

Algebra 1/ Math 1

Summer Packet

2018





City of Brockton

BROCKTON PUBLIC SCHOOLS

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Dear Seventh Grade Student,

You have been recommended to take Algebra1/Math1 next year in grade 8. As part of the course, you are required to complete the problems in this packet during summer vacation.

We have included problems that review the math skills you will need for Algebra I/Math 1. Please show all work in the packet or on a separate sheet of paper. Label each page of your work with the title and page number of the corresponding sheet in the packet.

In September, your math teacher will collect your packet and your work. This will be your first math grade for the year. You will also be tested on the problems in the packet.

Remember, this work is required.

Please sign the class list indicating that you have received the Algebra 1/Math1 Summer Packet.

Enjoy your summer vacation.

Sincerely,

John Lynch
Middle School Math Lead

Melissa Costello
Middle School Math Lead

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Massachusetts Comprehensive Assessment System Grade 8 Mathematics Reference Sheet

CONVERSIONS

1 cup = 8 fluid ounces	1 inch = 2.54 centimeters	1 pound = 16 ounces
1 pint = 2 cups	1 meter \approx 39.37 inches	1 pound \approx 0.454 kilogram
1 quart = 2 pints	1 mile = 5280 feet	1 kilogram \approx 2.2 pounds
1 gallon = 4 quarts	1 mile = 1760 yards	1 ton = 2000 pounds
1 gallon \approx 3.785 liters	1 mile \approx 1.609 kilometers	
1 liter \approx 0.264 gallon	1 kilometer \approx 0.62 mile	
1 liter = 1000 cubic centimeters		

AREA (A) FORMULAS

square	$A = s^2$
rectangle	$A = bh$
	OR
	$A = lw$
parallelogram	$A = bh$
triangle	$A = \frac{1}{2}bh$
trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$
circle	$A = \pi r^2$

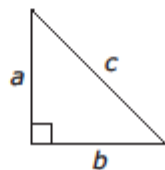
CIRCLE FORMULAS

area	$A = \pi r^2$
circumference	$C = 2\pi r$
	OR
	$C = \pi d$

VOLUME (V) FORMULAS

cube	$V = s^3$
	(s = length of an edge)
sphere	$V = \frac{4}{3}\pi r^3$
cone	$V = \frac{1}{3}\pi r^2h$
right circular cylinder	$V = \pi r^2h$
right prism	$V = Bh$

PYTHAGOREAN THEOREM



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

Proportions

Write and solve a proportion to answer each problem. Show your work.

1. Tommy types 54 words per minute, with an average of 3 mistakes. How many mistakes would you expect Tommy to make if he typed 300 words ?

2. Jackie burns 250 calories per hour doing aerobics. She has to burn 3500 calories to lose one pound. How long will Jackie have to work out to lose 5 pounds?

3. Six cans of fruit juice cost \$2.50. Ned needs to buy 72 cans for a camping trip for the Outdoor Club. How much will he spend?

4. A safe following distance is two car lengths for every ten miles per hour that you are traveling. If you are traveling at 65 miles per hour, how many car lengths is a safe following distance?

Percents

The items below were purchased in a city with a sales tax rate of 5%. Find the amount of sales tax on each purchase.

1. A DVD for \$18.00
2. A computer hard drive for \$140.00
3. A bathing suit for \$65.00
4. A bicycle for \$150.00

A shoe store is having a 25% off sale on all of its shoes. Calculate the discount on each of the pairs of shoes that sell for the original price listed below.

5. Men's running shoes for \$85.00
6. Women's cross training shoes for \$50.00
7. Softball cleats for \$29.95
8. Golf shoes for \$120

Table of Values

Plot each point in the table on a coordinate grid. Identify the rate of change for each.

1.

x	-3	-2	-1	0	1	2	3
y	15	13	11	9	7	5	3

2.

x	-2	-1	0	1	2	3
y	-14	-10	-6	-2	2	6

For each equation, create a table of values and plot the points. Identify the rate of change.

3. $y = x + 4$

x	-2	-1	0	1	2
y					

4. $y = 2x - 6$

x	y
-2	
-1	
0	
1	
2	

5. $y = 3x$

x	y
-2	
	-3
0	
1	
	6

6. $y = -\frac{1}{2}x + 4$

x	-2	-1	0	1	2
y					

Writing, Evaluating, and Simplifying Expressions

The Snack Shack has a special promotion in which you can buy a discount card for \$5.00 and purchase large drinks for a month for only \$1.50 each. Without a card, the price would be \$2.50.

