

Zhōng Guo
Extra Credit

1. Aspect Ratio is a number that can tell you the flying characteristics of aircraft. Aircraft with low Aspect Ratios, $AR \leq 4$, tend to be fast-flying but fly shorter distances. Aircraft with large Aspect Ratios, $AR \geq 7$, tend to be fly at moderate speeds but much farther distances.

- The formula for aspect ratio is as follows:

$$AR = \frac{b^2}{S}, \text{ where 'b' is the wingspan of the}$$

aircraft and 'S' is the wing area.

- If given the wingspan and area of a Boeing 787-9, determine its Aspect Ratio; round your value to the nearest 10th.

2. Mach Number is the ratio of an aircraft's speed to the speed of sound. The formula is as follows: $M_N = \frac{V}{a}$, where "V" is the aircraft's speed and "a" is the speed of sound. The speed

of sound changes with altitude.

- If given our 787-9's speed and the speed of sound at an altitude, calculate the Mach Number; round to the nearest 100th.

3. The USD (\$) varies directly with Chinese Yuan (¥). Currently \$1 is directly proportional to ¥6.282.

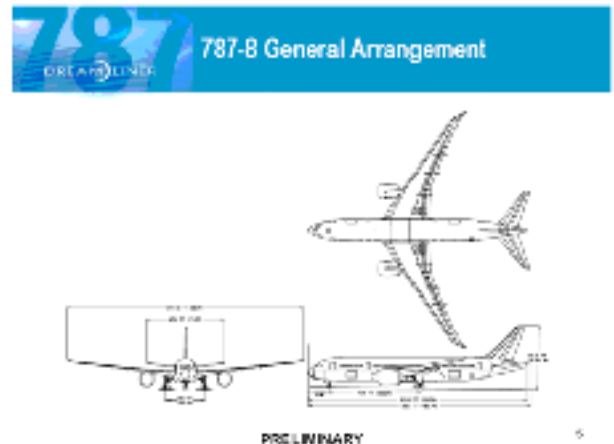
- Write a direct variation equation for USD to Yuan.

- If you knew how much Yuan Mr. Ford returned with, determine that value in USD.

4. Bryant bought a **SUPREME** wallet at the shopping center; he bargained down the seller from ¥800 to ¥85!

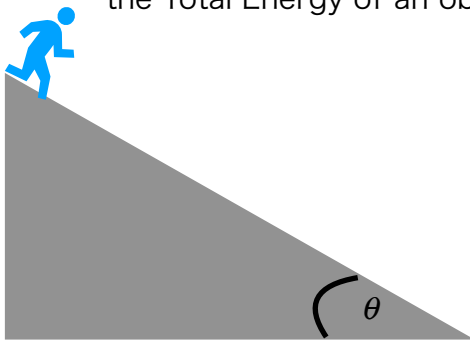
- Determine the percent reduction in price.

5. How much did Bryant pay in USD?

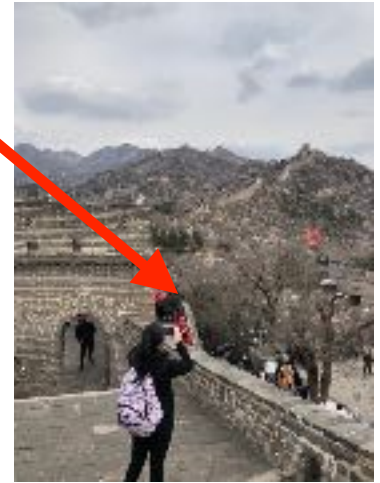


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6. Matthew went 'hardcore' on a stairwell ramp at the Great Wall:



the Total Energy of an object at rest on a ramp with



an angle of θ (theta) is described by the formula: $\frac{1}{2}mv^2 - mgh(\sin\theta) = 0$, where 'm' is the

mass of the object, 'v' is the speed, 'h' is the height above ground and g is the acceleration due to gravity.

- Solve the Energy equation for 'v'

- If Matthew's height above where he fell off (Lol) was 15ft, the acceleration of gravity is $32.17 \frac{ft}{s^2}$, and the angle theta was 30° thus $\sin 30^\circ = 0.5$, approximate his speed when he

fell off (lol), assuming friction is negligible.

7. Given your result from question #1 and the information given about a Boeing 787-9, is the 787-9 a short-distance, high speed aircraft or a long-distance, moderate speed aircraft? (remember to T.I.E.A.C!!!)
8. At one point during our return flight were cruising at an altitude of 39,000 ft and a speed of 560 mph. Determine the Mach Number for a given speed of sound.
9. On our return flight we took-off at 0250hrs PST, and touched down at 1410hrs PST. If given the total distance flown, determine the average speed for the flight; recall the formula for distance: $d = rt$, where 'd' is total distance, and 't' is total time.
10. On our return flight we took-off at 0250hrs PST and reached our cruising altitude at 0329hrs PST; if given our cruising altitude, determine the 787-9's average climb rate.