

**MMC**  
 2018 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  $x^2 - 16x + c$  a perfect square? [64]
2. Solve for  $x$  in the quadratic equation  $x^2 + 4x - 5 = 0$ . [x = -5, 1]
3. What is the sum of the roots of  $3x^2 + 12x + 2 = 0$ ? [-4]
4. Simplify the expression  $\frac{1}{\sqrt{x}} \cdot \frac{1}{\sqrt[3]{x^5}}$ . If  $x = 3$  when  $y = 2$ , find  $x$  when  $y = 5$ . [8x $\sqrt{x}$ ] <sup>5</sup>

6. The diagonals of a rhombus are 6 cm and 10 cm. Find the area of the rhombus. [30 cm<sup>2</sup>] -
7. In a parallelogram, two adjacent angles have measures  $(2x+3)^\circ$  and  $(4x-3)^\circ$ . Find  $x$ . [30°]
8. If  $x_{0.234} = 2$ , what is 3 more than  $x_{0.468}$ ? [7]
9. How long is the hypotenuse of a right triangle if its two legs are 2 cm and 3 cm? [ $\sqrt{13}$  cm]  
If  $a:b=3:1$  and  $b:c=3:1$ , find the ratio  $a:c$ . [9:1]

11. Find the vertex of the graph of  $y = x^2 - 2x + 4$ . [(1, 3)]  
1. Simplify:  $5\sqrt{27} - 3\sqrt{12}$  [9 $\sqrt{3}$ ]

30-Second Questions [3 points each]

2. If  $6x + 7 = (x+2)^2$ , solve for  $x$ . [x = -1, 3]
3. Find the range of values of  $k$  if  $x^2 + kx + 5k = 0$  has no real roots. [0 < k < 20 or (0, 20)]
4. In a triangle, a line parallel to the base divides one side into segments 6 and 15 units long. If the other has length 35, how long (in units) is each segment formed when the line divides this side? [10, 25]
5. Isosceles trapezoid ABCD has parallel bases AB and CD, and the diagonals intersect at E. If AE = 10, BE = 3x - 2 and DE = 4x + 1, how long in units is CE? [17]
6. The diagonals of a rhombus are 24 and 32. Find the length of each side. [20]

1-Minute Questions [5 points each]

1. Triangle ABC has a right angle at C. Let D be the foot of the altitude from C to AB. If  $AC = 12$  and  $AD = 8$ , find the length in units of BD. [x = 36] [10]
3. Suppose  $z$  varies directly as the square of  $x$  and inversely as  $y$ . If  $z = 2$  when  $x = 1$  and  $y = 3$ , find  $z$  when  $x = 3$  and  $y = 4$ . [z = 6]
4. Fencing material that is 300 m 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? [75 m, 150 m]
5. Find the smallest positive value of  $x$  which satisfies  $(3x+1)^2 + 10x \geq 3(x+1)^2 + 2$ . [x = 1]
6. The shortest sides of two similar triangles are 2 cm and 5 cm. If the perimeter of the bigger triangle is 20 cm, find the perimeter of the smaller one. [8 cm]

C.2. Rationalize  $1 + \sqrt{3}$   
Clincher Questions

- C.1. Find the smallest positive integer solution of  $x^2 - 2x - 15 \geq 0$ . [5]
- C.3. If  $r$  and  $s$  are the roots of  $3x^2 - 5x + 1$ , find the value of  $r^2 + s^2$ . [19]

**Do-or-Die Question**  
If  $x_2+y_2=7$ , find the value of  $x_4+2x_2y_2+y_4$ .

[49]

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9.1 Triangle ABC has a right angle at C. Let D be the foot of the altitude from C to AB. If AC = 12 and AD = 8, find the length in units of BD.

9.2 Solve for x in the equation  $\sqrt{x+1} = \sqrt{x+13}$ .

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9.3 Suppose  $x$  and  $y$  varies directly as  $z$ ,  $x$  varies as the square of  $y$  and inversely as  $y$ . If  $z=2$  when

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9.4 Fencing material that is 300 m 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?

9.5 Find the smallest positive value of  $x$  which satisfies  
 $(3x+1)^2 + 10x \geq 3(x+1)^2 + 2$ .

9.6 The shortest sides of two similar triangles are 2 cm and 5 cm. If the perimeter of the bigger triangle is 20 cm, find the perimeter of the smaller one.

9.C.3 If  $r$  and  $s$  are the roots of  $3x^2 - 5x + 1$ , find the value of  $r^2 + s^2$ .

9.D. If  $x_2 + y_2 = 7$ , find the value of  $x_4 + 2x_2y_2 + y_4$ .

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