

10π Tips and Tricks to Help Ace the 7th Grade NYS Math Exam

- 1) To convert a given rate of measurement to a different rate, set up a **proportion**:
 - a. Remember: Cross products in proportions are equivalent, so use this to create an equation
 - b. Ex: If $1\frac{1}{4}$ yard of mulch covers 200 square feet, how much would 1 yard cover?
- 2) Adding and Subtracting Integers:
 - a. Rid double signs $- (-) \rightarrow +$ $+ - \rightarrow -$ $- + \rightarrow -$
 - b. If the numbers have the same sign, keep that sign and add their absolute values.
 - c. If the numbers have different signs, keep the sign of the “larger” value and subtract absolute values.
- 3) Measuring the Center:
 - a. Mean: Add up all the values, divide by the *number* of data values in the set
 - b. Median: List the values in numerical order, find the center value. If 2 in center, find their average.
 - c. Range: Largest value – Smallest value
 - d. Mode: Value that occurs most frequently
- 4) Converting Decimals and Fractions
 - a. To convert a fraction into a decimal: set up long division with numerator as the dividend and denominator as the divisor (outside number). Look for patterns if decimal does not end.
 - b. To convert a decimal into a fraction: identify the place value (tenths, hundredths, thousandths) to create denominator, write the provided number as the numerator, simplify if necessary.
- 5) Simplifying Expressions and Combining Like Terms
 - a. Like terms have the same variable and same exponent. Add coefficients to combine, watch out for the sign of the coefficient!
 - b. Distribute: Multiply each number inside by the value outside. Distributing a negative changes the sign of each term in the parenthesis.
- 6) Simplifying Expressions that contain Decimals and Fractions
 - a. Convert each value to the same format (make everything a fraction or everything a decimal), depending on whether you are given “common” fractions. Ex) 17 is not easily made into a decimal
- 7) Proportional Graphs
 - a. Must pass through the origin (0, 0)
 - b. The unit rate (C.O.P.) can be found by looking at the y-value when $x = 1$, or dividing any y-value by the corresponding x-value.
 - c. Coordinates: (x, y)
- 8) Modeling Situations with Percents
 - a. Make sure that your percent is appropriately converted into a decimal (move decimal two places to the left). Ex) $7.5\% = 0.075$
 - b. Any situation representing growth or increase (tax, population), add your decimal to 1
 - c. Any situation representing a decrease (sale/discount) in value, do: $1 -$ your decimal value.

9) Modeling Situations with Equations

- a. Identify the variable in the provided problem. Think what is “unknown” ?
- b. Don’t forget to include determined values (Ex: One-time fee) that don’t have a variable
- c. Ex: A candy bar that costs \$1.50 and x bags of fruit that are \$3.75 each $\rightarrow 1.50 + 3.75x$

10) Using Tables to Predict (Extrapolate)

- a. Identify the component of the table you need and set up a ratio using that value over the total number of values in the table.
- b. Create a proportion using the new total you are trying to estimate out of. Solve proportion by cross-multiplying.

11) Solving Equations

- a. Use inverse operations to isolate the variable (+/- and \times/\div)
- b. Keep the equation balanced (do to one side, do to the other)
- c. Verify your answer through substitution (Check by plugging back in)
- d. Be careful of integer rules (negative divided by a negative is a positive)

12) Equations with Fractions

- a. When adding/subtracting, remember to obtain a common denominator if necessary
- b. To “get rid of” a fractional coefficient, multiply by the reciprocal.

13) Scale Factor

- a. Use provided scale to set up a proportion 1 cm = 200 yards
- b. Make sure to line up corresponding units
- c. Solve by setting cross products equal to one another

14) Multiplying Fractions

- a. Before multiplying: look to cross-cancel any common factors: $15 \times \frac{4}{5} = 3 \times \frac{4}{1} = 12$
- b. Next: Multiply numerators, then multiply denominators to obtain your result
- c. Be careful of integer rules

15) Dividing Fractions

- a. Change to multiplication by the reciprocal of the second fraction (Keep, change, flip)
- b. Use steps for multiplying (also look to cross-cancel any common factors)

