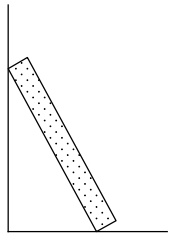


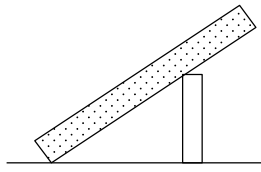
力のモーメントのドリル演習

75.

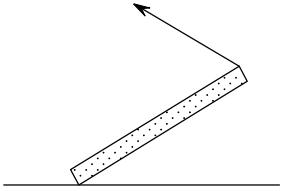
(1) 壁は摩擦なし



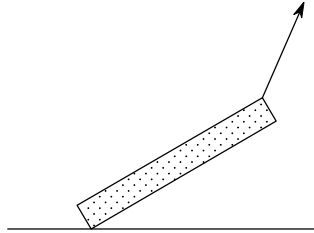
(2) 杭は摩擦なし



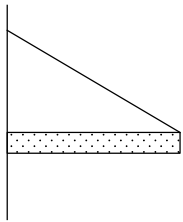
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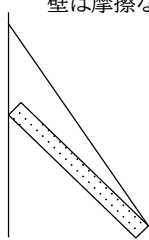
(4)



(5)

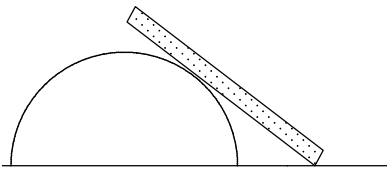


(6)

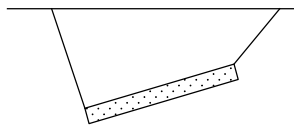


(7)

球は摩擦なし

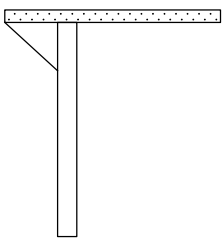


(8)

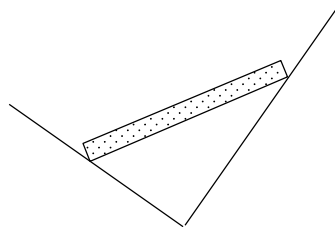


76.

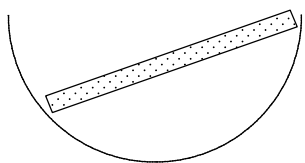
(9)



(10)

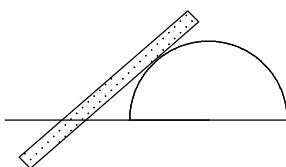


(11)



滑らかな面

(12)



水中に一部浮かんでいる

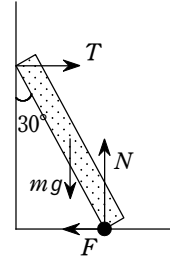
(13)

屋根は摩擦なし

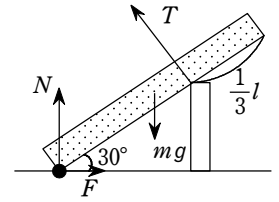
(14)

解説

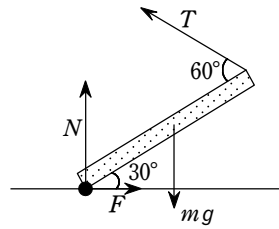
(1) 壁は摩擦なし



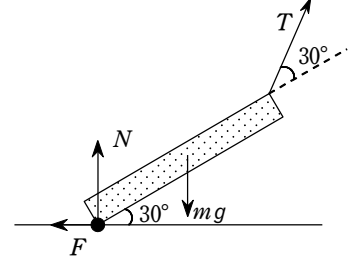
(2) 杭は摩擦なし



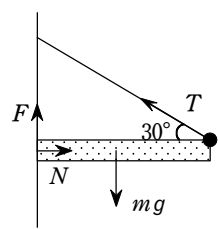
(3)



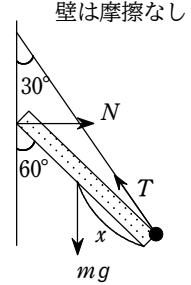
(4)



