



## Individual Test 7th/8th

1	Evaluate: $642 \div 6$
2	If $3x + 4 = 43$ , what is the value of $x$ ?
3	What is the eleventh term of an arithmetic sequence with a second term of 13 and a common difference of 7?
4	What is the area of a circle with a diameter of two units? Give an exact answer.
5	What is the missing number in the pattern? $\frac{2}{3}$ , —, $\frac{8}{27}$ , $\frac{16}{81}$ , $\frac{32}{243}$ , ...
6	How many integer factors does 12 have?
7	How many diagonals can be drawn in an irregular, convex nonagon (9-gon)?
8	Find the positive difference between the product and the sum of the smallest three prime numbers.
9	If $8x + 2 = 2 + 6x$ , evaluate $3x + 6$ .
10	A certain rectangle has one side measuring $2x - 10$ cm and a perimeter measuring $3x$ . If $x = 10$ cm, what is the area, in square centimeters, of the rectangle?
11	If four painters can paint two houses in three days, how many painters would it take to paint five houses in two days?
12	The product of two negative integers is 102, and they differ by 11. What is their sum?
13	Tony has a flat pizza shaped like a regular hexagon with a perimeter of 36 inches. If he cuts the pizza into six congruent slices, what is the area of each slice, in square inches? ( <i>Express your answer in simplest radical form.</i> )
14	What is the perimeter, in inches, of a right triangle with one leg measuring 10 inches and a hypotenuse measuring 26 inches?
15	Find the sum of the coefficients when $(x - 7)(x + 3)$ is expanded and like terms are grouped.
16	Austin has 100 pencils on January 31. At each math competition, he loses 10% of his pencils (rounding his remaining number up to the nearest pencil each time). If he attends 3 math competitions in February, how many pencils will he have at the end of February?
17	Find the sum of all solutions for $x$ if $x^2 + 13x - 23 = 7$
18	Find the measure, in degrees, of the largest possible exterior angle of a regular decagon.
19	I have equilateral triangles with sides each measuring 1 cm. What is the minimum number of triangles I need to express their total area as $x\sqrt{3}$ cm <sup>2</sup> , where $x$ is an integer?
20	Write the equation of the line of symmetry of the parabola described by the equation $x^2 + 6x - 4 = 23 + y$ .
21	If 5 apples and 9 bananas are worth 38 cherries, and 7 apples and 3 bananas are worth 34 cherries, how many cherries are 4 apples and 4 bananas worth?

22	What are the coordinates of intersection of the lines $2x + 3y = 12$ and $3x + 2y = 18$ ?
23	Write the equation, in slope-intercept form, of the line that is perpendicular to $4y - 3x = 10$ and passes through the point $(7, 8)$ .
24	Find the coordinates of the topmost point (the point that has the largest value of $y$ ) on the circle described by the equation $x^2 - 6x + y^2 + 16y = -24$ .
25	If $x^2 + 12x + 40 - k$ is a perfect square for all integer values of $x$ , what is the value of $k$ ?
26	What is the result when the point $(3, 8)$ is reflected across the line $x = y - 3$ ? (Express your answer as an ordered pair in the form $(x, y)$ .)
27	Oliver Queen has a jar of 8 identical gumballs, except that half are red and half are green. If he picks four gumballs at random, what is the probability that he will have more red gumballs than green gumballs? (Express your answer as a reduced fraction.)
28	If a Ferris wheel with a radius of 20 feet makes a complete rotation every 30 seconds, what is the linear velocity of a passenger on the Ferris wheel? (Express your answer in terms of $\pi$ in feet per minute.)
29	Kevin decides to buy a two-layer cake for math club. The bakery gives him three kinds of cake from which to choose: chocolate, vanilla, and meat. Kevin will like the cake if it has a chocolate layer or a meat layer, but not both. If he chooses the layers randomly, and both layers can be the same, what is the probability that he will like the cake?
30	A square with vertices $(0, 0)$ , $(0, 3)$ , $(3, 3)$ , and $(3, 0)$ is rotated 90 degrees clockwise about the origin. What is the sum of the coordinates of the new square's vertices?
31	Find the distance between the points $(4, 19)$ and $(12, 5)$ . (Express your answer in simplest radical form.)
32	What is the sum of the first 23 positive odd integers that are greater than 16?
33	If the graph of $y = \frac{a}{x}$ passes through the midpoint of the line segment with endpoints $(3, 12)$ and $(9, -4)$ , what is the value of $a$ ?
34	In base 10, a google is a number that can be written as 1 followed by 100 zeros. A googolplex is a number that results when 10 is raised to the power of one google. Express the common logarithm of one googolplex in scientific notation.
35	A convex pentagon has interior angles whose measures form an arithmetic series. Find the smallest integer that could be a measure, in degrees, of an angle of this pentagon.
36	The harmonic mean is defined as the multiplicative inverse of the arithmetic mean of the multiplicative inverses of a set of numbers. Find the harmonic mean of 1, 2, 4, 8, and 16.
37	Evaluate: $(\log_3 11)(\log_{11} 5)(\log_5 729)$
38	The "Knight mean" of a set is defined as the product of the members in a set divided by the number of members in that set. If the "Knight mean" of $\{4096, 2048, 512, 256, 128, 32, 16, 4\}$ is equal to $x \times 4^{24}$ , evaluate $x$ .
39	If $a$ and $b$ are the smallest two consecutive positive integers whose respective positive divisors have equal sums, evaluate $a + b$ .
40	Express the product of $-111_{-3}$ and $1201_{-3}$ as a negative integer in base $-3$ .