

Middle School Level
Mathematics Assessment
Multiple Choice Items

The PSSA Mathematics Assessment is given in grades 3 through 8 and 11.

- Look at the mathematics terms included here – you need to know these for the PSSA
- Look at the formulas included in your handouts – they will be provided, but you must know how to use them
- Look at the sample questions included here and practice – your teacher has the correct answers
- Read the question several times and underline or highlight important information
- Try to solve the math question before you look at the answer choices so you are not fooled by any answer choices
- Use the test book and extra paper to do your work
 - ❑ work slowly and neatly so you don't make any mistakes
 - ❑ check your mental math
 - ❑ write carefully and keep numbers in proper columns
 - ❑ copy carefully from the question
 - ❑ look carefully at the units of measurement
 - ❑ draw a picture of the problem if it will help you
 - ❑ if you don't get the right answer, don't give up – try again, or try to solve the problem a different way
 - ❑ if all else fails, try each answer choice to see which one works to answer the question
- You will be able to use a calculator for some of the questions but not for all of them
- In the calculator section, **use** the calculator to check your answers
- Read all the answers carefully
- Watch out for trick answer choices – read the question carefully and choose the right math operation
- When you finish the section, go back and check your work

Mathematics Assessment

Open Ended (Performance) Items

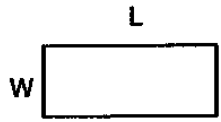
- Look at the sample question included here and practice using the rubric
- Look at the Sample Response for Category 5 included here as a model of a great response
- This is not multiple choice - you must provide the answer
- Use the rubric if necessary while you solve the problem
- There are only a few of these questions, but they make up an important part of your score – **do not** skip these questions
- Do what you can, because you can get partial credit even if you make mistakes
- Read the question carefully, highlight important parts, and take your time
- Pay attention to how many solutions are required, and before you begin writing, divide your page so you will have enough space for all your work
- Write neatly
- Be sure to show all your work even if you use a calculator
- If you used a calculator, explain what you did on the calculator (for example, “I entered 3 multiplied by 3 and I got 9.”)
- Explain every step of your math and why you chose to perform that math – make sure that your explanation is easy for somebody else to read and understand
- Try to use these words when you write your explanation:
 - to get
 - to find
 - to figure out
 - to show
 - because
 - since
 - therefore
- You may want to make two columns on the answer page, like this:

WORK	EXPLANATION
show the math calculations, the numbers, and the solutions here	use words to describe each step of your work here

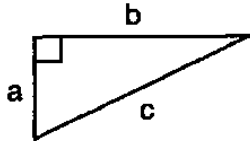
Terms used in the Academic Standards for Mathematics through Grade 8

1. Angle Measurement in Degrees
 2. Bisector
 3. Box-and-Whisker Plot
 4. Combination
 5. Complementary Angle
 6. Coordinate Plane
 7. Counter Example
 8. Deductive Reasoning
 9. Dimensions
 10. Equation
 11. Evaluate the Expression
 12. Exponent
 13. Exponential Relationship
 14. Functional Relationship
 15. Inductive Reasoning
 16. Inequality
 17. Irrational Number
 18. Linear Function
 19. Linear Relationship
 20. Logical Reasoning
 21. Number Line
 22. Order of Operations
 23. Percent
 24. Permutation
 25. Proportion
 26. Pythagorean Theorem
 27. Quadratic Relationship
 28. Quartile
 29. Random Sampling
 30. Ratio
 31. Rational Number
 32. Regular Polygon
 33. Reliability
 34. Scale Model
 35. Scientific Notation
 36. Sequence
 37. Slope
 38. Square Root
 39. Stem-and-Leaf Plot
 40. Supplementary Angle
 41. Transformation
 42. Transversal
 43. Unit Rate
 44. Verbal, Symbolic Rules
 45. Vertical Angle
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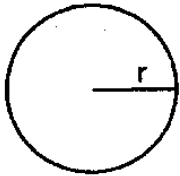
GRADE 8 FORMULA SHEET



