

## Going into Grade 7 Math Pre-AP Summer Study

For students to reinforce foundational computational skills, students, enrolled in Grade 7 Math Pre-AP, are expected to preserve their mastery of Grade 6 Math Pre-AP concepts and skills over the summer. Students will be assessed on selected learning expectations (Texas Essential Knowledge and Skills—TEKS) from Grade 6 Math PAP during the first week returning to school in August. This assessment will indicate level of sustained mastery, but will be used as a diagnostic and not a test grade.

In the chart below, each selected student learning target will be followed with assessment samples. These examples do not represent an exhaustive list of exercises. Answers to these example items are provided at the end of the document.

Several free online resources are available for additional learning support.

McGraw-Hill (online textbook)

Think Through Math

Khan Academy

IXL.com/math

**TEKS 6.2.A: Classify whole numbers, integers, and rational numbers using a visual representation such as Venn diagram to describe relationships between sets of numbers.**

**TEKS 7.2.A: Extend previous knowledge of sets and subsets using a visual representations to describe relationships between sets of rational numbers.**

Ex 1 Sketch a Venn diagram representing the relationships among whole numbers, integers, and rational numbers.

Ex 2 Sketch a number line spanning from -3 to 3. Identify some whole numbers, positive and negative integers, and positive and negative fractions, decimals, and percents

Ex 3 Determine if each statement is true or false. Explain your reasoning.

- a) All integers are rational numbers.
- b) All whole numbers are integers.
- c) All integers are whole numbers.
- d) All rational numbers are integers.

Khan Academy:

Ixl Math: <http://www.ixl.com/math/grade-6>

**TEKS 6.2.B: Identify a number, its opposite, and its absolute value.**

For Ex 4 & 5, identify which group(s) by letter that contains a number, it's opposite and it's absolute value, in this order.

Ex 4 a) 7, -7, -7    b) -8, 8, -8    c) 22, -22, 22    d) -114, -114, 114

Ex 5 a) -2.1, 2.1, 2.1    b)  $1\frac{1}{4}$ ,  $-1\frac{1}{4}$ ,  $-1\frac{1}{4}$     c) 3.25, 3.25, 3.25

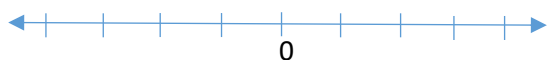
Ex 6 Give the opposite and absolute value of -13.4

Khan academy: [https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-negative-number-topic/cc-6th-absolute-value/e/absolute\\_value](https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-negative-number-topic/cc-6th-absolute-value/e/absolute_value)

Ixl Math: <http://www.ixl.com/math/grade-6>

**TEKS 6.2.C: Locate, compare, and order integers and rational numbers using a number line.**

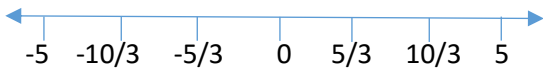
Use the number line for Ex 7 and 8



Ex 7 Determine  $>$  or  $<$ :  $-1.8$    $-2.5$

Ex 8 Locate on the number line:  $1\frac{1}{3}$ ,  $-2.5$ ,  $\frac{1}{2}$

Ex 9 Plot -3 on the number line below.



Ex 10 Show evidence to support whether each statement is true or false.

- a)  $0.5 > -3.4$
- b)  $\frac{-1}{4} < \frac{-3}{4}$
- c)  $4\frac{3}{5} > 4\frac{5}{7}$

Khan Academy: <https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-negative-number-topic/cc-6th-negatives/e/understanding-inequalities-and-the-number-line>

Or : <https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-negative-number-topic/cc-6th-negatives/e/number-opposites>

Ixl Math: <http://www.ixl.com/math/grade-6>

**TEKS 6.2.D: Order a set of rational numbers arising from mathematical and real-world contexts.**

Ex 11 Diver A descended 20 feet into the ocean while Diver B was at 40 feet below sea level. Which diver was farthest away from sea level? Model and explain your answer.

Ex 12 Anchorage, AK recorded these temperatures over 3 days: -3, 7, -1, 0  
List the temperatures in order starting with the coldest.

Ex 13 List these numbers in order from greatest to least:  $4\frac{1}{3}$ , 0,  $-1\frac{3}{5}$ , -2.5, 3

Khan Academy: [https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-negative-number-topic/cc-6th-negatives/e/negative\\_number\\_word\\_problems](https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-negative-number-topic/cc-6th-negatives/e/negative_number_word_problems)

Ixl Math: <http://www.ixl.com/math/grade-6>

**TEKS 6.2.E: Extend representations for division to include fraction notation such as  $a/b$  represents the same number as  $a \div b$  where  $b \neq 0$ .**

Ex 14 Find each quotient. Write all remainders as fractions. a)  $25 \div 4$  b)  $318 \div 9$  c)  $84 \div 5$

Ex 15 Fraction as an operation: Five people need to equally share 6 pounds of chocolate. How much will each person receive?