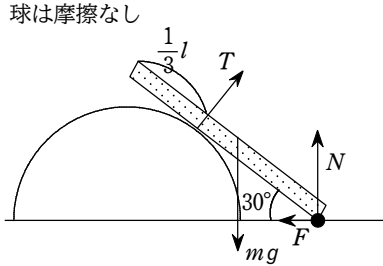
(5)



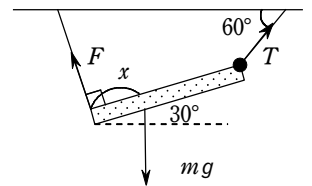
(6)



(7)



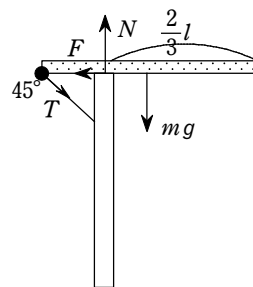
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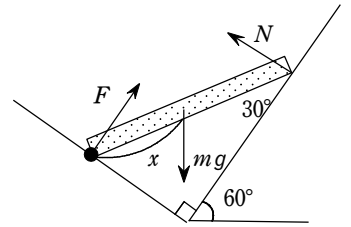
棒の長さはすべて l 。(6)(8)以外は一樣な棒。黒点が回転の中心

解説

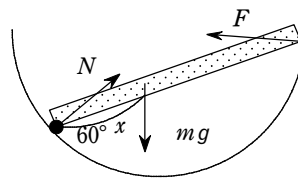
(9)



(10)

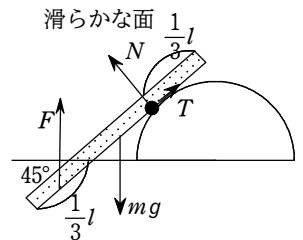


(11)

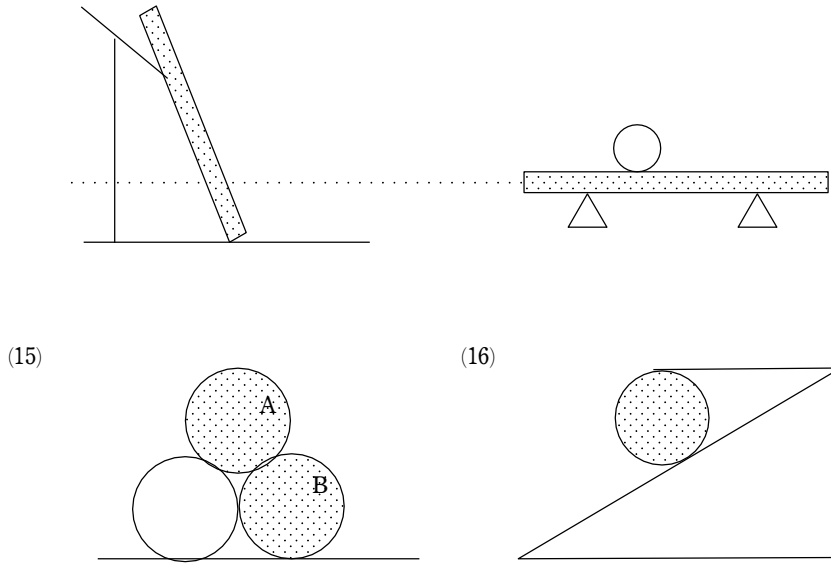


滑らかな面
力 F は水平である。

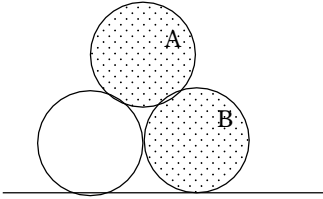
(12)



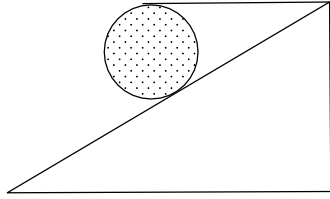
水中に一部浮かんでいる



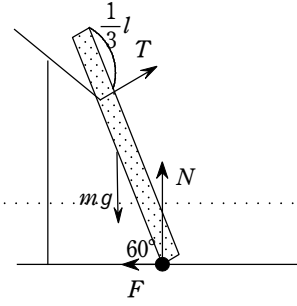
(15)



