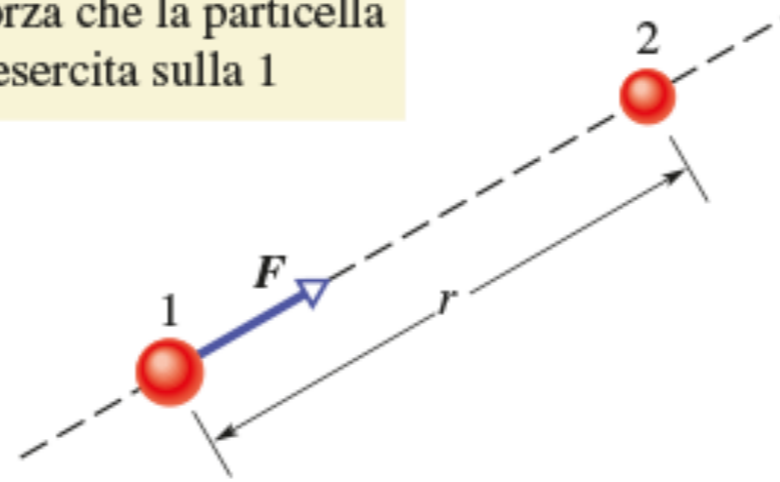




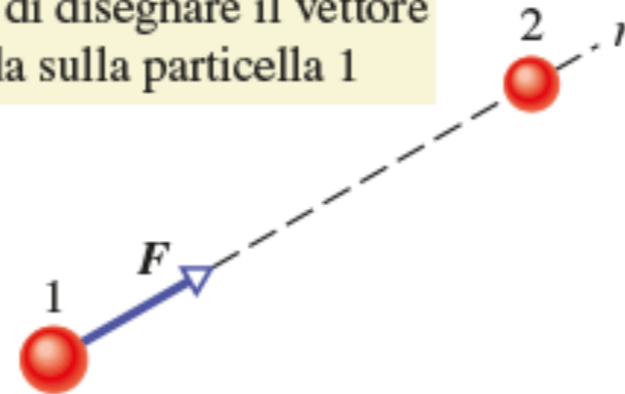
Courtesy NASA

Forza che la particella
2 esercita sulla 1



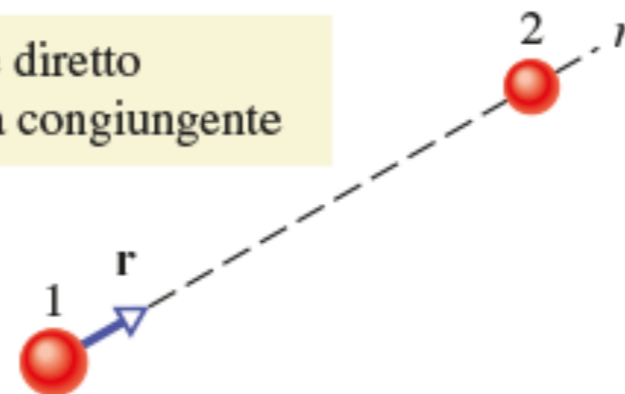
(a)