1. Use this information to complete the table below.

Month	Number of Drinks Purchased	Cost of Discount Card	Total Cost of drinks (with card purchased)
January	15	\$5.00	
February	20		
March	10		
April			\$17.00
May			\$14.00
June	4		

2. In the table, what values changed?
3. In the table, what values do not change?
4. Do the values in one column of the table depend on the values in another column?
5. Show how you found the total cost of the drinks for each month?
6. Would you save money by buying the discount card? Explain.

Complete the table below.

m	$4m + 8$
	20
6	
-2	
	8
.5	

Adding and Subtracting Integers

Simplify each expression

1. $-2 + (-3)$

2. $8 - 7 + 4$

3. $8 + (-5)$

4. $15 + (-3)$

5. $-16 + 8$

6. $7 + (-10)$

7. $-9 + (-5)$

8. $-12 + 14$

9. $8 + 7$

10. $-63 - 89$

11. $-12 - (-21)$

12. $92 - (-16)$

13. $72 - 15$

14. $-86 - (-19)$

15. $17 - (-46)$

16. $-78 - (-53)$

17. $-19 - (-12)$

18. $-16 - (-21)$

19. $27 - 19$

20. $-14 - 27$

Order of Operations - Integers

Accentuate the Negative

Find the value of each expression.

1. $(8 + 2) \times 9$ 2. $5 - 1 \div 4$ 3. $(6 + 3) \div 18$ 4. $80 - 6 \times 7$

5. $4 \times 6 + 3$ 6. $4 \times (6 + 3)$ 7. $35 - 6 \times 5$ 8. $8 \div 3 + 6$

9. $(-4)^2 + 10 \cdot 2$ 10. $-4^2 + 10 \cdot 2$ 11. $(5 \cdot 3)^2 + 8$

12. $5 \cdot 3^2 + 8$ 13. $9 + (7 - 4)^2$ 14. $-9 + 7 - 4^2$

15. $(-6)^2 + 3^3 - 7$ 16. $-6^2 + 3^3 - 7$ 17. $2^3 + (8 - 5) \cdot 4 - 5^2$

18. $(2^3 + 8) - 5 \cdot 4 - 5^2$ 19. $2^3 \cdot 3 - 5 \cdot 5^2 + 8$ 20. $2^3 \cdot 3 - 5(5^2 + 8)$

Multiplying and Dividing Rational Numbers

Accentuate the Negative

Use the algorithms you developed to find each value.

1. $-\frac{1}{6} \cdot 2\frac{3}{4}$

2. $\frac{3}{16} \div \left(-\frac{1}{8}\right)$

3. $-\frac{31}{56} \cdot (-8)$

4. $-5\frac{7}{12} \div 12$

5. $-8 \div \frac{1}{4}$

6. $-3\frac{1}{6} \div \left(-2\frac{1}{12}\right)$

7. $8\frac{3}{4} \cdot 3\frac{7}{8}$

8. $-\frac{11}{12} \div \frac{5}{6}$

9. $4\frac{9}{28} \cdot (-7)$

10. $-1\frac{1}{15} \div 15$

11. $-3 \div \frac{3}{4}$

12. $-2\frac{7}{8} \div 3\frac{3}{4}$

13. $-\frac{23}{24} \cdot (-8)$

14. $\frac{7}{8} \cdot \left(-\frac{2}{7}\right)$

15. $-7 \div \frac{1}{9}$

Adding and Subtracting Rational Numbers

Accentuate the Negative

Find each sum or difference as a mixed number or fraction in simplest form.

1. $\frac{3}{4} + \frac{7}{8}$

2. $-1\frac{1}{6} + 2\frac{2}{3}$

3. $4\frac{1}{2} - 7\frac{7}{8}$

4. $-3\frac{5}{6} - (4\frac{1}{12})$

5. $\frac{5}{18} + \frac{7}{12}$

6. $-4\frac{7}{20} + 3\frac{9}{10}$

7. $5\frac{8}{21} - (-3\frac{1}{7})$

8. $1\frac{19}{24} + 2\frac{23}{20}$

9. $3\frac{16}{25} - 4\frac{7}{20}$

Write each answer as a fraction or mixed number in simplest form.