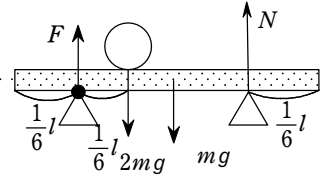
(16)



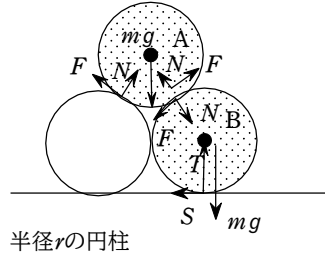
(13)



(14)

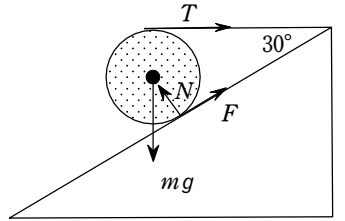


(15)



半径rの円柱

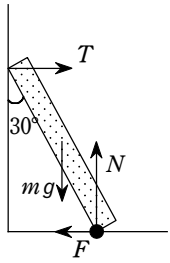
(16)



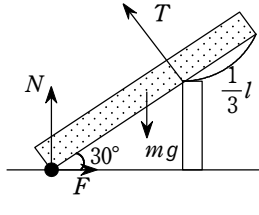
半径rの円柱

77.

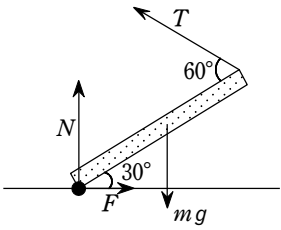
(1) 壁は摩擦なし



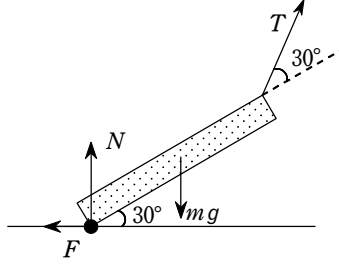
(2) 杭は摩擦なし



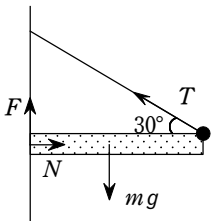
(3)



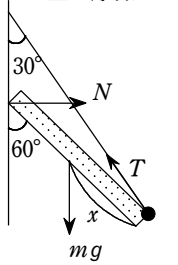
(4)



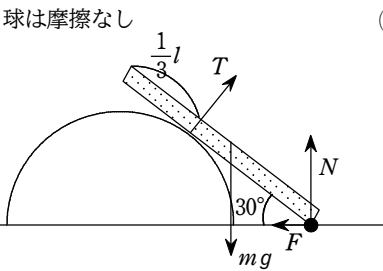
(5)



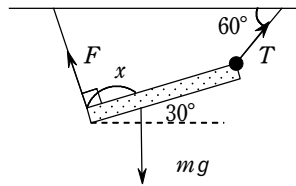
(6)



(7)



(8)



