Frequency :-

$$F = \frac{1}{T}$$

period is time to complete one cycle.

Reciprocal of the period is frequency.

wave :

$$y = (x, t) =$$

$$A \sin(kx - wt)$$

$k \Rightarrow$ angular wave number

$$k = \frac{2\pi}{\lambda}$$

$w \Rightarrow$ angular frequency

$$w = 2\pi f$$

wave speed :

$$V = \frac{\text{wavelength}}{\text{period}} = \frac{\lambda}{T}$$

$$V = f\lambda = \frac{w}{k}$$

Amplitude :

$$\frac{\text{distance of the medium}}{\text{its wavelength}}$$

Mach number :

the ratio of the speed of an aircraft to the speed of sound =

$$M = \frac{V}{a}$$

$V \rightarrow$ velocity of aircraft

$M \rightarrow$ mach number

$a \rightarrow$ speed of sound

Speed of sound :

$$T_1 = T_0 - ah$$

Examples of speed of sound

[1] An airplane is flying at 10,000 ft altitude. what is its speed of sound ??

Where : T_1 => Temperature at an altitude °R

T_0 => temperature at sea level, 519°R

a => lapse rate, 0.003566 °R/ft

h => altitude, ft

$$T_1 = T_0 - ah$$

$$= 519 - 0.003566\,(10{,}000)$$

(first)

unknown => T_1

Remember:

PEMDAS

multiply, then subtract

[1] 0.003566×10000

move decimal 4 times; 4 zeros

$= 35.66$

[2] $519 - 35.66$

$$\begin{array}{r} {}^{11}\not{5}\,{}^{9}\not{1}\,{}^{10}\not{9}.\not{0}\not{0} \\ -\quad 35.66 \\ \hline 484.34 \end{array}$$

$= 484.34\ ^\circ R$

final answer

Examples of mach number

[1] if the speed at sea level is 760 mph, an aircraft flying at a mach number of 1.2 at sea level would be traveling at speed of ??

$$M = \frac{V}{a}$$

V → speed of aircraft

a → speed of sound

$$760 \times 1.2 = \frac{V}{760} \times 760$$

$$760 \times 1.2 = V$$

there is one number after the point so

$$= 912.0 \text{ mph}$$

760 × 1.2 =>

```
  1
 760
x 12
1520
+7600
9120
```

Nouf Albedwawi