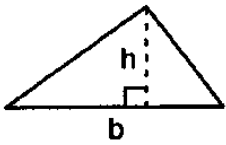
$$A = LW$$
$$P = 2L + 2W$$



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



$$C = 2\pi r$$
$$A = \pi r^2$$



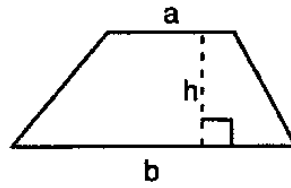
$$A = \frac{1}{2}bh$$

Constant Motion

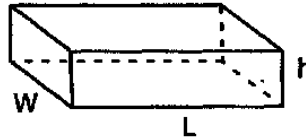
$$d = rt$$

Simple Interest

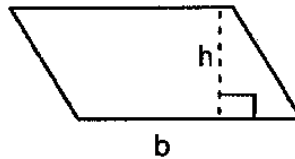
$$I = prt$$



$$A = \frac{h}{2}(a + b)$$



$$V = LWh$$
$$A = 2LW + 2Lh + 2Wh$$



$$A = bh$$

You may not use a calculator for items 1-5.

1. Multiply.

$$\begin{array}{r} 762 \\ \times 968 \\ \hline \end{array}$$

- A. 737,616
- B. 737,516
- C. 737,216
- D. 737,606

2. Subtract.

$$\begin{array}{r} 14\frac{5}{8} \\ - 6\frac{5}{8} \\ \hline \end{array}$$

- A. $8\frac{5}{24}$
- B. $21\frac{11}{24}$
- C. 8
- D. $7\frac{19}{24}$

3. Divide.

$$3 \div 0.24 =$$

- A. .08
- B. .72
- C. 12.5
- D. 125.00

4. Subtract.

$$\begin{array}{r} 11 \\ - 1\frac{2}{3} \\ \hline \end{array}$$

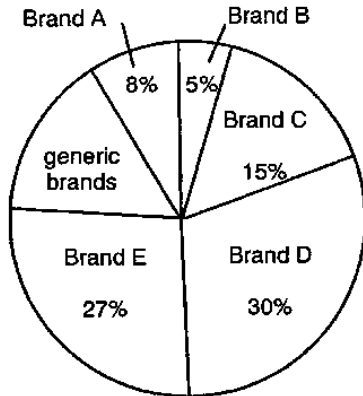
- A. $9\frac{1}{3}$
- B. $9\frac{2}{3}$
- C. $10\frac{1}{3}$
- D. $10\frac{2}{3}$

5. A secretary can type 56 words per minute. How much time will she need to type a 4200 word report?

- A. 7 hours 30 minutes
- B. 1 hour 4 minutes
- C. 1 hour 28 minutes
- D. 1 hour 15 minutes

You may use a calculator for the rest of the questions on this test.

6. According to the graph, what percent of the students chose generic brands?



Favorite Sneakers at Sherman High School

- A. 15%
 B. 14%
 C. 17%
 D. 16%
7. Chris had the following equation for math homework: $6x - 7 = 47$. Which of the following steps would be correct in solving the equation?
- A. $13x = 47$
 B. $6x - 7 + 7 = 47 + 7$
 C. $6x - 7 + 7 = 47 - 7$
 D. $-x - 7 + 7 = 47 - 7$

8. Juanita works in a large department store and earns \$3.60 per hour. The store will pay her an extra 5% in salary for each hour that she sells more than \$100 worth of merchandise. She makes this sales quota for each hour of her 5-hour shift. How much will she earn for the shift?

