MTAP SATURDAY PROGRAM IN MATHEMATICS GRADE 9 SESSION 6
TRIGONOMETRY

A. The smaller angle of rt △CUT is C. Complete the table below.

	c	u	t	sinC	cosC	tanC	cscC	secC	cot
1.	8	15							
2.	1	2							
3.		12	13						
4.	3	4							
5.		21	29						
6.		2	$\sqrt{6}$						
7.	$\sqrt{2}$		$\sqrt{5}$						
8.	0.1	0.5							

B. Solve each right triangle given that it is right angled at C.

1. If csc B=$\frac{37}{12}$, find cotB.

2. If cot B=$\frac{28}{45}$, find cosB.

3. If sin A=$\frac{7}{25}$, find tanA.

4. If tan A=$\frac{21}{20}$, $find\ secA.$

5. Find cot A if cosB=$\frac{2}{3}$

6. Find sin A if sec B=$\frac{15}{2}$

7. Find csc B when sec A=$\sqrt{2}$

8. Find sin A if sec B=$\frac{\sqrt{5}}{2}$

9. Find sin A if sec B=$\frac{65}{56}$

10. If cot A $=\frac{16}{63}$, fins csc A.
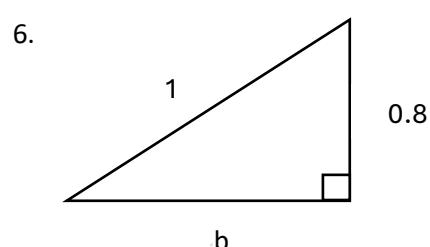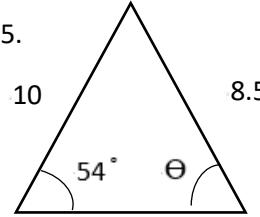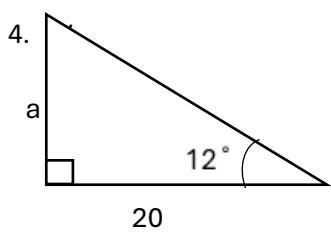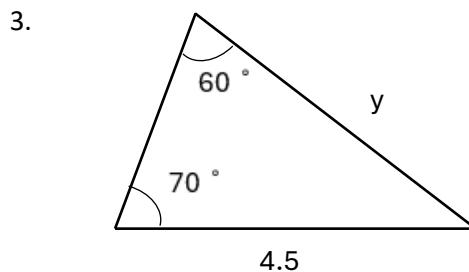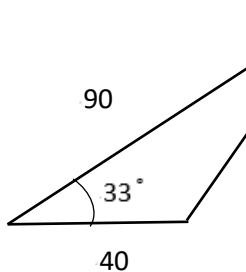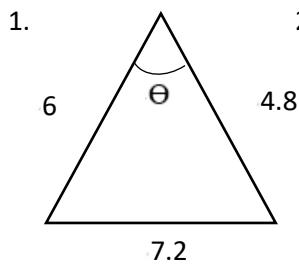
C. Give the exact value of the following.

1. csc 30°
2. sec 60°
3. cos 45°
4. cot 30°
5. sin 45°
6. sec 45°
7. sin 60°
8. Tan 60°

D. Evaluate the following numerical expressions.

1. sec 30° c0s 30°

2. $\frac{sin\ 60°}{cos\ 60°}$

3. $cot^2 45°$ - $csc^2 45°$

4. $\frac{sin\ 30°tan\ 30°}{sec\ 30° - c0s\ 30°}$

5. sin 60° (csc 60° - sin 60°)

6. csc 60° sec30° cot 45°

7. $\frac{1+cos\ 45°}{sin\ 45°}$

8. $\frac{1+cos^2\ 30°}{1+tan^2\ 30°}$

9. $sin^2 30°$ - $cos^2 60°$

E. Find the unknown in each of the following figures.

F. Given triangle ABC, decide whether to use the **Law of Sines** or the **Law of Cosines** to begin solving the triangle. Use the same triangle for all items (∠A, ∠B, ∠C are opposite sides a, b, c, respectively

1. A = 50°, B = 60°, a = 10
2. a = 8, b = 7, C = 110°
3. a = 9, b = 10, c = 11
4. A = 45°, a = 12, b = 13

6. b = 8, c = 9, A = 40°
7. a = 6, b = 6, C = 80°
8. A = 60°, B = 55°, c = 18
9. a = 10, c = 12, B = 100°

5.   A = 30°, C = 70°, b = 15   10. a = 7, b = 10, C = 60°

G. Problem Solving

1. Liam is flying a kite. If the horizontal distance between them is 80 m and the string connecting the kite makes an angle of 29° horizontally, find the length of the string.

2. The length of the shadow of a tree is 7 m when a ray of sunlight makes and angle of 50° with the horizontal. Find the height of the tree.

3. An electric post was broken by a strong typhoon. It formed a right triangle with the ground. If the broken part made an angle of 25° with the other part, and the topmost part of the post which was on the ground was 4o ft. from the base, how tall was the post?

4. A boat is 450 m away from a lighthouse. If the angle of depression of the boat from the top of the lighthouse is 15°, find the height of the lighthouse.

5. Two straight roads diverge from point A at an angle of 32° , Ana and Zach leave A at the same time. Zach walks at 5 km per hour on one road and Ana rides a bicycle at 14 km per hour along the other. How far apart are Ana and Zach at the end of 1 hour?

6. A triangular field has sides of lengths 22, 36 and 44 yd. Find the largest angle.

7. A road in Baguio is inclined 37° to the horizontal. If a man jogs 4.5 km along this road, how high above is his starting point?

8. A building is 800 m from the base of a cellphone tower. If the angle of elevation of the top of the tower is 45.75° from the building, how high is the tower?

9. A wire is used to support a telegraph post. One end of it is 8 m above the ground and the other end is 3 m from the post. Find the angle that the wire makes with the ground.

10. An isosceles triangle has a base of 22 cm and a vertex angle measuring 36°. Find its perimeter.

11. Given that sides of a triangle are in the ratio of 3:5:6, find the angles of the triangle.

12. A land surveyor is measuring the boundaries of a triangular plot. Two sides of the plot are 120 meters and 85 meters long, and the angle between them is 95°. What is the length of the third side?

13. An airplane travels 500 km due north and then turns 60° to the right and flies another 400 km. How far is the plane from its starting point?

Challenge!

1.   Verify the identity $\frac{tan\theta+sec\vartheta-1}{tan\theta-sec\vartheta+1} = tan\theta + sec\theta$
2.   Find the area of the triangle ABC whose vertices are $A(2,5), B(-1.3), C(4,0)$.
3.   Find the siz trigonometric function values of an angle θ in standard position if the terminal side of θ is defined by $x + 2y = 0, x \geq 0$.
4.   Three circles of radii 115cm, 150cm and 225cm are tangent to each other externally. Find (a) angles of the triangle formed by joining the centers of the circles, (b) the area of the triangle formed by joining the centers of the circles.
5.   In the diagram at the right, ΔABE is right angles at A, ΔBCD is right angled at C, $\angle ABC = 135°$, and $AB = AE = 7\sqrt{2}$. If $DC = 4y, DB = 8y$ and $DE = 8y - 6$ for some real number y, to determine all possible values of y.

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