

# Review

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## MCR

- ① For the angle  $945^\circ$  state
- the principal angle
  - the related acute angle
  - two other co-terminal angles
  - the ratio value of  $\sec 945^\circ$
  - an equivalent ratio to d) using an angle in quadrant I and another in quadrant II
  - at least one point that lies on the terminal arm of the rotation angle  $945^\circ$

- ② Simplify each expression. Do not use a calculator.

a)  $\sin 30^\circ + \cos 60^\circ$     b)  $\tan 45^\circ + \tan 225^\circ$     c)  $\sin 240^\circ + \cos 300^\circ$

- ③ Solve each equation for  $0^\circ \leq \theta \leq 360^\circ$ . *→ replace all x angles as  $\theta$  for less confusion.*

a.  $\cos x = 0$                       b.  $2 \sin x - 1 = 0$                       c.  $\tan x = -1$

d.  $\sqrt{2} \sin x = 1$                       e.  $2 \cos x - 3 = 0$                       f.  $2 \sin x + \sqrt{3} = 0$

g.  $\sqrt{2} \cos x + 1 = 0$                       h.  $\cos x - 1 = 0$                       i.  $\tan x = \sqrt{3}$

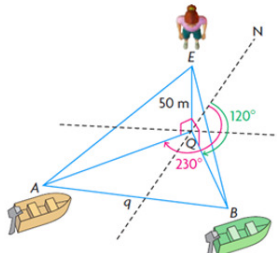
- ④ Prove each identity.

a)  $(\sin \theta + \cos \theta)^2 = 1 + 2 \sin \theta \cos \theta$

b)  $\frac{1}{\cos \theta} - \tan \theta \sin \theta = \cos \theta$

c)  $\sin^2 \theta \left(1 + \frac{1}{\tan^2 \theta}\right) = 1$

- ⑤ Emma is on a 50 m high bridge and sees two boats anchored below. From her position, boat A has a bearing of  $230^\circ$  and boat B has a bearing of  $120^\circ$ . Emma estimates the angles of depression to be  $38^\circ$  for boat A and  $35^\circ$  for boat B. How far apart are the boats to the nearest metre?



- ⑥ Prove the trig identities, explain what is done in each step.

2 a)  $\sin^4 \alpha - \cos^4 \alpha = \sin^2 \alpha - \cos^2 \alpha$

4 b)  $\frac{\sin x}{1 + \cos x} = \csc x - \cot x$

*← any restrictions on angle x?*

- ⑦ Decide how many  $\Delta$ 's are possible

a)  $a = 15, b = 12, \angle A = 135^\circ$

b)  $a = 5, b = 8, \angle A = 40^\circ$

c)  $a = 9, b = 12, \angle A = 35^\circ$

## MHF

8) If  $\theta = \frac{7\pi}{6}$ ,  $\alpha = \frac{-9\pi}{4}$ ,  $\csc \beta = \frac{-5}{3}$ , and  $\cos \phi = 0$

State only exact answers, if impossible – round to 2 decimals

- Draw separate pictures for each angle  $\theta, \alpha, \beta, \phi$  and the triangles that relate to them, if possible.
- Solve for  $\beta$  and  $\phi$  within the first positive revolution in radians
- Find all possible answers for  $\cot \theta$ ,  $\cos \alpha$ ,  $\tan \beta$ , and  $\sin \phi$
- Convert  $\alpha$  to degrees, and show a check of your answer in c. using calculator in degree mode and in radian mode.

9.)

a) Find the exact ratio for  $\csc \theta$ ,  $\sec \theta$ , and  $\cot \theta$  for  $\frac{2\pi}{3}$  radians.

b) Find all the possible angles for  $A$  if  $0 \leq A \leq 2\pi$ :

i)  $\cos A = \frac{-1}{\sqrt{2}}$

ii)  $\tan A = \frac{-1}{\sqrt{3}}$

c) Solve for  $\theta$  if  $\cos \theta = \frac{\sqrt{3}}{2}$  and  $-\pi \leq \theta \leq 2\pi$ .

d) Find the exact value of  $\csc\left(\frac{7\pi}{6}\right)$ .

e) Find the exact value of  $\sec\left(\frac{21\pi}{4}\right)$ .

f) Find all values of  $\theta$  for which  $2\sin \theta - 1 = 0$  for  $\theta \in (-\infty, \infty)$

10.)

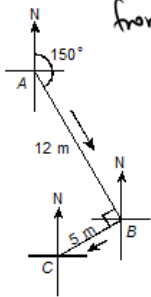
If  $\cos \theta = \frac{-5}{13}$  and  $\theta \in (-\infty, \infty)$

determine

- $\tan \theta$
- $\sec \theta$
- the possible values of  $\theta$  to the nearest tenth

AP

11. Find compass bearing and true bearing from A to C.



12. Group A of bushwalkers leaves a starting point S and walks on a compass bearing of  $N60^\circ E$  at 5 km/h. At the same time, group B leaves point S and walks on a compass bearing of  $S50^\circ E$  at 6 km/h. Each group walks for 4 hours then stops.

- How far is each group from the starting point?
- Find the distance between the groups.
- What compass bearing should group B follow so they can meet group A?
- How long will it take group B to reach group A if they walk at 5 km/h

13. The bearing from A to C is  $S 52^\circ E$ . The bearing from A to B is  $N 84^\circ E$ . The bearing from B to C is  $S 38^\circ W$ . A plane flying at 250 mph takes 2.4 hours to go from A to B. Find the distance from A to C.

14. A man wandering in the desert walks 2.3 miles in the direction  $S 31^\circ W$ . He then turns  $90^\circ$  and walks 3.5 miles in the direction  $N 59^\circ W$ . At that time, how far is he from his starting point, and what is his bearing from his starting point?

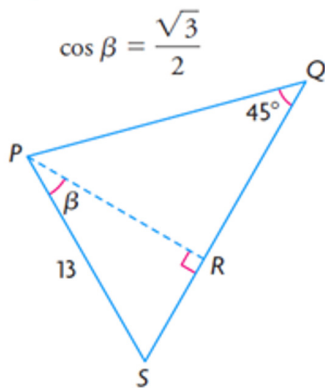
15. Radar stations A and B are on the east-west line, 3.7 km apart. Station A detects a plane at C, on a bearing of  $61^\circ$ . Station B simultaneously detects the same plane, on a bearing of  $331^\circ$ . Find the distance from A to C.

Tips #1

$$\tan(\theta + 20^\circ) = -3.65 \quad \text{solve for } -270^\circ < \theta < 180^\circ$$

Tips #2

Determine the exact area of this triangle.



$$\cos \beta = \frac{\sqrt{3}}{2}$$