1. ② The angle of twist (in radians) of a circular shaft, shown in Fig. P1, is $\theta = TL/(JG)$, where $T = Fd$, $F = 200$ lb, $d = 4$ in., $L = 300$ mm, $J = 10^4$ mm^4, and $G = 3.7 \times 10^6$ psi. Determine the value of θ in degrees.
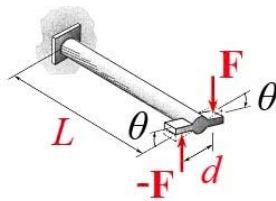

Fig. P1

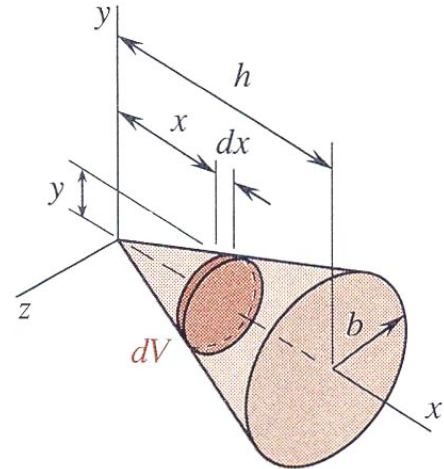$$D = \begin{vmatrix} 5 & -7 & 9 \\ 8 & 0 & -4 \\ 6 & -4 & 1 \end{vmatrix}$$

Fig. P3

2. ② Compute the value of the determinant D shown.

3. ① The volume of the circular cone shown in Fig. P3 is given by

(a) $\int_0^h (2\pi b/h)\, x\, dx$ (b) $\int_0^h (2\pi h/b)\, x\, dx$ (c) $\int_0^h 2\pi x\, dx$

(d) $\int_0^h \pi x^2\, dx$ (e) $\int_0^h (\pi b^2/h^2)\, x^2 dx$ (f) $\int_0^h (\pi h^2/b^2)\, x^2 dx$

4. ② Using *chain-link conversion* technique and 1 lbm = 0.4536 kg, convert the tire pressure of $p = 200$ kPa into psi.

5. ② Describe the *rigid-body principle*.

6. ① From which *two teachers* have you been advised to learn your basics in mechanics?

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1. $\theta = 6.09°$ ②
2. $D = -144$ ②
3. (e) $\int_0^h (\pi b^2/h^2)\, x^2 dx$ ①
4. $p = 29.0$ psi ②
5. The *rigid-body principle* states that if two collinear forces equal in magnitude but opposite in direction are applied to a rigid body, the condition of rest or motion of this rigid body will remain unchanged. ②

6. I have been advised to learn my basics in mechanics from the *Speaking Teacher* in the class and the *Silent Teacher* on the pages of the books and the Internet. ①