S.T.H.S. - TERM 2 TEST.

Year 11 Trigonometry Test

Name: ____________________

Mark: ____________________

1. Find the exact value of

a) $\sin 30^0$

b) $\sec 45^0$

c) $\cos 300^0$

d) $\tan 135^0$

2. Draw a neat sketch of sin θ for $0^0 \le \theta \le 360^0$

3. Given $\sin\theta = \frac{3}{5}$ and θ is acute, find the exact value of $\cot\theta$

4. Simplify

a) $\frac{\sin(90^0 - A)}{\sec(180^0 + A)}$

b) $(1-\sin^2 A)\sec^2 A$

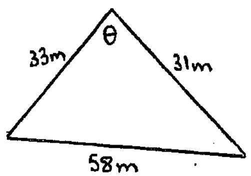
5. Prove that $\frac{\sin^3 B}{\cos B} + \sin B \cos B = \tan B$

6. Solve for all the values of θ between 0^0 and 360^0

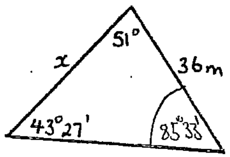
$\cos\theta = -0.47$

$\cot\theta = 3.43$

7. Find θ to the nearest minute and hence find the area.



8. Find x to the nearest metre

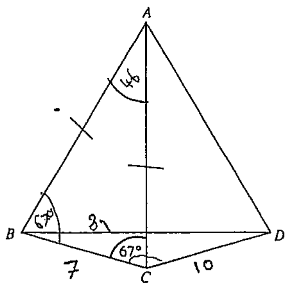


9. Two ships are sailing at the same time. Ship A sails 8 nautical miles due east in one hour, and Ship B sails on a coarse bearing 120^0, and after one hour has travelled 11 nautical miles. How far apart are the two ships?

10. ABCD is a triangular pyramid with BC=7m, CD=10m, BD=8m AB=AC and $\angle ACB = 67^0$ Calculate

a) $\angle BCD$

b) length AB, to the nearest metre.



11. Show that $\cos 6\theta \cos 4\theta - \sin 6\theta \sin 4\theta = 2\cos^2 5\theta - 1$

12. Simplify $\cos ec\theta(\cos\theta - 1)$ by expressing in terms of t $\left(\tan\frac{\theta}{2}\right)$

~~13.~~ Find the general solution of $\sin\theta = -1$

S.T.H.S. - TERM 2 TEST.

Year 11 Trigonometry Test

Name: ____________

Mark:_____ ____________

1. Find the exact value of

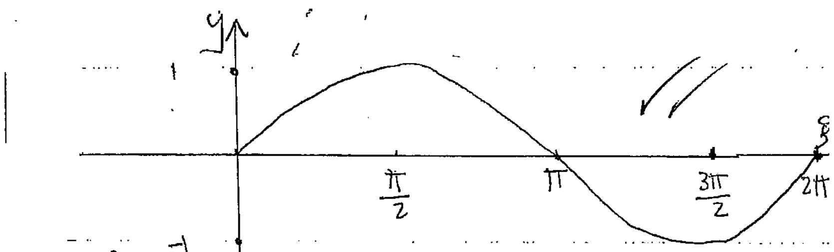
a) $\sin 30^0 = \frac{1}{2}$ ✓

b) $\sec 45^0 = \frac{1}{\cos 45} = \sqrt{2}$ ✓

c) $\cos 300^0 = \frac{1}{2}$ ✓

d) $\tan 135^0 = -1$ ✓

2. Draw a neat sketch of $\sin\theta$ for $0^0 \le \theta \le 360^0$



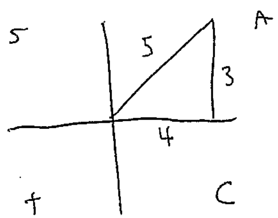
✓✓

3. Given $\sin\theta = \frac{3}{5}$ and θ is acute, find the exact value of $\cot\theta$

$\sin\theta = \frac{3}{5}$

$\tan\theta = \frac{3}{4}$

$\therefore \cot\theta = \frac{4}{3}$ or $1\frac{1}{3}$ ✓✓



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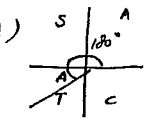
4. Simplify

a) $\frac{\sin(90^0 - A)}{\sec(180^0 + A)} = \frac{\cos A}{-\cos A} = -1$

$\sec(180^\circ + A)$

$= \frac{1}{\cos(180^\circ + A)}$

$= \frac{1}{-\cos A}$



b) $(1 - \sin^2 A)\sec^2 A$

$\sin^2 A + \cos^2 A = 1$

$\cos^2 A = 1 - \sin^2 A$

$(\cos^2 A)\sec^2 A$

$\frac{\cos^2 A}{\cos^2 A} = 1$ ✓✓

5. Prove that $\frac{\sin^3 B}{\cos B} + \sin B\cos B = \tan B$

$LHS = \frac{\sin^3 B}{\cos B} + \sin B \cos B$

$= \frac{\sin^3 B + \sin B\cos^2 B}{\cos B}$

$= \frac{\sin B(\sin^2 B + \cos^2 B)}{\cos B}$

$\sin^2 B + \cos^2 B = 1$

$= \frac{\sin B(1)}{\cos B}$

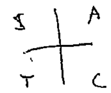
$\tan B = \tan B$

$LHS = RHS$ ✓✓✓

6. Solve for all the values of θ between 0^0 and 360^0

$\cos\theta = -0.47$

$\cot\theta = 3.43$



$\cos\theta = -0.47$

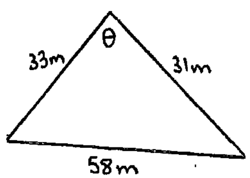
$\theta = 118^\circ 2', 241^\circ 58'$ ✓✓

