

Possible Stage Two Mathematics Test Topics

The Stage Two Mathematics Test questions are designed to be answerable by a good problem-solver with a strong mathematics background. It is based mainly on material covered by Grade 5 students in Ontario schools, as well as some Grade 6 work. The questions are designed to be answerable by a good problem-solver who has mastered the Grade 5 material.

The test may include any of the following topics. Starred (*) topics are considered Grade 6 material by the Ontario government.

Number Sense and Numeration

- Basic arithmetic operations (+, -, x, ÷) with whole numbers and decimal numbers
- The meaning of the words “sum,” “difference,” “product” and “quotient”
- Ordering and comparing whole numbers, decimal numbers* and fractions*
- Average (arithmetic mean) of whole numbers and decimal numbers
- Rounding numbers to a specified digit, including decimal numbers
- Approximating calculations involving decimal numbers
- The meaning of the word “digit” in reference to a number (847 has three digits: 8, 4 and 7)
- The divisibility tests for 2 and 5 (last digit) and 3 (adding the digits)
- The meaning of the words “even” and “odd” with respect to whole numbers
- Quickly calculating products involving 5×2 (such as $25 \times 5 \times 7 \times 2 \times 2 \times 4$)
- Identifying numbers as prime or composite
- Numerical calculation of numbers with exponents (such as 7^2)
- The meaning of the words “square” (or “perfect square”), “cube” (or “perfect cube”) and “power” in reference to exponents
- The square root symbol $\sqrt{\quad}$
- The meaning of “dozen” and “dozen dozen”
- Problem solving involving money, using trial and error or listing
- Meanings of “penny,” “nickel,” “dime,” “quarter,” “loonie,” “toonie,” and “dollar”
- Ratio* and simple proportions*
- Fractions and percents when represented in drawings (what fraction is shaded?)
- Numerical problems of the type that can be solved with a two-circle Venn diagram.

Measurement

- Applying formulas for the area of a rectangle, square or triangle.
- Perimeter of any polygon (and especially the rectangle)
- Volume and surface area of a rectangular prism*
- Metric prefixes and conversions*
- Given a length, area or volume, naming a common object of that approximate size.
- Approximating perimeters, areas or volumes
- Time measurements, including the Gregorian calendar and the number of days in each month

Geometry and Spatial Sense

- Knowledge of angles up to 360°
- Understanding of a standard analog clock and its relationships with geometry
- Using a protractor to measure an angle.
- Classification of angles (acute, right, obtuse, straight, reflex)
- Classification of triangles by sides (scalene, isosceles, equilateral)
- Classification of triangles by angles (acute, right, obtuse)
- Classification of polygons (esp. triangle, quadrilateral, pentagon, hexagon and octagon)
- Approximating an angle's degree measure
- The sum of the angles in any triangle is 180°

- Identifying a solid from its net*
- Reasoning involving a painted cube cut up into smaller cubes

Patterning

- Finding missing terms in simple sequences
- Simple division-and-remainder problems
- Extending patterns to find later terms

Data Management and Probability

- Reading graphs and tables and evaluating data presented in these formats.
- Calculating probabilities in simple experiments, expressing answers as fractions*

Some topics that exam-writers do NOT need to know are:

- Integers and signed numbers
- Order of operations
- Algebra
- Formulas for the area or perimeter of a circle

Additional Web Resources

- www.themathleague.com (5th and 6th Grade Contests)

For more information on Elementary School Curriculum see the Ontario Ministry of Education and Training Website.

Mathematics Warm-Up Quiz 1

Calculator NOT permitted.

1. Add $4.235 + 36.7 + 441 + 0.007$
2. Which is largest?
3.2409 3.2491 3.199999 3.249
3. What is the surface area of a rectangular prism measuring $2 \times 3 \times 7$?
4. How many digits are in the answer to $(5 + 69) \times 100$?
5. Everyone in Mr. Henderson's class likes either orange juice or apple juice or both. The number of students in Mr. Henderson's class who like orange juice is 15 and the number of students in Mr. Henderson's class who like apple juice is 23. If 8 students like both types of juice, how many in total like only one type of juice?
6. Calculate $2^{10} - 10^2$.
7. If the time is 5 p.m., what time will it be 8000 hours from now?

