Metrobank-MTAP-DepEd Math Challenge 2016
Elimination Stage, Grade 9

Name: _____ School: _____ Score: _____

Instruction: Write your answer on the space provided before each item. Give all fractions in lowest terms, and all expressions in expanded form.

_____1. Solve for x in $\sqrt{2-x}-4=0$.

_____2. Find $\sin\theta$ if $\tan\theta=\frac{3}{4}$ and $\cos\theta<0$.

_____3. What is the value of $\tan\left(-\frac{17}{6}\pi\right)$?

_____4. Solve for x in $\frac{5}{x+2}-\frac{2}{x+1}=\frac{1}{2}$.

_____5. Solve for x in $x^4-4x^2-5=0$.

_____6. Find the sum of the first 20 positive odd numbers.

_____7. Solve for x in $x^2+12<7x$.

_____8. Find all possible values of x if one of the interior angles of a square is $(2x^2-8x)^\circ$.

_____9. What is the sum of the interior angles of a pentagon?

_____10. The supplement of an angle is four times its complement. Find the angle.

_____11. What is the shortest side of ΔPQR if $\angle P=57^\circ$ and $\angle Q=67^\circ$?

_____12. Rationalize the denominator and simplify: $\frac{2\sqrt{2}}{\sqrt{6}+\sqrt{2}}$.

_____13. Find the 25th term of the arithmetic sequence whose first 3 terms are 4,7, and 10.

_____14. Solve for x in $\sqrt{2x+1}-\sqrt{x}=1$.

_____15. For what value/s of x is $x^2-8x+18\geq 0$?

_____16. In ΔABC, $\angle B=90^O$ and $\sin A=\frac{3}{4}$. Determine the value of $\tan C$.

_____17. The angle bisector at vertex B of ΔABC meets AC at D. If $BC=6$, $AC=40$, and $CD=15$, find AB.

_____18. Find the equation of the line parallel to $4x+3y=12$ and passing through $(-12,4)$.

_____19. Express in terms of sines or cosines of θ and simplify: $\cot\theta\sec^2\theta$.

_____20. Find the common ratio of a geometric sequence whose first term is -2 and the 7th term is-1458.

_____21. Solve for x in $4\sqrt{3x+1}=4x+3$.

_____22. Find the 7^{th} term of the geometric sequence: 8, 12, 18, ...

_____23. Triangle ABC is a right triangle with $C=90°$. If $A=60°$ and $a=50$, find b.

_____24. Two of the exterior angles of a regular polygon have measure $(6x-30)^\circ$ and $(114-10x)^\circ$. How many sides does this regular polygon have?

_____25. Solve for x in $\frac{3}{2x-1}-\frac{2}{x}=0$.

_____26. Find x so that $x-2, x+2$, and $x+4$ are consecutive terms of a geometric sequence.

_____27. What is the smallest positive angle which is co-terminal to -1125^O?

_____28. What is the height of an equilateral triangle whose perimeter is 6meters?

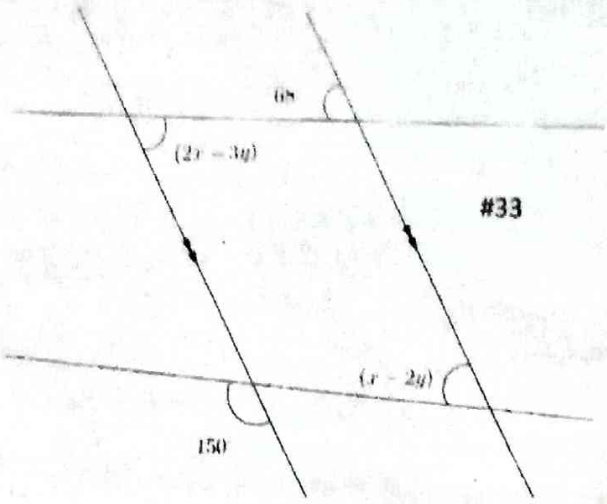
_____29. By what factor is the volume of a cube increased if each of its sides is tripled?

_____30. z varies directly as x and varies inversely as the square of y. If $z=\frac{7}{2}$ when $x=14$ and $y=6$, find z when $x=27$ and $y=9$.