10. $14.6 + (-3\frac{1}{5})$

11. $-7\frac{3}{4} + 4.125$

12. $5.75 + (-2\frac{1}{8})$

Operations with Rational Numbers

13. $(-2)(8)$

14. $(-6)(-9)$

15. $(-3)^4$

16. -2^5

17. $(6)(-8)$

18. $(-14)^2$

19. $2(-4)(-6)$

20. $-30 \div (-5)$

21. $\frac{-52}{-13}$

22. $(-8)(5)(-3)$

23. -7^2

24. -3^5

25. $\frac{-68}{17}$

26. $\frac{(-4)(-13)}{-26}$

27. $\frac{225}{(-3)(-5)}$

28. $2^4 - 3^2 + 5^2$

29. $(-8)^2 - 4^3$

30. $32 \div (-7 + 5)^3$

31. $\frac{3}{4} \div \left(-\frac{3}{7}\right)$

32. $18 + 4^2 \div (-8)$

33. $26 \div [4 - (-9)]$

Fractions - Word Problems

1. Suppose you have $2\frac{1}{2}$ oranges. If a student serving consists of $\frac{3}{4}$ an orange, how many student servings (including parts of a serving) can you make?
2. Suppose instead that you have $1\frac{1}{2}$ oranges. If this is enough to make $\frac{3}{5}$ of an adult serving, how many oranges (and parts of an orange) make up 1 adult serving?
3. Sarah is making posters by hand to advertise her school play, but her posters are not the same length as a standard sheet of paper (the width is the same, though). She has $3\frac{1}{2}$ sheets of paper left over, which she says is enough to make $2\frac{1}{3}$ posters. How many sheets of paper (and parts of a sheet) does each poster use?
4. If Alberto is also making posters, but his posters only use $\frac{2}{3}$ of a sheet of paper, how many of Alberto's posters will those $3\frac{1}{2}$ sheets of paper make?
5. Carmen is tying ribbons in bows on boxes. She uses $2\frac{1}{4}$ feet of ribbon on each box. If she has $7\frac{1}{2}$ feet of ribbon left, how many bows (or parts of bows) can she make?
6. Pat is also tying ribbons into bows. Pat sees the same $7\frac{1}{2}$ feet of ribbon measured out and says "Since my bows are bigger than Carmen's, there is only enough for me to make $2\frac{1}{4}$ bows." How much ribbon does Pat use on each bow?

Evaluating Expressions

For Exercises 1–26, evaluate the expression for the given value of x .

- $3.5x - 10$ when $x = 2$
- $45 - 2x$ when $x = 6$
- $-3 - x$ when $x = \frac{1}{2}$
- $4x + 9$ when $x = 11$
- $2x^2$ when $x = 8$
- $11 - 3x^2$ when $x = 1$
- $4.5 + x^2$ when $x = 1.5$
- $6x^2 + 13$ when $x = -10$
- $6x^2 + x - 11$ when $x = 2$
- $6x^2 + x - 11$ when $x = -2$
- $12 - 2x^2 + 5x$ when $x = -4$
- $12 - 2x^2 + 5x$ when $x = 4$
- $x(31 - x)$ when $x = 3$
- $(x + 5)(x - 1)$ when $x = 0$
- $(x - 1.5)(x + 42)$ when $x = 1.5$
- $(31 - x)x$ when $x = -3$
- $\frac{36}{x^2}$ when $x = -6$
- $\frac{x^2}{24}(x + 7)$ when $x = -7$
- $42(x + 1)$ when $x = 4$
- $\frac{3(16 - x)}{2x}$ when $x = 10$
- $\frac{x}{4} + 6(x - 12)$ when $x = 12$
- $7x(3 + x)$ when $x = -4$
- $7x^2 - x + 10$ when $x = 2$
- $8x - 2x(6 - x)$ when $x = 0$
- $0.5x^2 + x - 20$ when $x = 10$
- $(x + 7)(x - 2)$ when $x = -5$

Distributive Property

Say It With Symbols

Use the Distributive Property to write each expression in expanded form.

1. $2(x + 6)$

2. $-5(8 - b)$

3. $4(-x + 7)$

4. $-\frac{3}{4}(12 - 16d)$

5. $\frac{2}{3}(6h - 1)$

6. $(-3.2x + 2.1)(-6)$

7. $3.5(3x - 8)$

8. $4(x + 7)$

9. $-2.5(2a - 4)$

10. $\frac{2}{3}(12 - 15d)$

11. $-2(k - 11)$

12. $-\frac{1}{3}(6h + 15)$

Solving Equations

Solve each equation. Show your work and check your solution.