Ex 16 Fraction as a rate: Two after school clubs are having pizza parties. For the Math Club, the teacher will order 3 pizzas for every 5 students. For the student council, the teacher will order 5 pizzas for every 8 students. Since you are in both groups, you need to decide which party. How much pizza would you get at each party? If you want to have the most pizza, which party should you attend?

Khan Academy: <https://www.khanacademy.org/math/arithmetic/fractions/dividing-fractions-tutorial/v/creating-a-fraction-through-division-of-whole-numbers>

Ixl Math: <http://www.ixl.com/math/grade-6>

**TEKS 6.3.A: Recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values.**

Ex 17 Explain why  $20 \div \frac{4}{5} = 20 \times \frac{5}{4}$ .

Ex 18 Use models to determine how many fourths are in  $\frac{3}{4}$ ? (Model 1:  $\frac{3}{4} \div \frac{1}{4}$  ; Model 2:  $\frac{3}{4} \times 4$ )

Ex 19 Rewrite  $5\frac{1}{5} \div 3\frac{2}{10}$  as a product, then find its equivalent value as a number.

Khan Academy: <https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-arithmetic-operations/cc-6th-dividing-fractions/e/understanding-dividing-fractions-by-fractions>

Ixl Math: <http://www.ixl.com/math/grade-6/reciprocals>

**TEKS 6.3.B: Determine, with and without computation, whether a quantity is increased or decreased when multiplied by a fraction, including values greater than or less than one.**

Ex 20 Is the product of 3 and  $\frac{2}{5}$  greater than or less than 1? Show evidence to support your response.

Ex 21 Would  $\frac{1}{2} \times \frac{5}{8}$  be greater than or less than 1? Show evidence to support your response.

Ex 22 Write  $<$  or  $>$  to complete each:

a)  $\frac{1}{8} \times 6\% \square 1$       b)  $\frac{3}{8} \times \frac{2}{5} \square 1$       c)  $10\frac{1}{5} \times \frac{2}{3} \square 1$

Khan Academy: <https://www.khanacademy.org/math/cc-fourth-grade-math/cc-4th-fractions-topic/cc-4th-mult-whole-number-frac/v/concept-whole-fraction-mult>

Ixl Math: <http://www.ixl.com/math/grade-6/estimate-products-of-fractions-and-whole-numbers>

**TEKS 6.3.C: Represent integer operations with concrete models and connect the actions with the models to standardized algorithms.**

Ex 23 Math Hotel has a ground floor (street level) with 28 floors above of guest rooms and 5 floors of parking below ground level. Write an integer addition expression that models the elevator's motion for each case. Use a number line, if needed.

a) The elevator starts at street level, goes up 8 floors, and then goes down 9 floors.

b) The elevator starts on the 5<sup>th</sup> floor (last floor) of the garage, goes up 5 floors, and goes up 7 floors, then goes down 7 floors.

Ex 24 Use counters to represent  $-3 - (-1)$ ; where  $\oplus$  represents positive one and  $\ominus$  represents negative one.

Ex 25 Write either a product or division expression representing the model of operation with integers.



Khan Academy: (add/subtract) [https://www.khanacademy.org/math/arithmetic/absolute-value/adding\\_subtracting\\_negatives/v/adding-integers-with-different-signs](https://www.khanacademy.org/math/arithmetic/absolute-value/adding_subtracting_negatives/v/adding-integers-with-different-signs)

(multiply/divide) [https://www.khanacademy.org/math/arithmetic/absolute-value/mult\\_div\\_negatives/v/multiplying-and-dividing-negative-numbers](https://www.khanacademy.org/math/arithmetic/absolute-value/mult_div_negatives/v/multiplying-and-dividing-negative-numbers)

Ixl Math: <http://www.ixl.com/math/grade-6/add-integers-using-counters>

<http://www.ixl.com/standards/texas/math/grade-6> (scroll down to 6.3C)

**TEKS 6.3.D: Add, subtract, multiply, and divide integers fluently.**

Ex 26  $-125 \div 25$

Ex 27  $13 \times (-4)$

Ex 28  $-18 - 3$

Khan Academy: [https://www.khanacademy.org/math/arithmetic/absolute-value/adding\\_subtracting\\_negatives/e/adding\\_and\\_subtracting\\_negative\\_numbers](https://www.khanacademy.org/math/arithmetic/absolute-value/adding_subtracting_negatives/e/adding_and_subtracting_negative_numbers) and

