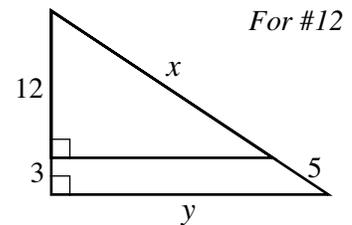


Section A. Each correct answer is worth 1 point.

- Simplify: $2 \cdot 0 + 1^2$
- Einstein can travel 5 mi in 3 hours. At the same rate, how many miles can he travel in 12 hours?
- Give the name of this geometric term: A segment joining two nonconsecutive vertices of a plane polygon is called a(n) _____.
- Express in simplest form: $\frac{1}{2} + \frac{3}{0.3} - 4.5$.
- Answer each of the following with A (Always), S (Sometimes), or N (Never). (Both answers must be correct to receive credit.)
 - Two lines parallel to a third line are A-S-N perpendicular to each other.
 - Two lines perpendicular to a third line are A-S-N parallel to each other.
- Find the equation of the line that passes through (12, 20) and (-13, 0). Express in slope-intercept form $y = mx + b$, with m and b given as decimals.
- Simplify and write the answer in scientific notation: $(3.5 \times 10^4) \times (4 \times 10^1)$.

Section B. Each correct answer is worth 2 points.

- Simplify: $-3^2 + 3^0 + 3x^0 + (3x)^0$
- Evaluate: $\sin(30^\circ) + \tan(45^\circ) + \cos(60^\circ) + \sin(90^\circ) + \cos(120^\circ) + \tan(135^\circ) + \sin(150^\circ)$
- Solve for x : $\log_6(x) + \log_6(x + 1) = 1$.
- The sum of the digits of a three-digit number is 5. How many such three-digit numbers are there? (Note: A three-digit number does not begin with zero.)
- In the figure on the right, find x and y .



Section C. Each correct answer is worth 3 points.

- Solve for all real values of x : $\sqrt{x - 3} - \sqrt{x + 1} = -2$
- If three fair dice are tossed and the product of the number that appears is even, what is the probability that the sum of the numbers is also even? Express as a fraction in simplest form.
- Find k so that $\frac{2x^3 + 3x^2 + kx + 3}{x + 2} = 2x^2 - x - 6$, remainder 15.

Section A. Each correct answer is worth 1 point.

1. Using as many of the ten digits (0–9) as needed, but no more than once each, construct the largest possible five-digit odd number with a 5 in the hundreds place.
2. How many positive factors, including 1 and 2012, does the number 2012 have?
3. Find the measure in degrees of one interior angle of a regular pentagon.
4. $\angle B$ is complementary to $\angle A$, and $\angle C$ is supplementary to $\angle A$. Find $m\angle C - m\angle B$ (in degrees).
5. A 100-foot ladder leans against a vertical wall. The foot of the ladder is 28 feet from the base of the wall. If the bottom of the ladder is pulled away from the wall 32 more feet, by how many feet does the top of the ladder slip?
6. If 20% of 12 is the same as 30% of m , find m .
7. Find the ratio of (12 yds, 20 in) to (20 yds, 12 in). Express as a fraction in simplest form.

Section B. Each problem is worth 2 points.

8. Find $m + n - d$, where m is the mean, n the median, and d the mode for the set of numbers 12, 20, 5, 15, 5, 0, 9, 13, 11.
9. The average of 12 different positive integers is 20. What is the largest possible value of any of these numbers?
10. Find p in the Fibonacci-style sequence 20, m , n , 12, p .
11. Find the point on the number line that is $\frac{2}{3}$ of the distance from -20 to -12 .
12. In a circle whose diameter is 12 units, two parallel chords divide the circle into four congruent arcs. Find the length of one of these chords.

Section C. Each problem is worth 3 points.

13. Find the value of c for which the roots of $2x^2 - 21x + c = 0$ are in the ratio 1 : 2.
14. Three solid metal spheres with radii of 3 cm, 4 cm, and 5 cm are melted and recast into a single (solid) sphere. Find the surface area of the new sphere. Express your answer in exact form in terms of π .
15. Find all points of intersection for the circle $(x - 3)^2 + (y + 2)^2 = 25$ and the ellipse $(x - 3)^2 + 10(y + 2)^2 = 169$.