

ARTIFACT CHECK 1

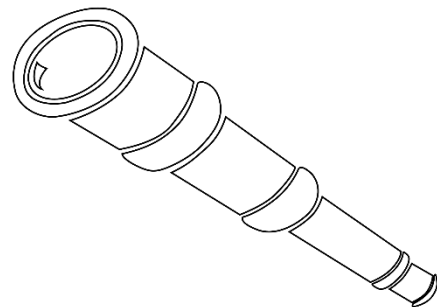
What did you discover? Did you prove the following identity?

Part A

$$\tan(\alpha + \beta) = \frac{\tan(\alpha) + \tan(\beta)}{1 - \tan(\alpha) \cdot \tan(\beta)}$$

Check your result with the identity above.

- If you correctly proved the sum identity for tangent, open the envelope and retrieve your next artifact to inspect.
- If you are not correct, go back to your team and find your mistake. Feel free to write the above identity on your notebook paper to help verify the identity.



ARTIFACT CHECK 2

What did you discover? Did you prove the following identities?

Part B

$$\sin(\alpha - \beta) = \sin(\alpha)\cos(\beta) - \cos(\alpha)\sin(\beta)$$

Part C

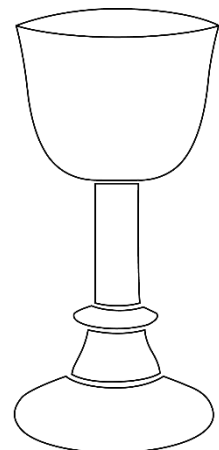
$$\cos(\alpha - \beta) = \cos(\alpha)\cos(\beta) + \sin(\alpha)\sin(\beta)$$

Part D

$$\tan(\alpha - \beta) = \frac{\tan(\alpha) - \tan(\beta)}{1 + \tan(\alpha) \cdot \tan(\beta)}$$

Check your result with the identities above.

- If you correctly proved the identities above, open the envelope and retrieve your next artifact to inspect.
- If all 3 are not correct, go back to your team and find your mistake. Feel free to write the above identities on your notebook paper to help verify the identity.



ARTIFACT CHECK 3

What did you discover? Did you prove the following identities?

Part E

$$\sin(2\theta) = 2\sin(\theta)\cos(\theta)$$

Part F

$$\cos(2\theta) = \cos^2(\theta) - \sin^2(\theta)$$

Part F: Challenge

$$\cos(2\theta) = 1 - 2\sin^2(\theta)$$

$$\cos(2\theta) = 2\cos^2(\theta) - 1$$

Check your result with the identities above.

- If you correctly proved the identities above, congratulations! You have completed your research! Put your teammates' names on your research papers (notebook paper with math work) in this envelope. Hopefully this will help us determine if we found the artifacts of the famous Hipparchus!
- If all 4 are not correct, go back to your team and find your mistake. Feel free to write the above identities on your notebook paper to help verify the identity.