16) Basic Probability

- a. Probability is always a value between 0 and 1 (including these)
- b. A probability of 0 has no chance of occurring and a probability of 1 is guaranteed to occur
- c. Probabilities that are less than 0.5 are less likely to occur, while a probability above 0.5 is more likely to occur
- d. The ratio is defined as: # of successes/ # of total outcomes
- e. **Cards:** 52, 13 of each suit, 26 black, 26 red. **Coin:** Heads, tails **Die:** #1 – 6
- f. **Sampling:** Should be random and not favor any one group in particular (bias)

17) Compound Probability

- a. To find the probability of multiple events, multiply the respective probabilities
- b. Ex: Probability of rolling a number less than 3 on a die, and flipping a heads: $(1/3)(1/2) = 1/6$

18) Commutative Property

- a. For addition and multiplication, the *order* of the elements does not change the results
- b. Does **not** apply for subtraction and division

19) Distributive Property

- a. $3(2x - 5y) = 6x - 15y$
- b. A term outside a set of parentheses can be “distributed” or multiplied by each term inside them
- c. Be careful of double negatives

20) Associative Property

- a. How we *group* for multiplication and addition does not change the results
- b. Ex: $(2 + 4) + 7 = 2 + (4 + 7)$

21) Inequalities

- a. To solve an inequality, use same principles as solving equations
- b. Flip the sign if you multiply or divide by a negative value
- c. To graph: use an open circle for $<$, $>$ symbols and a closed circle for \leq , \geq
- d. If you write the variable on the left, shade in the direction that the symbol is pointing towards
- e. Look for key words in word problems: Maximum and at most \leq Minimum and at least \geq

22) Circles

- a. The diameter is equal to twice the radius
- b. Circumference: Distance around the circle (like perimeter): $C = \pi d$ or $C = 2\pi r$
- c. Area: refers to region inside the circle: $\text{Area} = \pi r^2$
- d. *In terms of Pi* means to use the π symbol in your answer (don't multiply it out!)
- e. Unless the test explicitly says to use 3.14, assume that you should use the π button on your calculator.

23) Adding and Subtracting Fractions

- a. Always start by getting a common denominator. If working with mixed numbers, convert them to improper fractions also.
- b. Once achieved, add or subtract the numerators and leave the denominators the same
- c. If possible, simplify your answer. (Be mindful of integer rules!)

24) Discount/Tax/Tip

- a. Tax and tip **add** onto the price of an item, while discount **decreases** the price
- b. All three concepts can be solved through a proportion or an equation
- c. For proportions use: $\text{Final Price}/\text{Subtotal} = \text{Adjusted percent}/100$
- d. Adjusted percent refers to the fact that an item that is 15% off results in you paying for **85%** of the value.
- e. For equations: Convert percents to decimals and multiply. 15% off item $\rightarrow .85 \times \text{subtotal}$

25) Factoring Expressions

- a. Find a GCF for each term in the expression
- b. Factoring is the same as “dividing out” the GCF. Ex: $4xy + 12x = 4x(y + 3)$

26) Simple Interest

- a. $I = PRT$ P: Starting amount, R = Rate (as decimal), T = Time of investment
- b. Make sure to convert your % to a decimal. Ex) $3.25\% = 0.0325$

27) Percent Change (Increase/Decrease)

- a. $\text{Change in value} / \text{original value} = x100$
- b. Be careful when identifying the original. Look for words like “from” or the oldest amount

28) Commission

- a. $\text{Commission} / \text{Total Sales} = \text{Commission \%} / 100$
- b. Watch out for additional salaries or bonuses if asked to find **total** amount made

29) Finding Percents of a Number

- a. Convert the percent to a decimal and multiply. 80% of $200 = .80(200) = 160$
- b. If looking to increase/decrease percent: 15% more than $300 = 1.15(300) = 345$

30) Day 1 of Exam: 33 multiple-choice questions (calculator)

31) Day 2 of Exam: 7 multiple-choice questions, 7 short-response, 1 extended-response (calculator)

- a. For written questions, make sure to show your process, including the operations you type into the calculator.

.4159) In the day's before the exam, make sure to get a good night's rest, review your formulas and concepts, and look over questions/solutions in your blue books. One of the best ways to prepare for a mathematics assessment is by continuing to practice with similar style questions, which helps you notice patterns that will ultimately help you. Try your best, apply what you know, and you'll do great!