NAME _____
MESA CENTER _____
SCHOOL _____
GRADE LEVEL _____
CURRENT MATH COURSE _____

2006 Junior PRELIMINARY

Solo Math Competition

Geometry Exam:

For students currently enrolled in a Geometry Class

RULES AND PROCEDURES:

1. Complete the information at the top of this sheet.
2. Complete the information on the Scantron sheet.
3. Calculators are permitted.
4. Taking the examination is STRICTLY AN INDIVIDUAL EFFORT.
5. You may write in the test booklet (NO SCRATCH PAPER IS PROVIDED).
6. Record all answers on the Scantron sheet.
7. You will have 45 minutes to complete this test.

DO NOT START UNTIL YOU ARE INSTRUCTED TO DO SO.

GOOD LUCK

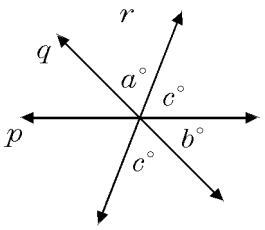
form the angles shown. What is the value of b in terms of c?

a) $90 - c$

b) $180 - \frac{1}{2}c$

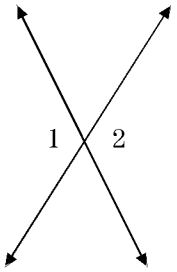
c) $180 - c$

d) $180 - 2c$



$\angle 1$ and $\angle 2$ are vertical angles. If $m\angle 1 = 8x + 1$ and $m\angle 2 = 4x + 25$, the find $m\angle 1$.

a) 24 b) 25 c) 48 d) 49



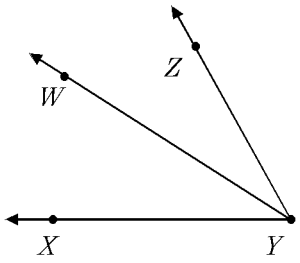
2. The perimeter of a rectangle is 48 metres. If the length is 3 metres more than twice the width, then what is the length of the rectangle?

a) 14 m b) 15 m c) 17 m d) 23 m

$\overrightarrow{\mathbf{YW}}$ bisects $\angle\mathbf{XYZ}$, if $m\angle\mathbf{ZYW} = 2x$ and $m\angle\mathbf{WYX} = 9x$, find $m\angle\mathbf{XYZ}$.

a) 2 b) 22

c) 24 d) 36



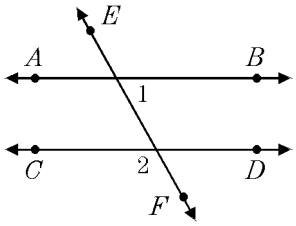
3. Given that $\angle\mathbf{A}$ and $\angle\mathbf{B}$ are supplementary, if $m\angle\mathbf{A} = (x + 28)^\circ$ and $m\angle\mathbf{B} = (3x)^\circ$, find $m\angle\mathbf{A}$.

a) 38° b) 66° c) 87° d) 114°

$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$, $m\angle 1 = 2x + 8$, and $m\angle$ [illegible] $x - 8$. Find the degree measure of $\angle 2$.

a) 46° b) 98°

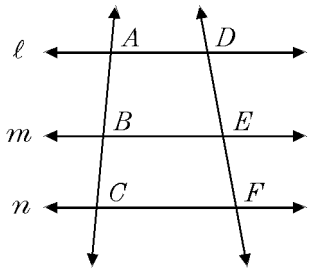
c) 124° d) 132°



[illegible] $\ell \parallel m \parallel n$, if $AB = 5$, $AC = 10$, $DE = 3x$ [illegible] DF [illegible] $x - 4$, then find DF.

a) 13 b) 26

c) 30 d) 42



8. Which of the following best describes $\triangle$**LMN.**

I. scalene

[illegible]

III. right

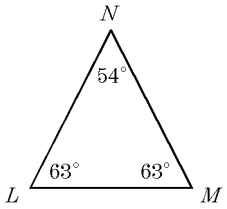
IV. acute

a) IV only

b) I and IV only

c) II and IV only

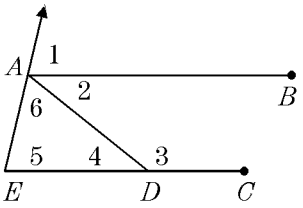
d) II and III only



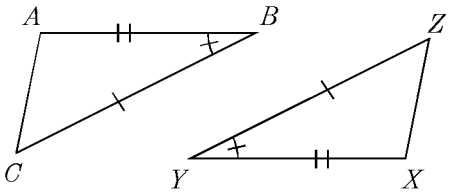
9. In the given figure, $m\angle 1 = 75$, $m\angle 2 = 50$, and $m\angle$ [illegible] $m\angle 3$.

a) 35 b) 90

c) 110 d) 145



[redacted] "$\triangle$**ABC** $\cong$ _____, by _____."