_____31. Express in terms of sines or cosines of θ and simplify: $\frac{\cot^2\theta+1}{\tan^2\theta+1}$

32. Right ΔABC, with right angle at C, has sides $b = 5$ and $c = 7$. Find $\csc B$.

33. In the following figure, the double arrows indicate parallel lines. Find x.



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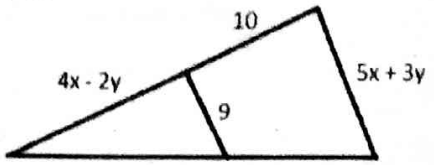
34. What is the perimeter of an equilateral triangle whose area is $75\sqrt{3}$ square centimeters?

35. A person is standing 40 ft away from a street light that is 25ft tall. How tall is he if his shadow is 10 ft long?

36. What is the maximum value of $f(x) = -2x^2 - 4x + 3$?

37. The figure shows a segment joining the midpoints of two sides of a triangle. What is the sum of x and y?



38. If $x > 1$, is $\frac{3}{2}x^{\frac{1}{2}} - \frac{3}{2}x^{-\frac{1}{2}}$ positive or negative?

39. The diagonals of a rhombus are in the ratio of 1:3. If each side of the rhombus is 10 centimeters long, find the length of the longer diagonal.

40. Find a and b so that the zeros of $ax^2 + bx + 24$ are 3 and 4.

41. Find all k so that the graph of $y = -\frac{1}{4}x^2 + kx - 9$ is tangent to the x-axis.

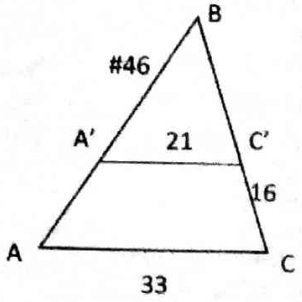
42. The diagonals of parallelogram $JKLM$ intersect at P. If $PM = 3x - 2$, $PK = x + 3$ and $PJ = 4x - 3$, find the length of PL.

43. Suppose that w varies directly as x and the square of y and inversely as the square root of z. If x is increased by 80%, y is increased by 40%, and z is increased by 44%, by how many percent will w increase?

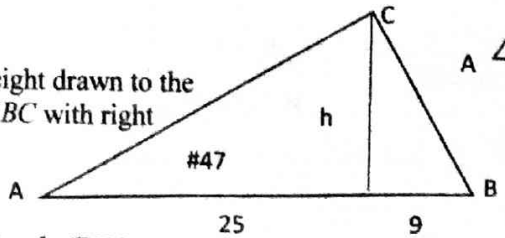
44. Find k so that the minimum value of $f(x) = x^2 + kx + 8$ is equal to the maximum value of $g(x) = 1 + 4x - 2x^2$.

45. The difference of two numbers is 22. Find the numbers so that their product is to be minimum.

46. In ΔABC shown below, $A'C'$ is parallel to AC. Find the length of BC'.

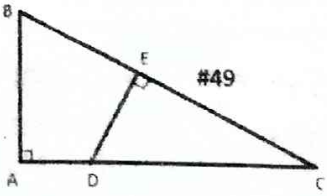


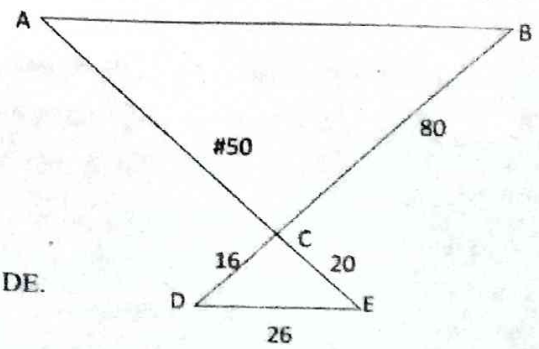
47. Find the length of h, the height drawn to the hypotenuse, of the right ΔABC with right angle at C.



48. In the figure below, ∠BAC and ∠DEC are both right angles, CD = 6, BC = 10, and the length of AD is one-fourth the length of AC. Find CE.

49. The number r varies jointly as s and the square of t. If $r = 6$ when $s = 12$ and $t = \frac{1}{2}$, find r when $s = 18$ and $t = \frac{3}{2}$.





50. Given the figure below with AB parallel to DE. Find the length of AB.