $\frac{5}{9} \cdot \frac{21}{25}$

45) $78\frac{2}{3} - 76\frac{3}{4}$

46) $\frac{3\frac{3}{4}}{5}$

47) $33 \div 3\frac{2}{3}$

Quickly Estimate.

48) $693 \cdot 79$

49) $2317 - 1824$

50) $51,893 + 16,256$

51) $36478 \div 491$

Arithmetic – Sheet #3

Do it in your head

- 1) $0.043 \cdot 100$
- 2) $7649 \div 100$
- 3) $6400 \div 5$
- 4) 109^2
- 5) $5024 - 4986$
- 6) $6 \cdot 9999$
- 7) $15 \cdot 2$
- 8) $16 \cdot 4$
- 9) $15 \cdot 3$
- 10) $160 \cdot 300$
- 11) 18^2
- 12) 4^4
- 13) $0.03 \cdot 0.4$
- 14) 2^{10}
- 15) $120 \cdot 90$
- 16) $0.87 \cdot 11$
- 17) $25 \cdot 3$
- 18) $6.4 \div 4$
- 19) $220 \div 330$
- 20) 3^3
- 21) 4^5
- 22) $\sqrt{0.0049}$

Divisibility.

23) State whether each number is evenly divisible by anything from 2 to 12 (but not 7).

a) 156,750

b) 18,698,988

24) Give the prime factorization.

a) 888

b) 156,750

Division. Leave your answers as exact decimals (perhaps repeating).

25) $7.43 \div 6600$

26) $7 \div 0.303$

Powers & Roots

- 27) $\sqrt{250000}$
- 28) $\sqrt[3]{8}$
- 29) $\sqrt[4]{625}$
- 30) $\sqrt{64}$
- 31) $\sqrt[3]{64}$
- 32) $\sqrt[6]{64}$
- 33) $\sqrt[5]{32}$
- 34) $\sqrt[4]{16}$
- 35) $\sqrt[10]{1024}$
- 36) $\sqrt[4]{81}$
- 37) $\sqrt{810000}$
- 38) $\sqrt[4]{810000}$
- 39) $\sqrt{25600000000}$
- 40) $\sqrt[4]{25600000000}$
- 41) $(1.8)^2$
- 42) $(3\frac{1}{3})^3$

Fractions & Decimals

- 43) Convert to a fraction.
- a) 0.0041
- b) 0.8
- c) $0.\bar{5}$
- d) 0.175
- 44) Convert to a decimal.
- a) $\frac{5}{8}$
- b) $\frac{1}{6}$
- c) $\frac{1}{30}$
- d) $\frac{33}{40}$
- 45) Convert to both a mixed number and an exact decimal.
- $$\frac{5303}{18}$$

- 46) $3.8 \cdot 0.0045$
- 47) $935.54 - 79.378$
- 48) $6\frac{2}{5} - 1\frac{3}{5}$
- 49) $6\frac{2}{5} \cdot 1\frac{3}{5}$
- 50) $6\frac{2}{5} \div 1\frac{3}{5}$
- 51) $12 \div 5\frac{1}{4}$
- 52) Quickly Estimate.
- a) $5249 \cdot 48$
- b) $78,804 - 67,914$
- c) $4083 \div 68$
- d) $315 \cdot 770$