[https://www.khanacademy.org/math/arithmetic/absolute-value/mult\\_div\\_negatives/e/multiplying\\_and\\_dividing\\_negative\\_numbers](https://www.khanacademy.org/math/arithmetic/absolute-value/mult_div_negatives/e/multiplying_and_dividing_negative_numbers)

Ixl Math: <http://www.ixl.com/math/grade-7/add-and-subtract-integers> and <http://www.ixl.com/math/grade-7/multiply-and-divide-integers>

**TEKS 6.3.E: Multiply and divide positive rational numbers fluently (multiply/ divide positive decimals & fractions)**

Ex 29  $1\frac{1}{3} \times \frac{5}{6}$

Ex 30  $3.25 \div \frac{1}{2}$

Ex 31  $8.1 \times \frac{2}{3}$

Ex 32  $12.9 \times 1.3$

Khan Academy: <https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-fractions-decimals/cc-7th-mult-div-frac/e/multiplying-fractions> and <https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-arithmetic-operations/cc-6th-dividing-fractions/e/dividing-fractions-word-problems-2> and <https://www.khanacademy.org/math/arithmetic/decimals/dividing-decimals/v/dividing-decimals>

Ixl Math: <http://www.ixl.com/math/grade-6>

TEKS 7.3.A: Add, subtract, multiply, and divide rational numbers fluently.

Ex 33  $-4 + 5.1 \times \frac{-10}{3}$

Ex 34  $\frac{-8}{9} \div \bar{3} + 2\frac{2}{3}$

Ex 35  $-17.2 - (-3\frac{4}{5} \div 19)$

Khan Academy: <https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-fractions-decimals/cc-7th-mult-div-frac/v/multiplying-negative-and-positive-fractions> and

Ixl Math: <http://www.ixl.com/math/grade-6>

TEKS 7.3.B: Apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.

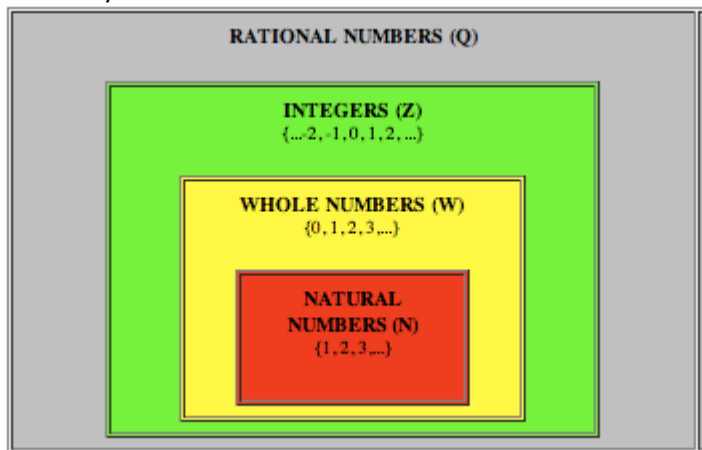
Ex 36 A glacier that was 1,076 meters thick changed in thickness at an average rate of -22.7 meters per year for 7 years. Write a numerical expression you can use to find the glacier's thickness after 7 years. Evaluate your expression.

Ex 37 When converting temperatures in degrees Fahrenheit to Celsius degrees, you first subtract 32 from the Fahrenheit temperature then multiply the difference by five-ninths. Write a numerical expression converting 95°F to a temperature measure in degrees Celsius. Evaluate your expression.

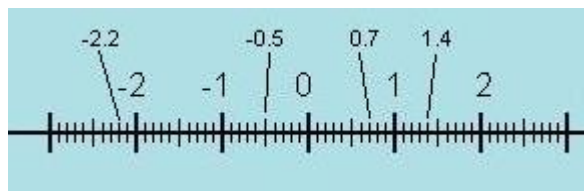
Khan Academy: <https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-fractions-decimals/cc-7th-rational-num-word-probs/v/rational-number-expressions>

Ixl Math: <http://www.ixl.com/math/grade-6>

Answer Key



1.



2.

Answers will vary: Whole number is zero, one, and two. Integers are -2, -2, 0, 1, and 2. Identified positive rational numbers are 0.7 and 1.4. Identified negative rational numbers are -2.2 and -0.5.

3. a) True

b) True

c) False. Counterexample. -2 is an integer but -2 is not a whole number.