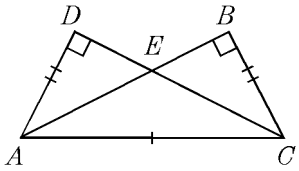
a) $\triangle$**XZY** [redacted] $\triangle$**XYZ**, SAS

c) $\triangle$**ZYX**, SSS d) $\triangle$**ZYX**, SAS

[redacted] $\triangle$**ABC** $\cong$ $\triangle$**CDA** by Hypotenuse-Leg with $m\angle$**BAC** $= 52\frac{3}{4}$ and $m\angle$**AEC** $= 3x + \frac{5}{2}$, find the value of x.

a) 24 b) 31

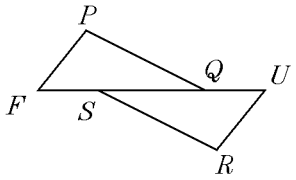
c) $36\frac{1}{2}$ d) 37



12. Given the figure shown with **FP** $\parallel$ **UR**, **PQ** $\parallel$ **RS**, and **PQ** $\cong$ **RS**. If $FS = 5x + 12$, $SQ = 2x - 3$, and $QU = 8x + 6$, find FQ.

a) 15 b) 23

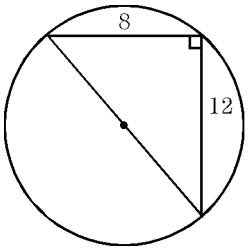
c) 37 d) 43



13. Find the radius of the circle

a) $2\sqrt{$ [redacted] $\sqrt{5}$

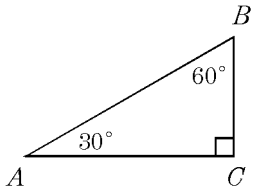
c) 6 d) 12



14. In the given figure, if $BC = 4\sqrt{3}$, find the length of **AC.**

a) $6\sqrt{3}$ b) 12

c) 14 d) $12\sqrt{3}$



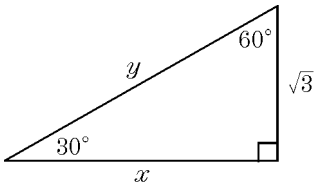
15. Find the area of the triangle.

a) $\dfrac{3\sqrt{3}}{2}$

b) $2\sqrt{3}$

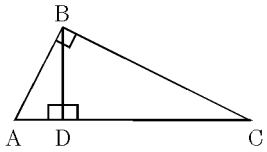
c) $3\sqrt{3}$

d) 12



16. In $\triangle$**ABC**, **AC** $= 10$, **BC** $= 8$, $m\angle$**B** $= 90°$ and $m\angle$**BDA** $= 90°$. How long is **AD**?

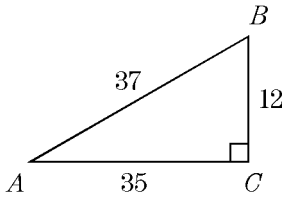
a) 10 b) 6 c) 3.6 d) 4.8



17. For the given triangle, find the value of $\tan\angle$**A**

a) 0.324 b) 0.343

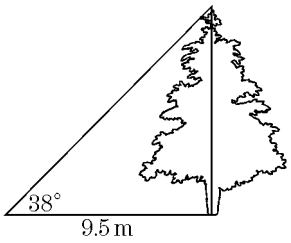
c) 0.789 d) 0.946



18. Determine the height of the tree.

a) 5.9 m b) 7.4 m

c) 8.4 m d) 9.3 m



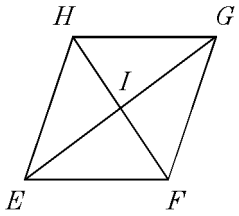
19. Find the sum of the degree measures of all the

a) 72° b) 180° c) 240° d) 360°

$EFGH$, if $EI = 9x - 1$ and $IG = 7x + 15$, find EG.

a) 87 b) 122

c) 142 d) 156



21. Given trapezoid $ABCD$, and median **EF**, if $DC = 20x + 2$, $EF = 26x$, and $AB = 24x + 4$,

I. $AB = 22$

II. $EF = \frac{1}{2}$

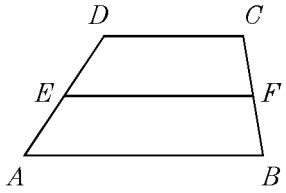
III. $DC = 17$

a) I only

b) III only

c) I and III only

d) I, II, and III



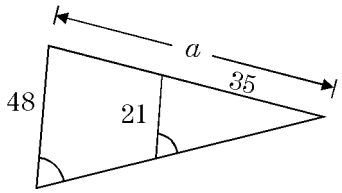
22. Find the value of a in the figure shown.

a) $a = 54$

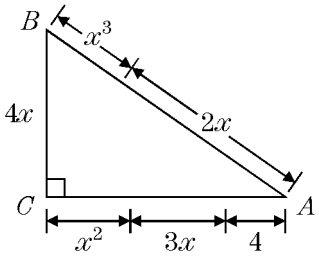
b) $a = 62$

c) $a = 72$

d) $a = 80$



23. Write a polynomial expression for the area of $\triangle$**ABC.**



a) $x^2 + 4x + 6$

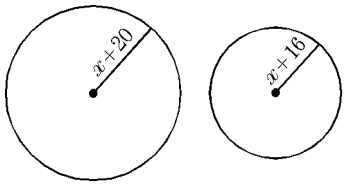
b) $2x^3 + 6x^2 + 8x$

c) $2x^3 + 10x^2 + 12x$

d) $2x^4 + 8x^3 + 10x^3$

[redacted]

of the larger circle and the area of the smaller circle?



a) $x^2\pi$

[illegible] $(x + 4)\pi$

[illegible] $(x + 144)\pi$

[illegible] $(x^2 + 72x + 650)\pi$

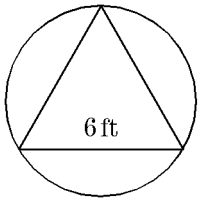
25. Find the circumference of the given circle with the inscribed equilateral triangle.

a) $\frac{1}{4}\sqrt{3}\pi$ ft

b) $\sqrt{3}\pi$ ft

c) $2\sqrt{3}\pi$ ft

d) $4\sqrt{3}\pi$ ft



Answer List

1. d
2. c
3. b
4. d
5. d
6. d
7. b
8. c
9. d
10. b
11. a
12. b
13. a
14. b
15. a
16. c
17. b
18. b
19. d
20. c
21. d
22. d
23. b
24. c
25. d