

The purpose of this chart is to help you understand the NWEA measurement scale (RIT scale) and how it can be used to measure academic growth over time. For more specific information to help support instruction please see NWEA's DesCartes: A Continuum of Learning.

## RIT Reference Chart for Mathematics

NWEA tests produce scores that make it possible to monitor student growth from year to year along developmental curriculum scales or continua. The chart inside shows examples of the kinds of work students can do at various points along the NWEA RIT scale, assuming they have been exposed to content. This type of information is helpful in supporting appropriate instruction.

Please note that each subject-area has a unique alignment to the RIT scale. As a result, scores between subjects are not equivalent.

### How to use the charts:

1. Find the column containing the student's score for a particular subject. For example, if the student's score in "Number Sense/Number Systems" is 188, refer to the column labeled 181-190.
2. Read down the column to locate a sample test question for a given reporting area, such as "Number Sense/Number Systems." A student's score suggests that, currently, they are likely to get about half of the questions of this difficulty correct.
3. Now look at the questions in the column(s) to the left. The student is likely to get most of these correct, assuming he or she has been instructed in these skills and concepts.
4. The questions in the column(s) to the right will probably require new learning on the student's part.

### RIT Scale


We use the RIT scale to measure a student's academic growth over time. Like units on a ruler, the scale is divided into equal intervals – called Rasch Units (RIT) – and is independent of grade level.

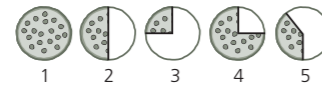




**MATHEMATICS** below **161** **161-170** **171-180** **181-190** **191-200** **201-210** **211-220** **221-230** **231-240** **241-250** above **250**


**Number Sense/ Number Systems**  
Students understand and apply concepts of numbers including representing, identifying, counting, comparing, ordering, equivalence, and number theory.

How many?  
  
 A. 4  
 B. 5  
 C. 6  
 D. 7  
 E. 8

Which shows  $\frac{1}{2}$  of a pizza?  
  
 A. 1  
 B. 2  
 C. 3  
 D. 4  
 E. 5

68 equals:  
 A. 60 + 8  
 B. 60 + 80  
 C. 6 + 8  
 D. 600 + 8  
 E. 6 + 80

Round 68 to the nearest tens place.  
 A. 60  
 B. 70  
 C. 78  
 D. 80  
 E. 100

How many dozen doughnuts?  
  
 A. 2  
 B.  $2\frac{1}{2}$   
 C. 3  
 D. 4  
 E. 24

What is  $\frac{6}{12}$  in simplest form?  
 A.  $\frac{1}{2}$   
 B.  $\frac{12}{24}$   
 C.  $\frac{2}{4}$   
 D.  $\frac{1}{6}$   
 E.  $\frac{1}{12}$

Which set contains all the factors of 20?  
 A. (5, 10, 15, 20)  
 B. (2, 4, 5, 10)  
 C. (1, 2, 4, 5, 10, 20)  
 D. (1, 2, 4, 5, 8, 10, 15, 20)

What is the Greatest Common Factor of 54 and 72?  
 A. 1  
 B. 6  
 C. 9  
 D. 18  
 E. 27

What is  $\sqrt{0.64}$ ?  
 A. 0.08  
 B. 0.08  
 C. 0.8  
 D. 8

43,000 equals:  
 A.  $4.3 \times 10^3$   
 B.  $4.3 \times 10^4$   
 C.  $4.3 \times 10^5$   
 D.  $43 \times 10^4$   
 E.  $43 \times 10^5$

Which is the simplified form of  $2 + 3\sqrt{-12}$ ?  
 A.  $8i\sqrt{3}$   
 B.  $2 + 6i\sqrt{3}$   
 C.  $-i\sqrt{12}$   
 D.  $2 - 3i\sqrt{12}$   
 E.  $-4i\sqrt{12}$

**Estimation and Computation**  
Students understand the processes for computation and can accurately compute and solve problems using whole numbers, fractions, decimals, integers, rational, and real numbers.