1. $x - 7 = 3$

2. $x + 2 = -11$

3. $-17 = p - 13$

4. $q + 12 = 3$

5. $-15t = -60$

6. $-5 = \frac{s}{-11}$

7. $\frac{c}{-6.1} = -9$

8. $\frac{a}{20} = -4$

9. $b + 5.6 = -8.4$

10. $y - 3.8 = 5.2$

11. $2 = -4z$

12. $y - 6 = -3$

13. $\frac{m}{-3} = -15$

14. $-5f = -75$

15. $-36 = 9d$

16. $\frac{x}{2} = -14$

17. $6n + 17 = 53$

18. $245 = 25n - 5$

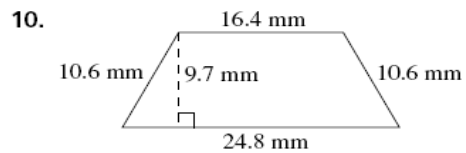
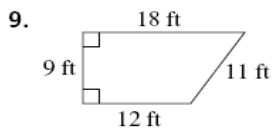
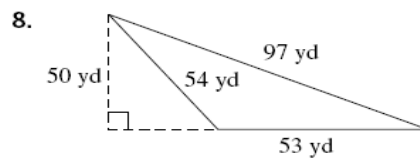
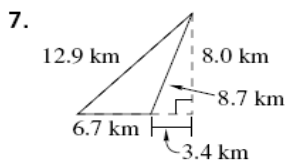
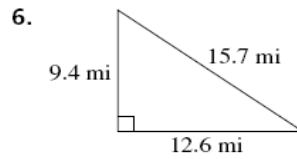
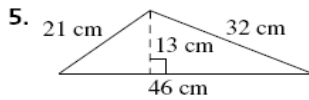
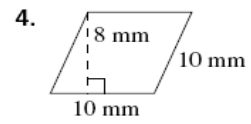
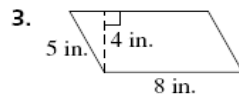
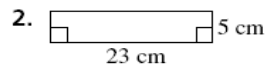
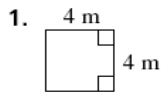
19. $\frac{x}{3} + 2 = 14$

20. $\frac{w}{4} - 7 = -5$

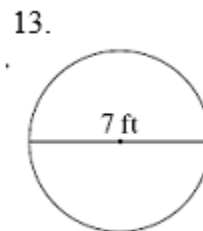
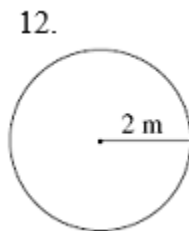
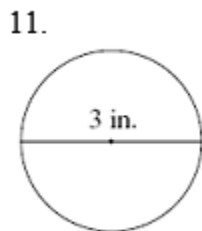
Area Review – Show all work

Filling and Wrapping

Find the area of each figure.



Find the **circumference** and the **area** of each circle.

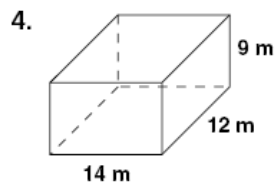
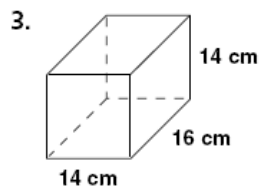
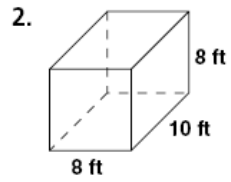
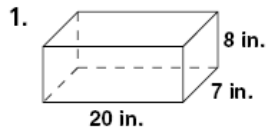


Surface Area and Volume

Find the Surface Area and Volume of each rectangular prism.

Filling and Wrapping

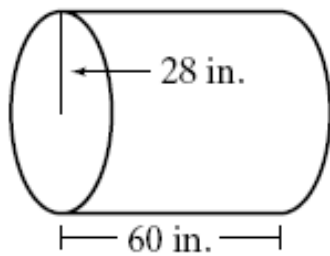
Find the volume of each closed box.



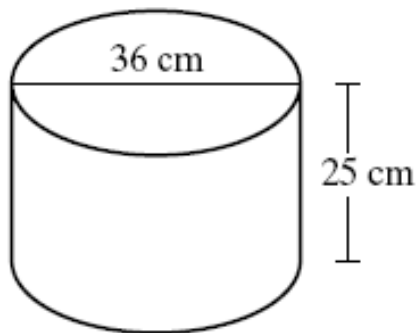
Volume of cylinders

Find the volume of each cylinder. Write the formula and show all work.

1.



2.



3. A water storage tank has a cylindrical shape. The base has a diameter of 18 meters and the tank is 32 meters high. How much water, to the nearest cubic unit, can the tank hold?

4. A cylindrical juice container is 9 inches tall and has a radius of 2 inches. What is the volume of the container to the nearest whole unit?

Working with Exponents

Simplify.

1) 15^0	6) $(2^{-3})(3)^3$
2) 5^{-2}	7) $(3^2)(3^{-5})$
3) $\left(\frac{2}{3}\right)^{-3}$	8) $\frac{3^{-5}}{3^{-2}}$
4) $\left(\frac{3}{5}\right)^{-2}$	9) $\frac{3^0}{3^{-4}}$
5) $\frac{3^{-2}}{5^3}$	10) $\frac{3^{-4}}{3^0}$
Evaluate and write your answer in scientific notation.	
11) $\frac{6.25 \times 10^{-4}}{1.25 \times 10^2}$	