- A. \$18.00
 B. \$18.90
 C. \$20.90
 D. \$23.00

9. The table below shows test scores for a class. How many students scored in the 80's?

Stem	Leaf
9	0 1 1 5 7
8	0 0 2 4 6 7 9
7	7 7 8 9
6	9
5	2 3
4	4

- A. 2 students
 B. 6 students
 C. 7 students
 D. 9 students

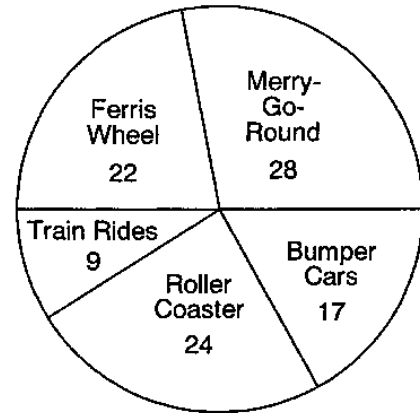
10. There are 9 packages, 5 red and 4 green. There are calculators inside 4 of the red packages and inside 2 of the green packages. What is the probability of choosing a package containing a calculator from the entire group of packages?

- A. $\frac{4}{5}$
- B. $\frac{2}{3}$
- C. $\frac{1}{2}$
- D. $\frac{4}{9}$

11. Which of the following sets **cannot** be the measures of the angles of a triangle?

- A. $25^\circ; 75^\circ; 90^\circ$
- B. $31^\circ; 61^\circ; 88^\circ$
- C. $50^\circ; 60^\circ; 70^\circ$
- D. $51^\circ; 49^\circ; 80^\circ$

12. The following graph shows the favorite rides of 5th-grade students and the number of students choosing each ride. The Merry-Go-Round was **about** _____ times as popular as the Train Rides.



- A. 3
- B. 4
- C. 9
- D. 19

13. Which of the following **best** describes the pattern 4, 8, 12, ...?

- A. $1 + n, 4 + n, 8 + n, \dots$
- B. n^2, n^3, n^4, \dots
- C. $n, 2n, 3n, \dots$
- D. $n, \frac{n}{2}, \frac{n}{3}, \dots$

14. How many yards are equal to 72 inches?
- A. 2 yards
B. 3 yards
C. 6 yards
D. 36 yards
15. Evaluate $5x + 4y$ when $x = 3$ and $y = -2$.
- A. -7
B. 7
C. 10
D. 23
16. A certain clock chimes every 15 minutes. Another clock chimes every 18 minutes. If they both chime together at 12 o'clock, in how many minutes will they chime together again?
- A. 33 minutes
B. 150 minutes
C. 90 minutes
D. 270 minutes
17. Which is the **best** way to find a representative sample of all the students in a school?
- A. Ask any 25 of the most popular student's friends.
B. Ask the first 25 people from a certain room.
C. Ask for 25 volunteers.
D. Select 25 people at random from homeroom class lists.

18. Find the area of a rectangle having sides of 10 feet and 5 feet.
- A. 15 square feet
B. 25 square feet
C. 30 square feet
D. 50 square feet
19. Using the chart below, determine the number of diagonals from a single vertex in a 10-sided figure.

	Triangle	Quadrilateral	Pentagon	Hexagon
Sum of interior angles	180°	360°	540°	720°
No. of diagonals from one vertex	0	1	2	3
No. of sides	3	4	5	6

- A. 6
B. 7
C. 8
D. 9

20. Jan entered a drawing for a dirt bike 5 times. Only 150 entries were received. What is the probability that Jan will win the dirt bike?

A. $\frac{1}{150}$
B. $\frac{1}{50}$
C. $\frac{1}{30}$
D. $\frac{1}{5}$

21. If A is equal to 1, then $A^4 \times A^4$ is equal to

A. 16
B. 8
C. 4
D. 1

22. At 11:00 a.m. a one-meter-high mailbox casts a 0.2-meter shadow. If a pole beside the mailbox casts a 4-meter shadow, how tall is that pole?

A. 2 meters
B. 20 meters
C. 0.2 meters
D. 0.02 meters

23. Keisha needs \$48,000 to meet her living expenses. She receives a yearly salary of \$25,000 for selling computers. She earns \$250 extra for each computer that she sells. How many computers will she need to sell to meet her living expenses?