$6 + 2 = \square$   
 A. 4  
 B. 8  
 C. 9  
 D. 26  
 E. 62

$63 + 34$   
 A. 31  
 B. 37  
 C. 71  
 D. 97  
 E. 98

$99 - 56$   
 A. 34  
 B. 42  
 C. 43  
 D. 53  
 E. 155

$23 \times 3$   
 A. 56  
 B. 66  
 C. 69  
 D. 59  
 E. 68

$\frac{5}{7} - \frac{3}{7} =$   
 A.  $\frac{8}{7}$   
 B. 2  
 C.  $\frac{2}{7}$   
 D. 0  
 E. 7

$0.32 \div 8 =$   
 A. 4.3  
 B. 0.15  
 C. 0.04  
 D. 0.4  
 E. 43.75

Which is the most appropriate estimation for  $7298 \times 632$ ?  
 A.  $7298 \times 632$   
 B.  $7000 \times 600$   
 C.  $7298.4 \times 632.9$   
 D.  $7290 \times 600$   
 E.  $8000 \times 600$

$-6 + (-7) =$   
 A. 13  
 B. -1  
 C. 42  
 D. 1  
 E. -13

Which is closest to  $\sqrt{10}$ ?  
 A. 3.0  
 B. 3.2  
 C. 3.5  
 D. 5.0

Which fraction represents a quarter of a half?  
 A.  $\frac{1}{16}$   
 B.  $\frac{1}{8}$   
 C.  $\frac{3}{8}$   
 D.  $\frac{1}{2}$   
 E.  $\frac{3}{4}$

Simplify  $5^{-4}$   
 A. 625  
 B.  $\frac{1}{20}$   
 C.  $\frac{1}{625}$   
 D. -20  
 E. -625

**Algebra**  
Students understand and apply algebraic concepts including extending patterns, simplifying expressions, solving equations and inequalities, using coordinate graphing, and solving functions and matrices.

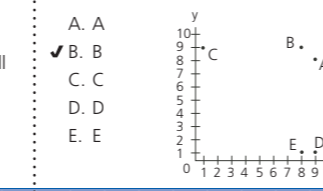
Which number does not fit?  
 2, 4, 5, 6, 8, 10  
 A. 4  
 B. 5  
 C. 6  
 D. 7  
 E. 10

$\square + 7 = 13$   
 $\square = ?$   
 A. 6  
 B. 9  
 C. 10  
 D. 11  
 E. 18

Which sign goes in the  $\square$ ?  
 $14 \square 6 = 8$   
 A. +  
 B. -  
 C.  $\div$   
 D. <  
 E. >

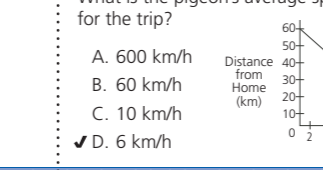
$52 - \square = 12$   
 $\square =$   
 A. 30  
 B. 32  
 C. 40  
 D. 42  
 E. 64

Jill sold bags of raisins. The first day she sold 6 bags and the second day she sold 12. On the third day she sold 18. If Jill continues to sell bags following the same pattern, how many bags will she sell on the sixth day?  
 A. 54  
 B. 48  
 C. 36  
 D. 30  
 E. 24

Which point of the graph shows the coordinates (9, 8)?  
  
 A. A  
 B. B  
 C. C  
 D. D  
 E. E

If  $6n = 102$ , n equals  
 A. 12  
 B. 17  
 C. 108  
 D. 196  
 E. 612






Evaluate  $gh - b$  if  $g = 4$ ,  $h = 9$ ,  $b = 12$   
 A. 48  
 B. 37  
 C. 25  
 D. 24  
 E. 1






The graph shows the flight home of a homing pigeon over a distance of 60 km. What is the pigeon's average speed for the trip?  
  