Answers to Warm-Up Quiz 1

1. The sum is 481.942
2. The largest is 3.2491
3. The surface area is 82 square units
4. The answer has 4 digits
5. 22 students like only one type of juice
6. The difference is 924
7. It will be 1 a.m.

Mathematics Warm-Up Quiz 2

Calculator NOT permitted.

1. Multiply 934.74×8.03
2. Find the average of the four numbers
3.4, 8.6, 7.3 and 1.1
3. What is the area of a square with one edge that measures 14 m?
4. The number 8111...1117 has 38 digits and all of the missing digits are ones. Is this number divisible by 3?
5. Jamie has \$8 more than Sally and at the same time has twice as much money as Sally. How much money in total do Jamie and Sally have?
6. Andrea is 12 years old. What is average of her age 8 years ago and her age 2 years from now?
7. In a sequence, each term is the sum of the previous two terms. If the fourth and fifth terms of this sequence are 13 and 23, respectively, what is the first term of the sequence?

Answers to Warm-Up Quiz 2

1. The product is 7505.9622
2. The average is 5.1
3. The area is 196 square metres
4. Yes (The sum of the digits is 51, which is divisible by 3)
5. They have \$24 together
6. The average of 4 and 14 is 9
7. The first term of the sequence is 7

Mathematics Warm-Up Quiz 3

Calculator NOT permitted.

1. Subtract $4573.25 - 894.336$
2. Which is larger? $\frac{3}{5}$ or $\frac{4}{7}$
3. How many odd numbers are there between 50 and 100?
4. The ratio of orange marbles to green marbles in a tin is 2:5. If there are 14 orange marbles in the tin, how many green marbles are in the tin?
5. A rectangle with an area of 133 square cm has a width of 7 cm. What is the length of this rectangle?
6. Which of these items is most likely to measure 20 cm in length?
ant paper clip table knife
park bench highway
7. A jar contains 8 white marbles, 5 red marbles and 7 blue marbles. You choose a marble from this jar at random. What is the probability that the marble you choose is white? Answer as a fraction in lowest terms.

Answers to Warm-Up Quiz 3

1. 3678.914
2. The larger fraction is $\frac{3}{5}$
3. There are 25 odd numbers between 50 and 100
4. There are 35 green marbles in the tin
5. 19 cm
6. The table knife is most likely to be 20 cm long
7. The probability that you choose a white marble is $\frac{2}{5}$.

Mathematics Warm-Up Quiz 4

Calculator NOT permitted.

1. Divide $39.1344 \div 9.3$
2. Through how many degrees does the minute hand of a clock move in five minutes?
3. Round 16 542 to the nearest thousand.
4. Calculate $2 \times 4 \times 381 \times 5 \times 25$
(Time limit: 15 seconds!)
5. Calculate the sum of three squared, two cubed, and two dozen dozen.
6. A triangle with an area of 24 cm^2 has a base of 8 cm. What is the height of this triangle?
7. A wooden cube measuring $3 \times 3 \times 3$ is painted red and cut up into 27 smaller $1 \times 1 \times 1$ cubes. How many of these smaller cubes are painted red on exactly one face?

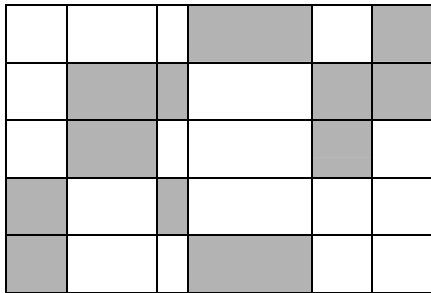
Answers to Warm-Up Quiz 4

1. The quotient is 4.208
2. The minute hand moves 30° in 5 minutes
3. 17 000
4. 381 000
5. The sum is 305
6. The height is 6 cm
7. Six smaller cubes are painted red on exactly one face

Mathematics Warm-Up Quiz 5

Calculator NOT permitted.