A. 62
B. 63
C. 92
D. 100

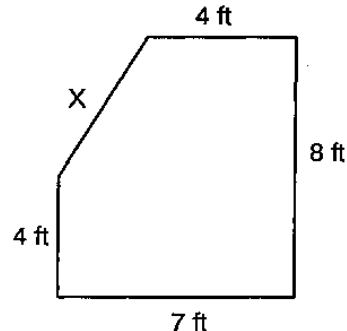
24. There was a power failure last weekend. The power went off on Friday at 7:00 p.m. and came back on at 2:00 p.m. Sunday. For how many hours was the power off?

A. 43 hours
B. 19 hours
C. 26 hours
D. 38 hours

25. Which one of the equations shows 630 written as a product of **prime** factors?

A. $2 \times 7 \times 45$
B. $2 \times 3 \times 3 \times 5 \times 7$
C. $3 \times 3 \times 5 \times 7$
D. $1 \times 2 \times 315$

26. This is a diagram of a wall. Find the length of side X.



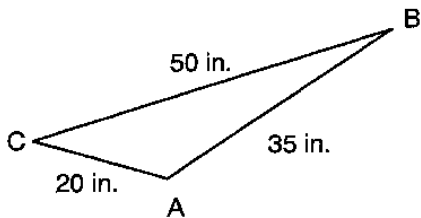
Note: Figure is **NOT** drawn to scale.

A. 5 feet
B. 8 feet
C. 15 feet
D. 896 feet

27. Choose another correct way to write:

$$P = 2L + 2W$$

- A. $P = 2(L + W)$
 - B. $P = 2(L + 4W)$
 - C. $P = 2(2L + 2W)$
 - D. $P = L(2 + W)$
28. If the perimeter of a square is 4 cm, what will the perimeter be if the length of each side is doubled?
- A. 64 cm
 - B. 16 cm
 - C. 8 cm
 - D. 6 cm
29. In triangle ABC, $AB = 35$ inches, $AC = 20$ inches, and $CB = 50$ inches. If angle CAB was made **larger** and AB and AC stayed the same length, what would happen to CB?



Note: Figure is **NOT** drawn to scale.

- A. CB gets larger.
- B. CB stays the same.
- C. CB gets smaller.
- D. none of the above

30. What is the next number in the number sentence?

4, 13, 28, 49, ... ?

- A. 58
 - B. 64
 - C. 76
 - D. 98
31. If $4x - 6 = 14$, what is the value of x ?

- A. 1
- B. 2
- C. 4
- D. 5

Figure 3
Mathematics General Problem Solving Rubric

5 - Advanced Understanding, Excellent

- Correct answer with correct procedures/correct calculations shown or described and a written explanation that supports the work shown. The explanation tells what was done in the solution process and explains **why** the steps were done (or the reason(s) for the steps to be taken). No blemishes, that is, everything is correct. May have a minor omission in calculation or explanation where the omitted step or explanation may be of the level of $2 + 2 = 4$ (something that is usually done mentally and considered trivial and understood).

4 - Satisfactory Understanding

- Correct answer with correct procedures/correct calculations shown or described and a written explanation which supports some of the work shown. May have minor omission in calculation or explanation (such as $2 + 2 = 4$).

3 - Almost Satisfactory Understanding

- Correct answer with most correct procedures/calculations shown or described and no explanation. Some steps are missing, but you can follow what is being done.
- Correct answer with few correct procedures/calculations shown or described and some explanation. Some steps are missing, but you can follow what is being done.
- Incorrect answer with correct procedures shown or described and some explanation, but with one calculation or copying error carried through.

2 - Partial Understanding

- Correct answer with few procedures/calculations shown or described or some explanation. Too many steps are missing to follow what is being done.
- Incorrect answer with half or more correct procedures shown or described and some or no explanation. The student either did not proceed far enough or proceeded incorrectly.
- Incorrect answer with correct procedures shown or described and no explanation. May have no more than 2 calculation or copying errors.