棒の長さはすべてl。(6)(8)以外は一樣な棒。黒点が回転の中心

解説

方程式

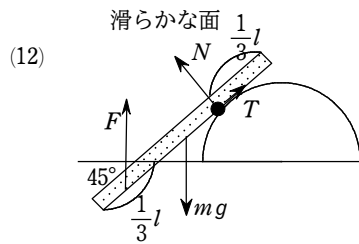
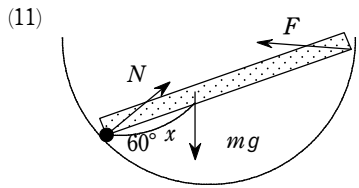
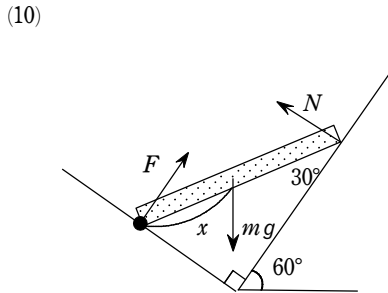
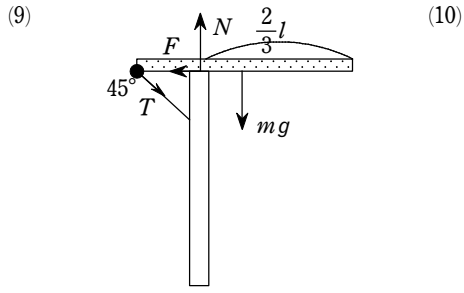
- (1) 上下 $N = mg$ 左右 $T = F$ 回転 $mg \cdot \frac{1}{2} l \sin 30^\circ = T \cdot l \cos 30^\circ$
- (2) 上下 $N + T \cos 30^\circ = mg$ 左右 $F = T \sin 30^\circ$ 回転 $mg \cdot \frac{1}{2} l \cos 30^\circ = T \cdot \frac{2}{3} l$
- (3) 上下 $N + T \sin 30^\circ = mg$ 左右 $F = T \cos 30^\circ$ 回転 $mg \cdot \frac{1}{2} l \cos 30^\circ = T \cdot l \sin 60^\circ$
- (4) 上下 $N + T \cos 30^\circ = mg$ 左右 $F = T \sin 30^\circ$ 回転 $mg \cdot \frac{1}{2} l \cos 30^\circ = T \sin 30^\circ \cdot l$
- (5) 上下 $F + T \sin 30^\circ = mg$ 左右 $N = T \cos 30^\circ$ 回転 $F l = mg \cdot \frac{1}{2} l$
- (6) 上下 $T \cos 30^\circ = mg$ 左右 $N = T \sin 30^\circ$ 回転 $mg \cdot x \sin 60^\circ = N \cdot l \cos 60^\circ$
- (7) 上下 $N + T \cos 30^\circ = mg$ 左右 $F = T \sin 30^\circ$ 回転 $mg \cdot \frac{l}{2} \cos 30^\circ = T \cdot \frac{2}{3} l$
- (8) 上下 $F \cos 30^\circ + T \cos 30^\circ = mg$ 左右 $F \sin 30^\circ = T \sin 30^\circ$
 回転 $F l = mg \cdot (l - x) \cos 30^\circ$

解答

- (1) $N = mg$ $F = \frac{\sqrt{3}}{6} mg$ $T = \frac{\sqrt{3}}{6} mg$
- (2) $T = \frac{\sqrt{3}}{8} mg$ $F = \frac{\sqrt{3}}{16} mg$ $N = \frac{7}{16} mg$
- (3) $T = \frac{1}{2} mg$ $F = \frac{\sqrt{3}}{4} mg$ $N = \frac{3}{4} mg$
- (4) $T = \frac{\sqrt{3}}{2} mg$ $F = \frac{\sqrt{3}}{4} mg$ $N = \frac{1}{4} mg$
- (5) $F = \frac{1}{2} mg$ $T = mg$ $N = \frac{\sqrt{3}}{2} mg$
- (6) $T = \frac{2\sqrt{3}}{3} mg$ $N = \frac{\sqrt{3}}{3} mg$ $x = \frac{1}{3} l$
- (7) $T = \frac{3\sqrt{3}}{8} mg$ $F = \frac{3\sqrt{3}}{16} mg$ $N = \frac{7}{16} mg$
- (8) $F = \frac{\sqrt{3}}{3} mg$ $T = \frac{\sqrt{3}}{3} mg$ $x = \frac{1}{3} l$

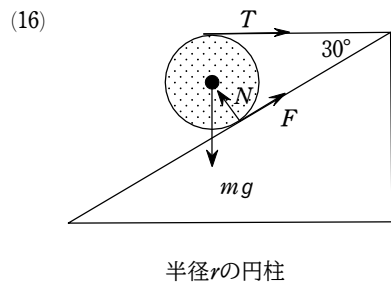
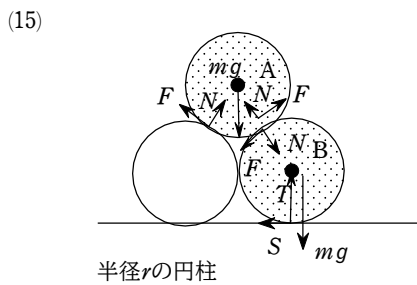
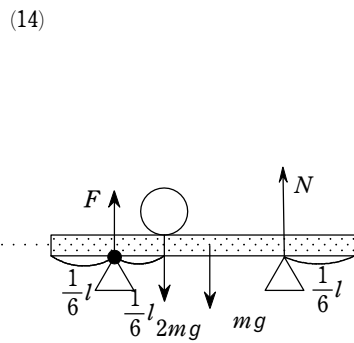
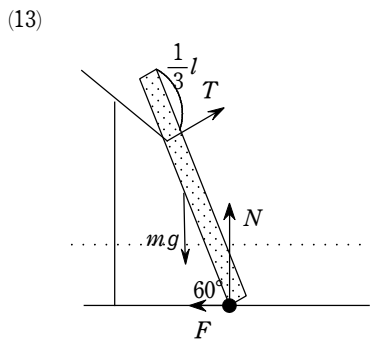
力のモーメントのドリル演習

