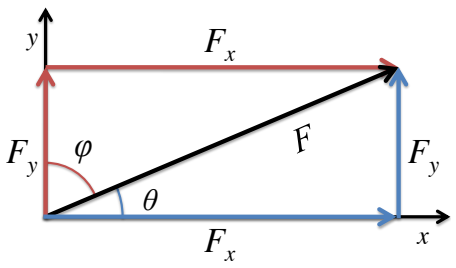
Annexe B

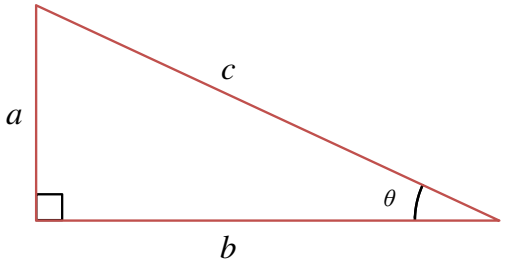
Formules

Géométrie			
Circonférence d'un cercle	$C = 2\pi r$	Aire d'une sphère	$A = 4\pi r^2$
Aire d'un cercle	$A = \pi r^2$	Volume d'une sphère	$V = \frac{4}{3}\pi r^3$
Aire d'un triangle de base b et de hauteur h			$A = \frac{1}{2}bh$

Équation quadratique
Si $ax^2 + bx + c = 0$, alors $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Décomposition d'un vecteur	
	$F_x = F\cos\theta = F\sin\varphi$ $F_y = F\sin\theta = F\cos\varphi$

Trigonométrie

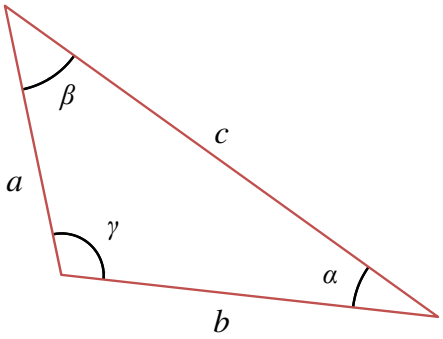


$$c^2 = a^2 + b^2$$

$$\sin\theta = \frac{a}{c}$$

$$\cos\theta = \frac{b}{c}$$

$$\tan\theta = \frac{a}{b}$$



$$\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} = \frac{c}{\sin\gamma}$$

$$c^2 = a^2 + b^2 - 2ab\cos\gamma$$

$$180^\circ = \alpha + \beta + \gamma$$

Identités trigonométriques

$$\sin(-\theta) = -\sin\theta$$

$$\cos(-\theta) = \cos\theta$$

$$\sin\theta = \cos(90^\circ - \theta)$$

$$\cos\theta = \sin(90^\circ - \theta)$$

$$\sin^2\theta + \cos^2\theta = 1$$

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

$$\sin(A \pm B) = \sin A\cos B \pm \cos A\sin B$$

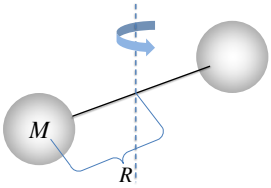
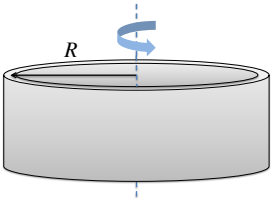
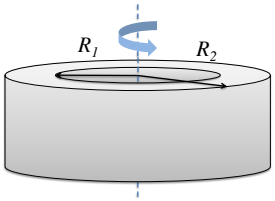
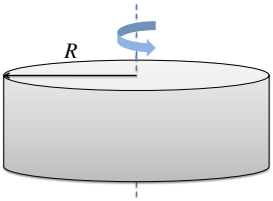
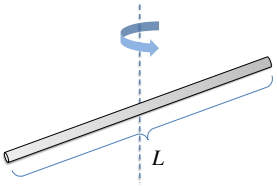
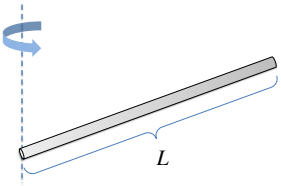
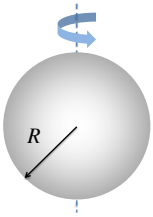
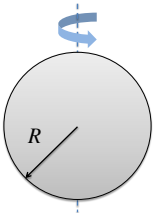
$$\cos(A \pm B) = \cos A\cos B \mp \sin A\sin B$$

Mouvement rectiligne uniformément accéléré	Forces	Travail et énergie
$v_f = v_i + at$	$\vec{F} = m\vec{a}$	$U_{gravité} = mgh$
$\Delta x = v_i t + \frac{1}{2}at^2$	$F_{gravité} = mg$	$U_{ressort} = kx^2/2$
$v_f^2 = v_i^2 + 2a\Delta x$	$F_{ressort} = -kx$	$K = mv^2/2$
$\Delta x = \frac{1}{2}(v_i + v_f)t$	$F_{frottement} = \mu N$	$W = \vec{F} \cdot \vec{d}$
$\Delta x = v_f t - \frac{1}{2}at^2$	$F_{centripète} = mv^2/r$	$P = \dfrac{\Delta W}{\Delta t} = \vec{F} \cdot \vec{v}$

Équilibre	Mouvement circulaire uniforme	Variables angulaires
	$a_c = \dfrac{v^2}{r}$	$\theta = s/r$
$\tau = F_\perp l = Fl \sin\theta$	$T = \dfrac{2\pi r}{v}$	$\omega = v_t/r$
$\sum F_i = 0$	$f = \dfrac{1}{T} = \dfrac{v}{2\pi r}$	$\alpha = a_t/r$
$\sum \tau_i = 0$	$\omega = 2\pi f$	$K = I\omega^2/2$
		$\tau = I\alpha$

Élasticité		
Traction/compression	Cisaillement	Contrainte hydraulique
$\frac{F_\perp}{A} = Y\frac{\Delta L}{L}$	$\frac{F_\parallel}{A} = G\frac{\Delta x}{L}$	$\Delta p = -B\frac{\Delta V}{V}$

Tableau B.1 – *Moment d'inertie pour différents solides en rotation autour d'un axe.*

Moments d'inertie	
 Masse à une distance R du pivot $I = MR^2$	 Cerceau cylindrique $I = MR^2$
 Cylindre creux $I = \frac{1}{2}M(R_1^2+R_2^2)$	 Cylindre ou disque plein $I = \frac{1}{2}MR^2$
 Tige mince $I = \frac{1}{12}ML^2$	 Tige mince $I = \frac{1}{3}ML^2$
 Sphère pleine $I = \frac{2}{5}MR^2$	 Sphère creuse $I = \frac{2}{3}MR^2$

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