- Find the next term in each of these sequences:
(a) 3, 4, 6, 9, 13, 18, 24, ____
(b) 1, 4, 9, 16, 25, 36, 49, ____
(c) 44, 51, 17, 24, 8, 15, 5, 12, ____
- A rectangle measuring 7 units by 11 units has the same perimeter as a square. What is the length of one edge of this square?
- Two whole numbers have a difference of 5 and a product of 24. What is their sum?
- What whole number best approximates the quotient $76.8 \div 15.4$?
- Calculate $\sqrt{49} + \sqrt{100} + \sqrt{\sqrt{16}}$
- The horizontal lines in this rectangle are equally spaced. What fraction is shaded?



- A triangle has two angles that measure 16° and 74° . Classify this triangle by its sides and angles.

Answers to Warm-Up Quiz 5

- (a) 31 (b) 64 (c) 4
- The length of one edge is 9 units
- The sum is 11.
- The best whole number approximation is 5
- The value is 19
- $\frac{2}{5}$ ("Slide" the shaded parts down.)
- A scalene right triangle

Mathematics Warm-Up Quiz 6

Calculator NOT permitted.

- How many of these eight numbers are composite?
9 11 13 15 17 19 21 23
- Determine the volume of a cube with an edge of length 7 cm.
- Lily received 88, 93 and 79 on her first three tests of the year. What score would she need on the fourth test to have an average of exactly 90 on these four tests?
- An isosceles triangle has one angle that measures 148° and two other angles that are equal in size. What is the measure of either of these other two angles?
- In a sequence of numbers, each term is triple the term before it. If the first term is 2, what is the fourth term?
- If a dozen dozen candies cost half-a-dozen dimes a dozen, how much does one candy cost?
- Mark is counting by 7's, like this: 7, 14, 21, 28, ... At the same time and the same rate, Chava is counting by 3's, like this: 3, 6, 9, 12, ... When Mark says 14, Chava says 6. What number is Mark saying when Chava says 198?

Answers to Warm-Up Quiz 6

- Three of them are composite (9, 15 and 21). The rest are prime numbers.
- The volume is 343 square cm
- Lily needs 100 on her fourth test.
- The other two angles each measure 16°
- The fourth term is 54
- One candy costs 5 cents
- Mark says 462 when Chava says 198

About the Practice Math Test

On the following pages is a Practice Mathematics Test. Following the test is an answer key so you can check your work.

Scoring 35 or over out of 50 is quite good. The test should take no more than 60 minutes.

To the right are instructions similar to those on the actual test. The practice test itself begins on the next page.

Mathematics Test

DO NOT TURN THE PAGE UNTIL YOU ARE TOLD TO DO SO.

This is a fifty-question short answer test.

For each question, put your answer in the blank provided.

Please read these sample questions:

Sample questions:	
What is the ones digit of 325?	_____
$18 + 5 = 20 + \underline{\quad}?$	_____
What is the area of a square with a side of length 9?	_____
Calculate $2^2 + 22$	_____
What is the product of the two smallest whole numbers?	_____

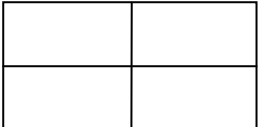
The correct answers, in order, are 5, 3, 81, 26, 0.

On the test, if you cannot answer a question, go on to the next one.

You do not have to provide measurement units with any answers. For example, if the answer is 18 grams, you only need to print the number 18.

Calculators are NOT permitted.

1. Add: $4000 + 300 + 1 + 0.02$ 1. _____
2. What is 40% of 40? 2. _____
3. Multiply: $4 \times 57 \times 25$ 3. _____
4. Three angles of a triangle measure 39° , 61° and $?$ $^\circ$ 4. _____
5. Add: $(100 + 17) + (100 - 17) + (100 + 23) + (100 - 23)$ 5. _____
6. What is the largest factor of 81 less than 81? 6. _____
7. Find the average of the five numbers 51, 53, 55, 57, 59 7. _____
8. What is the product of all four digits in the year 1945? 8. _____
9. If $A = 1$, $B = 2$, $C = 3$, and so on, what is the value of E times Y? 9. _____
10. Add: $71 + 71 + 71 + 71 + 71 + 71 + 71 + 71$ 10. _____
11. Calculate: $\sqrt{9 + 16}$ 11. _____
12. The total value in cents of 10 nickels and 3 quarters is... 12. _____
13. Calculate: $2^3 + 3^2$ 13. _____
14. What is the remainder when 50407 is divided by 4? 14. _____
15. Calculate: $42 - 42 + 42 - 42 + 42$ 15. _____
16. What is the degree measure of one angle of an equilateral triangle? 16. _____
17. How many seconds are there in an hour? 17. _____
18. Calculate: $(843 + 843 + 843) - (43 + 43 + 43)$ 18. _____
19. What is the largest whole number less than 1000 whose digits are all different? 19. _____
20. Round 51 to the nearest hundred 20. _____
21. What is the sum of four hundred seven and five hundred thirty? (Write your answer as a number, not in words.) 21. _____
22. Calculate: $10^3 - 10^2$ 22. _____
23. How many prime numbers are there between 10 and 22? 23. _____
24. In the number 37192.8254, what is the sum of the hundreds digit and the hundredths digit? 24. _____