 A. 60 km/h  
 B. 60 km/h  
 C. 10 km/h  
 D. 6 km/h

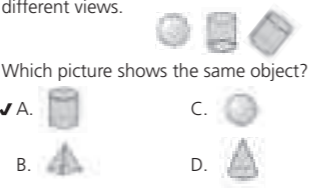




Ken works as a salesperson in a local electronics store. He earns \$200 each week plus 6% commission on his total sales. Which equation correctly represents Ken's weekly earnings? Let  $s =$  Ken's total sales.  
 A.  $E = 0.06s(\$200)$   
 B.  $E = 6s + \$200$   
 C.  $E = 0.06s + \$200$   
 D.  $E = 6s(\$200)$

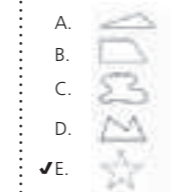
What is the x intercept of  $4x + 2y = 8$ ?  
 A. -4  
 B.  $\frac{1}{2}$   
 C. 2  
 D. 4  
 E. 8

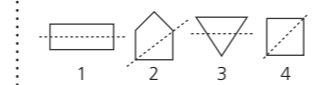
**Geometry**  
Students understand and apply geometric concepts including identification and classification of 2- and 3-D objects, symmetry and transformations, similar and congruent figures, Pythagorean Theorem, and scale.

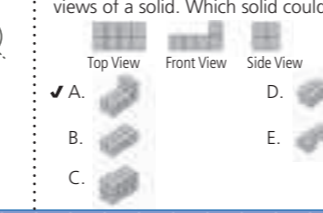





Which shape does NOT have any corners?  
 A.   D.   
 B.  E.   
 C. 

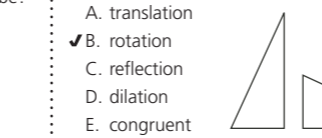
Which of these is a triangle?  
 A.   D.   
 B.  E.   
 C. 






The pictures show the same object from different views. Which picture shows the same object?  
  
 A.  C.   
 B.  D. 

Which shape has symmetry?  
  
 E.

Which figures show a line of symmetry?  
  
 A. 1, 4, and 5  
 B. 2, 4, and 5  
 C. 4 and 5  
 D. 1 and 4  
 E. 2, 3, and 4

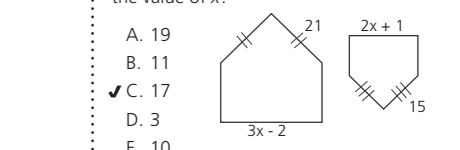
The diagram shows the top, front, and side views of a solid. Which solid could this be?  
  
 A.  D.   
 B.  E.   
 C. 

What type of transformation is shown?  
  
 A. translation  
 B. rotation  
 C. reflection  
 D. dilation  
 E. congruent


Which of these nets would fold into a closed cube?  
 A.  D.   
 B.  E.   
 C. 

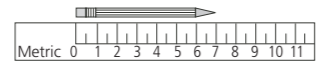
Students at a middle school built a model of their school. The school is 700 ft long and 500 ft wide. If the students used a scale of 10 ft = 1 in., what are the dimensions of the model?  
 A. 70 ft by 50 ft  
 B. 70 ft by 50 in.  
 C. 7 ft by 50 ft  
 D. 70 in. by 50 in.  
 E. 7 in. by 5 in.

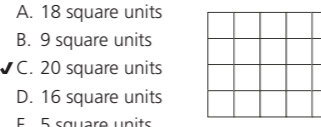
Using the Pythagorean Theorem,  $a^2 + b^2 = c^2$ , when  $a = 9$  and  $b = 12$ , then  $c = ?$   
 A. 8  
 B. 21  
 C. 15  
 D.  $\sqrt{21}$   
 E. 225

If the two pentagons are similar, what is the value of  $x$ ?  
  
 A. 19  
 B. 11  
 C. 17  
 D. 3  
 E. 10

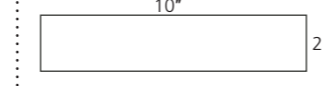
**Measurement**  
Students understand and apply concepts of measurement including measuring, conversion, using appropriate units, and calculating perimeter and circumference, area, surface area, volume, and rate.


Who is the shortest?  
  
 Annika Daniel Lucia Meiko Marcus  
 A. Annika  
 B. Daniel  
 C. Lucia  
 D. Meiko  
 E. Marcus

The pencil is about how many centimeters long?  
  
 A. 5 cm  
 B. 6 cm  
 C. 7 cm  
 D. 4 cm  
 E. 8 cm

What is the area of the figure?  
  
