2017 Metrobank-MTAP-DepEd Math Challenge
Division Finals - Team Oral Competition

GRADE 9

15-Second Questions [2 points each]

1. What value of the constant c will make $x^2 - 14x + c$ a perfect square? [49]

2. Solve for x in the quadratic equation $x^2 + x - 6 = 0$. [$x = -3, 2$]

3. What is the sum of the roots of $2x^2 + 6x + 1 = 0$? [-3]

4. Suppose y varies directly as x. If $x = 6$, then $y = 12$. If $x = 2$, find y. [4]

5. Simplify the expression $\sqrt{49x^7}$. [$7x^3\sqrt{x}$]

6. The diagonals of a rhombus are 4 cm and 8 cm. Find the area of the rhombus. [16 cm^2]

7. In a parallelogram, two adjacent angles have measures $(2x + 2)°$ and $(2x - 2)°$. Find x [45]

8. If $x^{0.123} = 4$, what is 1 more than $x^{0.246}$? [17]

9. If $a : b = 2 : 1$ and $b : c = 2 : 1$, find the ratio $a : c$. [$4 : 1$]

10. How long is the hypotenuse of a right triangle if its two legs are 1 cm and 2 cm long? [$\sqrt{5}$ cm]

11. Find the vertex of the graph of $y = x^2 - 4x + 5$. [$(2, 1)$]

30-Second Questions [3 points each]

1. Simplify: $4\sqrt{20} - 2\sqrt{45}$. [$2\sqrt{5}$]

2. If $9x + 19 = (x + 3)^2$, solve for x. [$x = -2, 5$]

3. In a triangle, a line parallel to the base divides one side into segments 4 and 14 units long. If the other side has length 27, how long (in units) is each segment formed when the line divides this side? [6, 21]

4. Find the range of values of k if $x^2 + kx + 9k = 0$ has no real roots. [$0 < k < 36$ or $(0, 36)$]

5. Isosceles trapezoid $ABCD$ has parallel bases AB and CD, and the diagonals intersect at E. If $AE = 8$, $BE = 3x - 1$ and $CE = 5x - 2$, how long (in units) is DE? [13]

6. The diagonals of a rhombus are 18 cm and 24 cm. Find the length of each side. [15 cm]

1-Minute Questions [5 points each]

1. Triangle ABC has a right angle at B. Let D be the foot of the altitude from B to AC. If $AB = 10$ and $AD = 6$, find the length (in units) of CD. [32/3]

2. Solve for x in the equation $\sqrt{x} + 2 = \sqrt{2x - 1}$. [$x = 25$]

3. Suppose z varies directly as the cube of x and inversely as y. If $z = 6$ when $x = \frac{1}{2}$ and $y = \frac{1}{12}$, find z when $x = 3$ and $y = 6$. [18]

4. Fencing material that is 400 m long is to be used to enclose 3 sides of a rectangular lot. What are the dimensions of such a lot with the largest possible area? [100 m, 200 m]

5. Find the smallest positive value of x which satisfies $(2x + 1)^2 + 3x \geq 2(x + 1)^2 + 1$. [1/2]

6. The shortest sides of two similar triangles are 5 cm and 7 cm. If the sum of their perimeters is 48 cm, find the perimeter of the smaller triangle. [20 cm]

Clincher Questions

C.1. Find the smallest positive integer solution of $x^2 - 3x - 10 \geq 0$. [5]

C.2. Rationalize the denominator of $\dfrac{1 + \sqrt{5}}{3 - \sqrt{5}}$ and simplify. [$2 + \sqrt{5}$]

C.3. If r and s are the roots of $2x^2 - 7x + 4 = 0$, find the value of $r^2 + s^2$. [33/4]

Do-or-Die Question

DoD. In a right triangle, the two legs have lengths a and $a + 7d$, while the hypotenuse has length $a + 8d$. Find the value of a/d. [5]