Model Assessment for grade 7:

Integers:

1. Give a real-life situation for the sum −25 + 10.
2. 2. Give a real-life situation for the product 6 · (−3).
3. a. −18 + (−35) + 80= _____
   b. −9 − (−8) = _____
   c. 2 − (−27) + 8 = _____
   d. −3 · (−8) = _____
   e. 48 ÷ (−4) = _____
   f. (−2) · 3 · (−2) = _____

4. The expression | 20 − 31 | gives us the distance between the numbers 20 and 31. Write a similar expression for the distance between −5 and −15 and simplify it.

5. Divide the following. Give your answer as a fraction or mixed number in lowest terms

   a. 1 ÷ (−8) b. −4 ÷ 16 c. −21 ÷ (−5)

Rational numbers:

6. Multiply and divide. For problems with fractions, give your answer as a mixed number in lowest terms.
   a. − 2 /7 ·(−3 5 /8)

   b. 27.5 ÷ 0.6

   c. −0.7 · 1.1 · (−0.001)

   d. (−0.12)2

   e. ¾ ÷ 5/12

   f. – 2/5 ÷ (-0.1)

7.Write the decimals as fractions.

a. 0.35678 b. -0.88976 c. 3.89907

8. Write the fractions as decimals.

a. – 28 /10,000 b.5678/100 c. 7 156/100,000

9.Convert to Decimals.

a. 7 /13 b. 1 9/11

Algebra:

10. Solve the equations.

a. 2x − 7= −6

b. 2 − 9= −z + 4

c. 120 = c −10 d

11. Factor the expressions (write them as multiplications).

a. 7x + 14 =

b. 15 − 5y =

c. 21a + 24b – 9=

12. Simplify the expressions.

a. 7s + 2 + 8s – 12

b. x · 5 · x · x · x

c. 3(a + b − 2)

13. Chris can run at a constant speed of 12 km/h. How long will it take him to run from his home to the park, a distance of 0.8 km?

14. a. Which equation matches the situation? A pair of binoculars is discounted by 1/5 of its original price (p), and now they cost $48. b. Solve the equation to find the original price of the binoculars.

w /5 = 48 4w/ 5 = 48 5w/ 4 = 48 w − 1/5 = 48 w − 4/5 = 48 5w − 4 = 48

15. The perimeter of a rectangle is 254 cm. Its length is 55 cm. Represent the width of the rectangle with a variable and write an equation to solve for the width.Then solve your equation.

16. You need to buy canning jars. They cost $15 a box, and you only have $150 to spend. You also have a coupon that will give you a $25 discount on your total. How many boxes can you buy at most?

a. Write an inequality for the problem and solve it.

b. Describe the solution of the inequality in words.

Ratios, Proportions, and Percent:

You may use a basic calculator for all the problems in this section.

17. (1) Write a unit rate as a complex fraction. (2) Then simplify it. Be sure to include the units

a. Lily paid $6 for 3/8 lb of nuts.

b. Ryan walked 2 ½ miles in 3/4 of an hour.

18. A Toyota Prius can drive 565 miles on 11.9 gallons of gasoline (highway driving). A Honda Accord can drive 619 miles on 17.2 gallons of gasoline (highway driving). (Source: Fueleconomy.gov)

a. Which car gets better gas mileage?

b. Calculate the difference in costs if you drive a distance of 300 miles with each car, if gasoline costs $3.19 per gallon.

19. Sally deposits $2,500 at 8% interest for 3 years. How much can she withdraw at the end of that period?

20. A ticket to a fair initially costs $10. The price is increased by 15%. Then, the price is decreased by 25% (from the already increased price). What is the final price of the ticket?

21. In December, Sarah's website had 72,000 visitors. In December of the previous year it had 51,500 visitors.

a. Find the percentage of increase to the nearest tenth of a percent in the number of visitors her website had for that year.

b. If the number of visitors continues to grow at the same rate, about how many visitors (to the nearest thousand) will her site have in December of the following year?

22. Alex measured the rainfall on his property to be 10.5 cm in June, which he calculated to be a 35% increase compared to the previous month. How much had it rained in May?

Geometry:

23. A room measures 4 ¼ in. by 3 ½ in. in a house plan with a scale of 1 in : 3 ft. Calculate the actual dimensions of the room.

24. Calculate the area of a circle with a diameter of 16 cm.

25. Calculate the circumference of a circle with a radius of 9 inches.

26. Draw a triangle with sides 8 cm, 11 cm, and 14.5 cm using a compass and a ruler.

27. A triangle has angles that measure 36°, 90°, and 54°, and a side of 8 cm. a. Does the information given determine a unique triangle? b. If so, draw the triangle. If not, draw several different triangles that fit the description.

28. *You and your friends are at a river at point A. You suddenly remember you need something from home, which is at point C. So you decide to go home (distance AC) and then walk along the road (distance CB) to meet your friends, who will walk along the riverside from A to B. If ABC is a right triangle, AC = 120 m, and CB = 110 m, how much longer distance (in meters) will you walk than your friends?

The Pythagorean theorem:

You may use a basic calculator for all the problems in this section.

29. *a. What is the area of a square, if its side measures √5 m?

*b. How long is the side of a square with an area of 45 cm2?

30. *Determine whether the lengths 57 cm, 95 cm, and 76 cm form a right triangle. Show your work

Probability:

31. A lunch restaurant offers a main dish with chicken or beef. The customer then chooses a portion of rice, pasta, or potatoes, and a side dish of green salad, green beans, steamed cabbage, or coleslaw.

a. Draw a tree diagram or make a list of all the possible meal combinations.

A customer chooses the parts of the meal randomly. Find the probabilities:

b. P(beef, rice, coleslaw) c. P(no coleslaw nor steamed cabbage) d. P(chicken, green salad)

Statistics:

You may use a basic calculator for all the problems in this section.

32. To determine how many students in her college use a particular internet search engine, Cindy chose some students randomly from her class, and asked them whether they used that search engine. Is Cindy's sampling method biased or unbiased? Explain why