 A. 18 square units  
 B. 9 square units  
 C. 20 square units  
 D. 16 square units  
 E. 5 square units

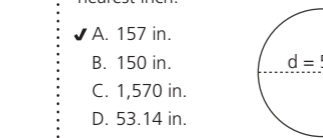
Dante has 3 dimes, 2 nickels, and 4 pennies. How much money does Dante have?  
 A. 21 ¢  
 B. 29 ¢  
 C. 36 ¢  
 D. 39 ¢  
 E. 44 ¢

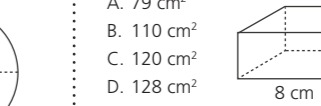
What is the perimeter of this rectangle?  
  
 A. 12"  
 B. 24"  
 C. 8"  
 D. 16"  
 E. 20"

This solid is built by stacking cubes. What is the volume of the solid?  
  
 A. 9 cubic units  
 B. 10 cubic units  
 C. 12 cubic units  
 D. 16 cubic units

4 yards =  $\square$   
 A. 16 feet  
 B. 20 feet  
 C. 144 inches  
 D. 80 inches  
 E. 36 inches

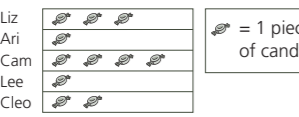
Regina needs  $2\frac{1}{2}$  pounds of fertilizer for her plants. How many ounces is  $2\frac{1}{2}$  pounds?  
 A. 16 ounces  
 B. 20 ounces  
 C. 30 ounces  
 D. 40 ounces  
 E. 48 ounces

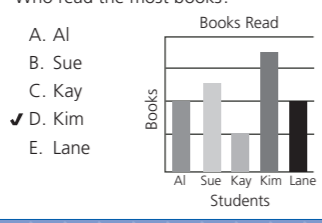
Use the formula  $C = \pi d$  and  $\pi = 3.14$ . Find the circumference of this circle to the nearest inch.  
  
 A. 157 in.  
 B. 150 in.  
 C. 1,570 in.  
 D. 53.14 in.  
 E. 46.86 in.

Calculate the surface area of this rectangular solid.  
  
 A. 79 cm<sup>2</sup>  
 B. 110 cm<sup>2</sup>  
 C. 120 cm<sup>2</sup>  
 D. 128 cm<sup>2</sup>  
 E. 158 cm<sup>2</sup>

The diameter of sphere A is twice the size of sphere B. What is the ratio of the volume of sphere A to the volume of sphere B?  
 A. 8 : 1  
 B. 1 : 8  
 C. 2 : 1  
 D. 1 : 2  
 E. 1 : 1

**Statistics and Probability**  
Students understand and apply concepts of organizing, reading, and interpreting graphs, collecting and analyzing data, and interpreting and predicting using probability and combinations.

Who has the most candy?  
  
 A. Liz  
 B. Ari  
 C. Cam  
 D. Lee  
 E. Cleo

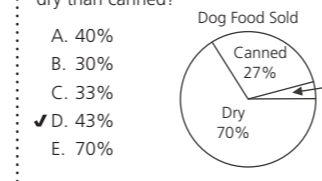
Who read the most books?  
  
 A. Al  
 B. Sue  
 C. Kay  
 D. Kim  
 E. Lane

Student Council Election Results  

Student	Number of Votes
Ann	THH THH THH THH II
Mark	THH THH THH I
Sue	THH THH THH THH

  
 How many votes did Mark get?  
 A. 20  
 B. 16  
 C. 22  
 D. 17  
 E. 19

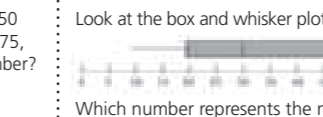
Ken wants to bake cookies for his class. He wants to know what cookie to bake. Which question is best to find out what kind of cookies to bake?  
 A. Do you like to eat cookies?  
 B. What is your favorite dessert?  
 C. How many cookies do you want to eat?  
 D. What is your favorite cookie?

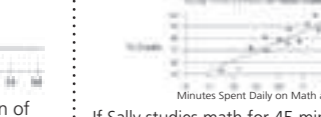
How much more of the dog food sold is dry than canned?  
  