78.



滑らかな面
力Fは水平である。

水中に一部浮かんでいる



半径rの円柱

半径rの円柱

解説

- (9) 上下 $N = mg + T \cos 45^\circ$ 左右 $F = T \sin 45^\circ$ 回転 $N \cdot \frac{1}{3}l = mg \cdot \frac{1}{2}l$
 (10) 上下 $N \cos 60^\circ + F \cos 30^\circ = mg$ 左右 $N \sin 60^\circ = F \sin 30^\circ$
 回転 $mg \cdot x \cos 30^\circ = Nl \cos 30^\circ$
 (11) 上下 $N \sin 60^\circ = mg$ 左右 $N \cos 60^\circ = F$ 回転 $mg \cdot x \cos 30^\circ = F \cdot l \sin 30^\circ$
 (12) 上下 $N \cos 45^\circ + T \sin 45^\circ + F = mg$ 左右 $N \sin 45^\circ = T \cos 45^\circ$
 回転 $mg \cdot \frac{1}{6}l \sin 45^\circ = F \cdot \frac{1}{2}l \sin 45^\circ$
 (13) 上下 $T \sin 30^\circ + N = mg$ 左右 $T \cos 30^\circ = F$ 回転 $mg \cdot \frac{1}{2}l \cos 60^\circ = T \cdot \frac{2}{3}l$
 (14) 上下 $N + F = mg + T$ 回転 $T \cdot \frac{1}{6}l + mg \cdot \frac{1}{3}l = N \cdot \frac{2}{3}l$
 (15) A 上下 $N \cos 30^\circ \times 2 + F \cos 60^\circ \times 2 = mg$
 左右・回転 常に成立
 B 上下 $T = mg + N \cos 30^\circ + F \sin 30^\circ$
 左右 $F \cos 30^\circ + S = N \sin 30^\circ$
 回転 $Fr = Sr$
 (16) 上下 $F \sin 30^\circ + N \cos 30^\circ = mg$ 左右 $T + F \cos 30^\circ = N \sin 30^\circ$
 回転 $Fr = Tr$

解答

- (9) $N = \frac{3}{2}mg$ $F = \frac{1}{2}mg$ $T = \frac{\sqrt{2}}{2}mg$
 (10) $N = \frac{1}{2}mg$ $F = \frac{\sqrt{3}}{2}mg$ $x = \frac{1}{2}l$
 (11) $N = \frac{2\sqrt{3}}{3}mg$ $F = \frac{\sqrt{3}}{3}mg$ $x = \frac{1}{3}l$
 (12) $N = \frac{\sqrt{2}}{3}mg$ $F = \frac{1}{3}mg$ $T = \frac{\sqrt{2}}{3}mg$
 (13) $N = \frac{13}{16}mg$ $F = \frac{3\sqrt{3}}{16}mg$ $T = \frac{3}{8}mg$
 (14) $N = \frac{1}{2}mg + \frac{1}{4}T$ $F = \frac{1}{2}mg + \frac{3}{4}T$
 (15) $N = \frac{\sqrt{3}}{3}mg$ $F = \frac{3-\sqrt{3}}{6}mg$ $T = \frac{3}{2}mg$ $S = \frac{3-\sqrt{3}}{6}mg$
 (16) $N = mg$ $F = (2-\sqrt{3})mg$ $T = (2-\sqrt{3})mg$