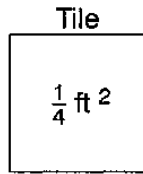
1 - Minimal Understanding

- Correct answer with calculations, procedures or explanation that are either not legible or not understandable or missing or the procedure is incorrect. Less than a "2" score.
- No answer or an incorrect answer, but the student has provided some of the information critical to the solution. There is some indication that the student has read the item.

0 - Incorrect

- Incorrect answer in which the student attempts the task incorrectly or gives an incorrect or incomplete answer with an incorrect explanation or no explanation of the procedure or logic used in the solution. Nothing is correct.
 - Blank responses and Off-Task responses (profanity, refusal to perform, unrelated drawings or comments such as "doodles") are scored as "Incorrect responses."
 - Question marks and "I don't know" are scored as "Incorrect responses." The student has read the task and responded to it.
 - No answer is treated as an incorrect answer.
-

32. A contractor has been hired to tile a rectangular region which has an area of 64 sq ft. He will use square tiles that measure $\frac{1}{4}$ sq ft.



For full credit, you **must** do the following:

1. show OR describe each step of your work, even if you did it in your head (“mental math”) or used a calculator,

AND

2. write an explanation stating the mathematical reason(s) **why** you chose each of your steps.

- A.** Using whole numbers, list all possible sets of dimensions (height and width) for the region.

GO TO THE NEXT PAGE TO FINISH QUESTION 32.

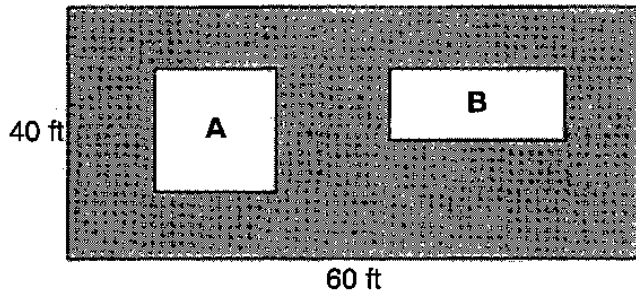
GO ON 

B. How many tiles will the contractor need for each region that you listed?

GO ON 

Grade 8 Sample Response for Category 5

79. A rectangular courtyard is shown in the diagram below. The shaded portion represents grass, and rectangles A and B are cement pads for picnic tables and chairs. The area of pad A is twice the area of pad B. The remaining area is grass, which has an area of 2,040 square feet. What is the area of each cement pad?



NOTE: Figure is NOT drawn to scale.

For full credit, you must do the following:

1. show OR describe each step of your work, even if you did it in your head ("mental math") or used a calculator,
- AND
2. write an explanation stating the mathematical reason(s) why you chose each of your steps.

$$\begin{aligned} \text{Pad A} &= 240\text{ft}^2 \\ \text{Pad B} &= 120\text{ft}^2 \end{aligned}$$

I arrived at this answer by first multiplying $40\text{ft} \times 60\text{ft}$ to find the total area of the diagram.

$$\begin{array}{r} 60 \\ \times 40 \\ \hline 2400 \end{array}$$

After completing this step, I subtracted 2040, which, according to the paragraph up top, is the total grass area, excluding the cement pads. My answer is 360ft^2 total Area of cement pads.

$$\begin{array}{r} 2400 \\ - 2040 \\ \hline 360 \end{array}$$

Since Pad a. is twice the size of Pad b, I divided this number by 3. I got 120ft^2 , the area of pad b. I then multiplied that by 2, to get the area for Pad A.

5 - Student has correct answer (240ft^2 and 120ft^2) with all correct procedures and calculations shown and/or described with full explanation of reasons why each step was taken (The phrases: "to find;" "since;" and "to get" trigger those explanations).