 A. 40%  
 B. 30%  
 C. 33%  
 D. 43%  
 E. 70%

A box contains 13 balls. 3 balls are red, 5 are blue, 4 are orange, and 1 is yellow. What is the probability of picking a red ball?  
 A.  $\frac{3}{5}$   
 B.  $\frac{3}{13}$   
 C.  $\frac{1}{13}$   
 D.  $\frac{3}{13}$   
 E.  $\frac{5}{13}$

Diana received scores of 100, 63, 80, 85 and 92 on her math tests. What is her mean (average) score?  
 A. 83  
 B. 84  
 C. 85  
 D. 86  
 E. 87

If the average of five numbers is 50 and four of the numbers are 25, 75, 30, and 70, what is the fifth number?  
 A. 75  
 B. 50  
 C. 30  
 D. 20  
 E. 10


Look at the box and whisker plot. Which number represents the median of the data?  
  
 A. 20  
 B. 30  
 C. 32.5  
 D. 35  
 E. 45

If Sally studies math for 45 minutes a day at home, predict her math grade based on the scatter plot above.  
  
 A. 50  
 B. 60  
 C. 70  
 D. 80  
 E. 90


For these test grades, which measures of central tendency are equal to 80%?  
 A. mean and median only  
 B. mean only  
 C. mean, median, and mode  
 D. mean and mode only  
 E. mode and median only

**Problem Solving, Reasoning, and Proofs**  
Students understand and apply the processes of problem solving including understanding and representing problems, developing solution strategies, verifying results, and explaining reasoning strategies and proofs.

Jo has 3 books. Mom gave her 2 more. How many books does Jo have?  
 A. 2  
 B. 3  
 C. 4  
 D. 5  
 E. 6

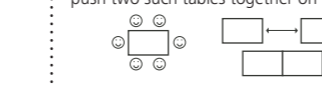
Lia wants to find out the number of candy hearts in these boxes. Which number sentence could Lia use?  
  
 A.  $4 + 4 + 4 = \square$   
 B.  $4 + 4 = \square$   
 C.  $3 + 4 = \square$   
 D.  $3 + 3 + 3 = \square$   
 E.  $4 + 4 + 4 + 4 = \square$

There are 12 donuts in a box. 7 children each eat 1 donut. They want to know how many donuts are left. Which number sentence answers the question?  
 A.  $12 - 7 = \square$   
 B.  $7 - \square = 12$   
 C.  $12 + 7 = \square$   
 D.  $12 - 1 = \square$   
 E.  $1 + \square = 12$

Two children will share the dolls equally. How many dolls will each get?  
  
 A. 1  
 B. 2  
 C. 4  
 D. 8

Suzana is making a fruit salad. She buys 2 bananas, 3 apples, 1 pear, and 25 grapes. She paid \$3.82 for the fruit. How many pieces of fruit did she buy?  
 A. 2 bananas  
 B. 3 apples  
 C. 1 pear  
 D. 25 grapes  
 E. \$3.82

Maria is 5 years older than her brother José. Next year she will be 14 years old. How old is José now?  
 A. 8  
 B. 9  
 C. 10  
 D. 18  
 E. 19

If you have tables that seat 6 people each, as shown, how many people can you seat if you push two such tables together on the short side?  
  
 A. 12  
 B. 8  
 C. 6  
 D. 11  
 E. 10

A phone company charges \$0.20 per minute for the first three minutes and \$0.07 for each additional minute. Which is the cost of a 24 minute call?  
 A. \$1.47  
 B. \$1.67  
 C. \$1.68  
 D. \$2.07  
 E. \$2.08

If 24 girls in a class are 60% of the class, how many students are in the class?  
 A. 16  
 B. 24  
 C. 32  
 D. 40  
 E. 48

A \$30.00 pair of jeans is discounted 20%. If sales tax is 5%, what will be the final price for the jeans?  
 A. \$22.80  
 B. \$24.00  
 C. \$24.20  
 D. \$25.20  
 E. \$28.35

A block of ice loses  $\frac{1}{6}$  of its weight each hour that it sits in the sun. If a 180 pound block of ice is placed in the sun, what will it weigh after 2 hours?  
 A. 150 pounds  
 B. 130 pounds  
 C. 125 pounds  
 D. 120 pounds  
 E. 90 pounds