

2019 Metrobank-MTAP-DepEd Math Challenge Division Finals • Grade 9

15-Second Questions [2 points each]

1. What is the slope of the line perpendicular to $5x + 3y = 2$? [3/5]
2. Suppose y varies directly as x , and if $x = 4$, then $y = 12$. If $x = 6$, find y . [18]
3. If $x^{22} = 4$, what is x^{44} ? [16]
4. List down the roots of the quadratic equation $x^2 + x - 6 = 0$. [-3, 2]
5. Find the square of $3 + \sqrt{3}$. [12 + 6\sqrt{3}]
6. Two sides of a triangle are 5 cm and 7 cm. The third side has integer length in cm. What is its largest possible length in cm? [11]
7. Determine the vertex of the graph of $f(x) = 4x - x^2$. [(2, 4)]
8. A square has area 36 cm². Find the area in cm² of a square with half the perimeter. [9]
9. A rhombus has diagonals with lengths 4 cm and 6 cm. Find its perimeter in cm. [4\sqrt{13}]
10. If $f(x) = x^2$, simplify $f(x + 4) - f(x)$. [8x + 16]
11. What value of the constant k will make $x^2 - 7x + k$ a perfect trinomial square? [49/4 or 12.25]

30-Second Questions [3 points each]

1. Simplify $\sqrt{108} + \sqrt{48} - \sqrt{12}$. [8\sqrt{3}]
2. Twice a number, and another number, have a sum of 20. What is their largest possible product? [50]
3. If z varies directly as x and inversely as y , and $z = 9$ when $x = 6$ and $y = 5$, find z when $x = 5$ and $y = 6$. [25/4 or 6.25]
4. Given $\triangle ABC$, point P is chosen on AB and Q is chosen on AC such that $PQ \parallel BC$. If $AP = 2.1$, $PB = 3.5$, and $AC = 16$, find AQ . [6]
5. In rhombus $PQRS$, $\angle QPR = 5\angle QSR$. Find $\angle QSP$. [15°]
6. Find the smaller root of $12x(x - 2) = x - 12$. [3/4 or 0.75]

1-Minute Questions [5 points each]

1. Simplify: $\frac{\frac{x}{x+2} + \frac{x}{x^2-4}}{\frac{1}{x-2} + 1}$. [$\frac{x}{x+2}$]
2. Each side of equilateral $\triangle ABC$ has length 6. Let D be the midpoint of BC , and E the point on AD so that BE bisects $\angle B$. Find the perimeter of $\triangle ABE$. [6 + 4\sqrt{3}]
3. Find all possible values of the real constant k if the graph of $y = 2x^2 - (2k + 5)x + (4k + 2) = 0$ touches the x -axis at only one point. [3/2 or 1.5]
4. In a trapezoid, the midline, which is the line through the non-parallel sides, intersects the diagonals at P and Q . Find PQ if the parallel sides have lengths 6 and 20. [7]
5. List down all the roots of $\sqrt{3x + 19} = \sqrt{x + 21} - 2$. [5]
6. Triangle ABC has a right angle at A . Let D be the foot of the altitude from A to BC . Let E be the foot of the perpendicular from D to AC . If $AB = 13$ and $BD = 5$, find DE . [144/13]

Clincher Questions

- C.1. Lila rolls a coin, a red die, and a blue die. How many possible outcomes are there? [72]
- C.2. In an isosceles trapezoid with base angle 60°, the two parallel sides have lengths 3 cm and 7 cm. Find its area in sq. cm. [10\sqrt{3}]
- C.3. Find all possible values of the constant k if the minimum of $x^2 + kx + 20$ equals the maximum of $-3x^2 + 12x + 5$. [$\pm 2\sqrt{3}$]

Do-or-Die Question

- DoD. List down all the roots of $(x^2 - 3x)^2 - 14(x^2 - 3x) + 40 = 0$. [-2, -1, 4, 5]