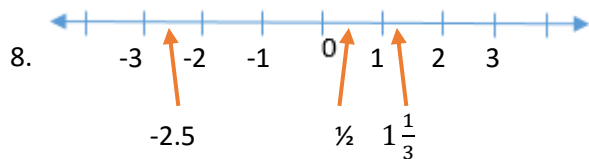
d) False. Counterexample.  $\frac{1}{2}$  is a rational number but  $\frac{1}{2}$  is not an integer.

4. only group c

5. only group a

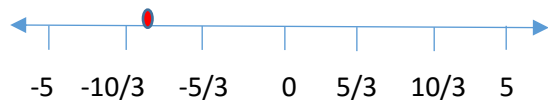
6. opposite is 13.4; absolute value is 13.4

7.  $-1.8 > -2.5$



8.

9.



10. a) True. All positive numbers are larger than negative numbers.

b) True. Being "in debt" one-fourth of a dollar is less than being "in debt" three-fourths of a dollar.

c) False. Convert fractions to share a common denominator of 35.  $\frac{3}{5}$  converts to  $\frac{21}{35}$  while  $\frac{5}{7}$  converts to  $\frac{25}{35}$ .  $\frac{21}{35}$  is not larger than  $\frac{25}{35}$ .

11. Diver B is farthest from sea level (-40 ft) vs. Diver A at -20 ft.

12. -3, -1, 0, 7

13.  $4\frac{1}{3}$ , 3, 0,  $-1\frac{2}{3}$ , -2.5

14. a)  $6\frac{1}{4}$     b)  $35\frac{1}{3}$     c)  $16\frac{4}{5}$

15.  $\frac{6}{5}$  or  $1\frac{1}{5}$  lb/person

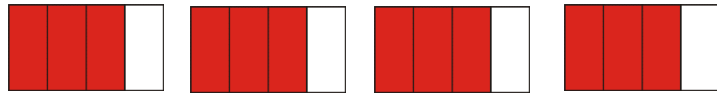
16. Math club  $\rightarrow$  3 pizzas/5 students =  $\frac{24}{40}$  compared to Student Council  $\rightarrow$  5 pizzas/8 students =  $\frac{25}{40}$ . Student council offers one additional pizza slice per every 40 students.

17. Dividing a rational number by a fraction of the form a/b is equivalent to multiplying that same rational number by the reciprocal of the fraction in the form of b/a.

18. a)  $\frac{3}{4} \div \frac{1}{4} \rightarrow$  there are 3 one-fourths in three-fourths.



b)  $\frac{3}{4} \times 4 \rightarrow \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{12}{4}$  or 3.



19.  $5\frac{1}{5} \div 3\frac{2}{5} = \frac{26}{5} \div \frac{32}{10} = \frac{26}{5} \times \frac{10}{32} = \frac{2}{1} \times \frac{1}{5} \times \frac{13}{1} \times \frac{2}{2} \times \frac{5}{1} \times \frac{1}{2} \times \frac{1}{8} = \frac{2}{2} \times \frac{5}{5} \times \frac{2}{2} \times \frac{13}{8} = 1\frac{5}{8}$

20.  $3 \times \frac{2}{5} = \frac{6}{5}$  or  $1.2 > 1$

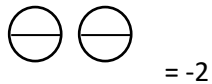
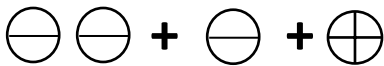
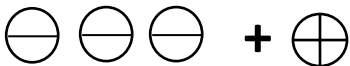
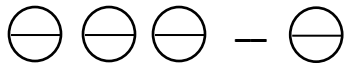
21. Half of a number already less than one will become smaller.  $\frac{1}{2} \times \frac{5}{8} = \frac{5}{16}$

22. a) < b) < c) >

23. a)  $0 + 8 + -9 = -1$ , 1<sup>st</sup> floor of garage

b)  $-5 + 5 + 7 + -7 = 0$  street level

24.



25. product  $4(-2) = -8$  or division  $-8 \div -2 = 4$  or division  $-8 \div 4 = -2$

26 -5

27. -52

28. -21

29.  $\frac{10}{9}$  or  $1\frac{1}{9}$

30.  $\frac{13}{2}$  or 6.5

31.  $\frac{27}{5}$  or  $5\frac{2}{5}$

32. 16.77

33. -21

34. 0

35. -17

36.  $-22.7 \times 7 + 1076 = 917.1$  m

37.  $\frac{5}{9}(95 - 32) = \frac{5}{9}(63) = 35^\circ C$