$\cot\theta = 3.43$

$\theta = \cancel{73^\circ 45'}, \cancel{253^\circ 45'}$

$16^\circ 15', 196^\circ 15'$ ✓✓

7. Find θ to the nearest minute and hence find the area.



$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

$\cos\theta = \frac{31^2 + 33^2 - 58^2}{2(31 \times 33)}$

$\theta = 129^\circ 57'$ ✓✓

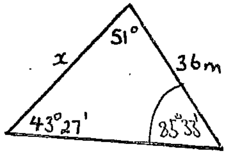
$A = \frac{1}{2}ab\sin C$

$A = \frac{1}{2} \times 31 \times 33 \times \sin 129^\circ 57'$

$A = 392.12\ m^2$ ✓✓

14.

8. Find x to the nearest metre



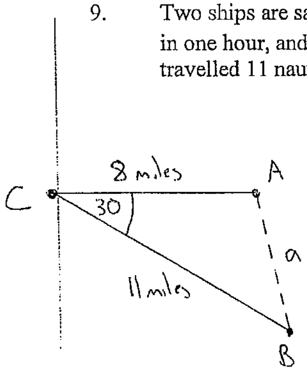
$$\frac{x}{\sin 85°33'} = \frac{36}{\sin 43°27'}$$

$$x = \frac{36}{\sin 43°27'} \times \sin 85°33'$$

$$x = 52.19\text{m}$$ ✓ 3

$$x = 52\text{m}$$ (nearest metre)

9. Two ships are sailing at the same time. Ship A sails 8 nautical miles due east in one hour, and Ship B sails on a coarse bearing 120^0, and after one hour has travelled 11 nautical miles. How far apart are the two ships?



$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$a^2 = 8^2 + 11^2 - (2 \times 8 \times 11) \times \cos 30$$

$$a = \sqrt{32.5795}$$

$$a = 5.71 \text{ nautical miles}$$ ✓ 3

10. ABCD is a triangular pyramid with BC=7m, CD=10m, BD=8m AB=AC and $\angle ACB = 67^0$ Calculate

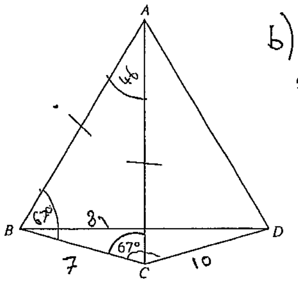
a) $\angle BCD$

b) length AB, to the nearest metre.

a) $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

$$\cos BCD = \frac{7^2 + 10^2 - 8^2}{2 \times 7 \times 10}$$

$$\angle BCD = 52°37'$$ ✓ 3



b) $\dfrac{AB}{\sin 67} = \dfrac{7}{\sin 46}$

$$AB = \frac{7}{\sin 46} \times \sin 67$$

$$AB = 8.96\text{ m}$$

$$AB = 9\text{ m (nearest metre)}$$ ✓ 3

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11. Show that $\cos 6\theta \cos 4\theta - \sin 6\theta \sin 4\theta = 2\cos^2 5\theta - 1$

$$\cos(x+y) = \cos x \cos y - \sin x \sin y$$

$$\text{LHS} = \cos(6\theta + 4\theta) = \cos 6\theta \cos 4\theta - \sin 6\theta \sin 4\theta$$

$$\text{LHS} = \cos(10\theta)$$

$$\cos\theta = 2\cos^2\tfrac{\theta}{2} - 1$$

$$\therefore \cos 10\theta = 2\cos^2 5\theta - 1$$

$$2\cos^2 5\theta - 1 = 2\cos^2 5\theta - 1$$

$$\text{LHS} = \text{RHS}.$$ ✓✓

12. Simplify $\operatorname{cosec}\theta(\cos\theta - 1)$ by expressing in terms of t $\left(\tan\dfrac{\theta}{2}\right)$

$$\sin\theta = \frac{2t}{1+t^2} \qquad \cos\theta = \frac{1-t^2}{1+t^2}$$

$$= \frac{1+t^2}{2t} \times \left(\frac{1-t^2}{1+t^2} - \frac{1+t^2}{1+t^2}\right)$$

$$= \frac{1+t^2}{2t} \times \left(\frac{1-t^2-1-t^2}{1+t^2}\right)$$

$$= \frac{1+t^2}{2t} \times \left(\frac{-2t^2}{1+t^2}\right)$$

$$= \frac{-2t^2}{2t}$$

$$= -t$$ ✓✓

~~13~~. Find the general solution of $\sin\theta = -1$

$$180n + (-1)^n(-90°)$$

$$= 180n - 90(-1)^n$$