25. What is the lowest common multiple of 4 and 6? 25. _____
26. Calculate: $\sqrt{9} + 9^2 - 9$ 26. _____
27. How many 2's must be multiplied together for the product to equal 128? 27. _____
28. In the theatre lineup, Jon is 14th from the front and also 14th from the back. How many people in all are in the theatre lineup? 28. _____
29. Find the missing number: $14 \times 14 = 4 \times \underline{\quad ? \quad}$ 29. _____
30. The product of two whole numbers is 24. What is the largest that either of these whole numbers can be? 30. _____
31. What is the smallest whole number greater than 100 that is divisible by 99? 31. _____
32. What is the total number of sides in 2 pentagons and 3 rhombuses? 32. _____
33. How many whole numbers between 1 and 100 are divisible by 3? 33. _____
34. Sal counted aloud by ones starting with 123 and ending with 234. How many whole numbers did Sal say? 34. _____
35. The perimeter of a rectangle is 16 cm. If its width is 3 cm, what is its length, in cm? 35. _____
36. The average of three consecutive whole numbers is 45. What is the smallest of these three numbers? 36. _____
37. The ratio 15:6 is the same as the ratio 20: ? 37. _____
38. Calculate: $\sqrt{10 + \sqrt{36}}$ 38. _____
39. What percent of the value of a quarter is the value of a dime? 39. _____
40. Today, the difference between my parents' ages is 6 years. Three years ago, what was the difference between their ages? 40. _____
41. How many rectangles of all sizes are there in this diagram?
 41. _____
42. What is the largest prime factor of $20 \times 30 \times 40$? 42. _____

43. In buying items for a shared meal, I spent \$20 and my sister spent \$50. If we want to split costs equally, how many dollars do I owe my sister? 43. _____
44. Find the sum of the digits in the number $(10^{10} - 1)$ 44. _____
45. If $a \blacklozenge b$ means $a \times b + 3$, what is the value of $4 \blacklozenge 5$? 45. _____
46. What is the smallest prime number greater than 47? 46. _____
47. Two whole numbers have a sum of 36 and a product of 35. What is their difference? 47. _____
48. Cookies are sold in packages of 45. If Paul needs 500 cookies for a meeting, he needs to buy ? packages. 48. _____
49. If I drive at a rate of 100 km/h for a total time of 2 hours and 12 minutes, what distance of kilometres will I travel? 49. _____
50. In the repeating decimal $0.\overline{391758}$, what is the 2000th digit after the decimal point? 50. _____

Answers to the Mathematics Test

- | | | | | |
|------------|----------|---------|---------|---------|
| 1. 4301.02 | 11. 5 | 21. 937 | 31. 198 | 41. 9 |
| 2. 16 | 12. 125 | 22. 900 | 32. 22 | 42. 5 |
| 3. 5700 | 13. 17 | 23. 4 | 33. 33 | 43. 15 |
| 4. 80 | 14. 3 | 24. 3 | 34. 112 | 44. 90 |
| 5. 400 | 15. 42 | 25. 12 | 35. 5 | 45. 23 |
| 6. 27 | 16. 60 | 26. 75 | 36. 44 | 46. 53 |
| 7. 55 | 17. 3600 | 27. 7 | 37. 8 | 47. 34 |
| 8. 180 | 18. 2400 | 28. 27 | 38. 4 | 48. 12 |
| 9. 125 | 19. 987 | 29. 49 | 39. 40 | 49. 220 |
| 10. 568 | 20. 100 | 30. 24 | 40. 6 | 50. 9 |