Ricordate di disegnare il vettore
con la coda sulla particella 1

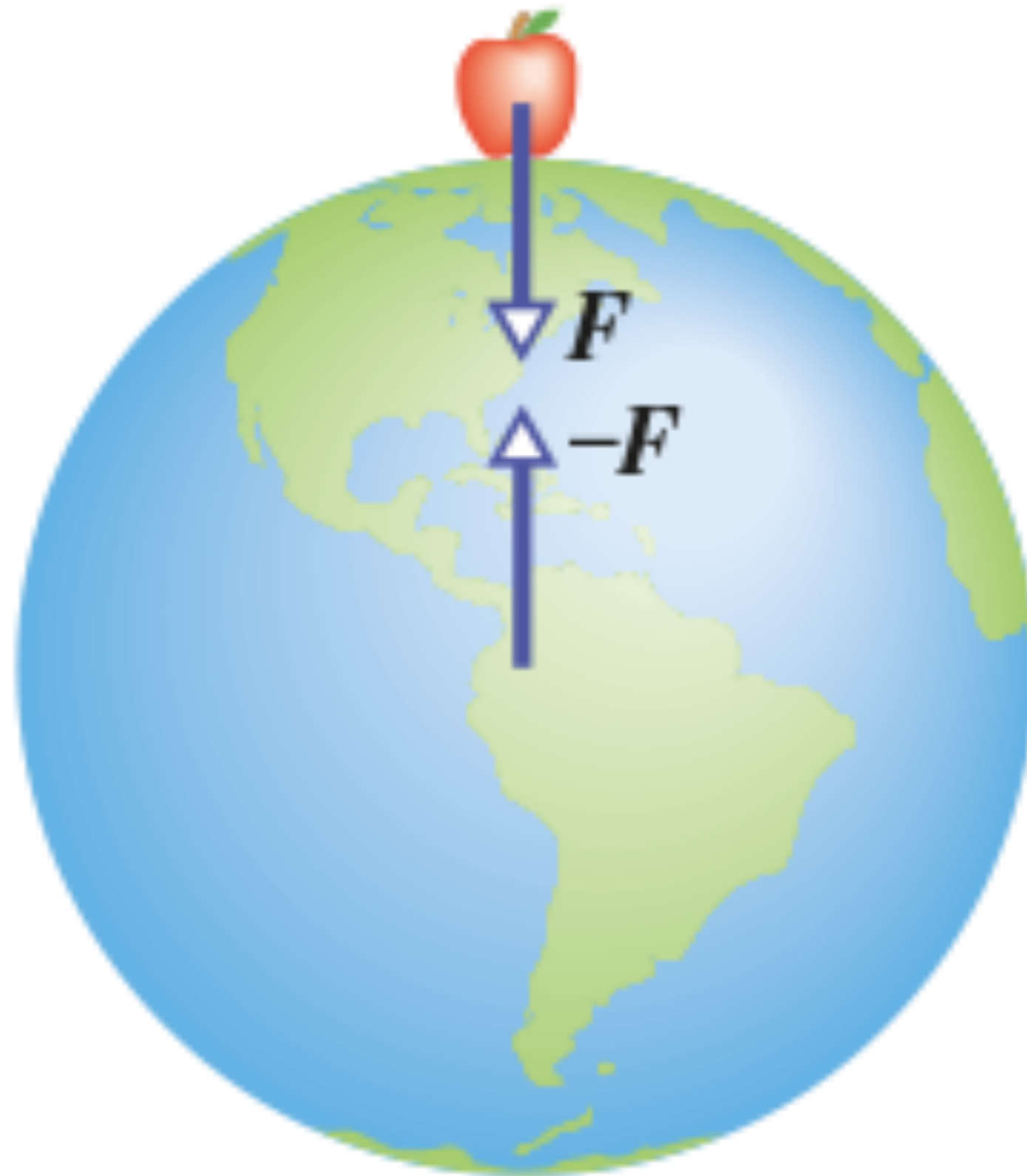


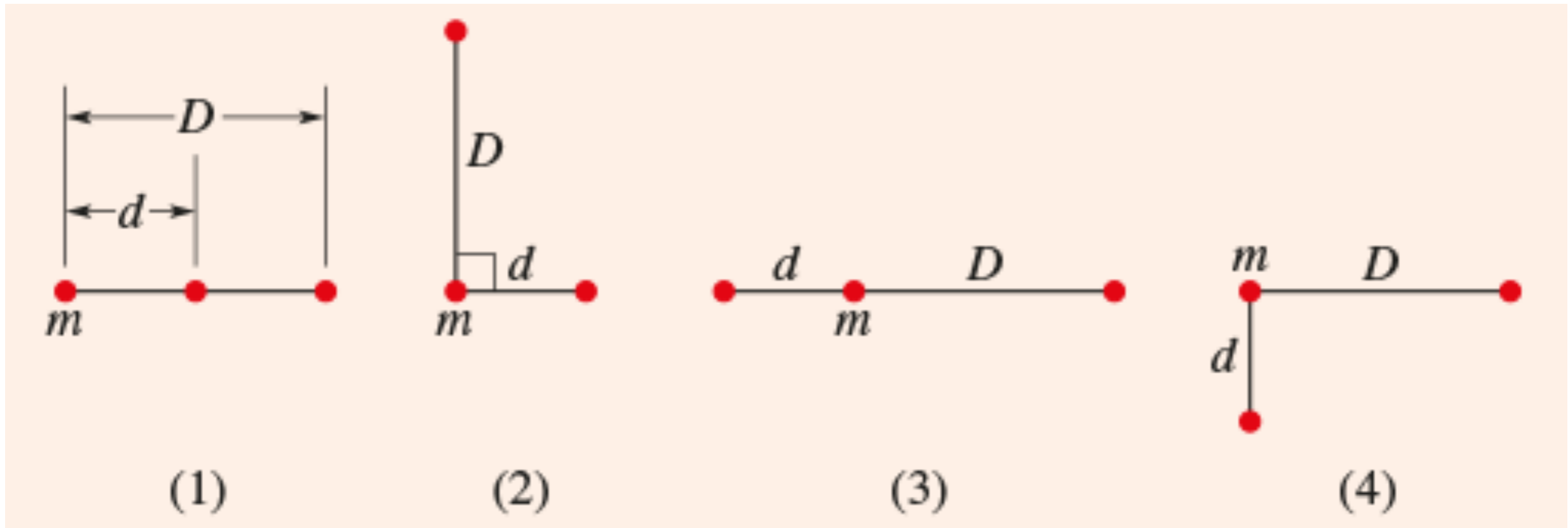
(b)

Versore diretto
come la congiungente

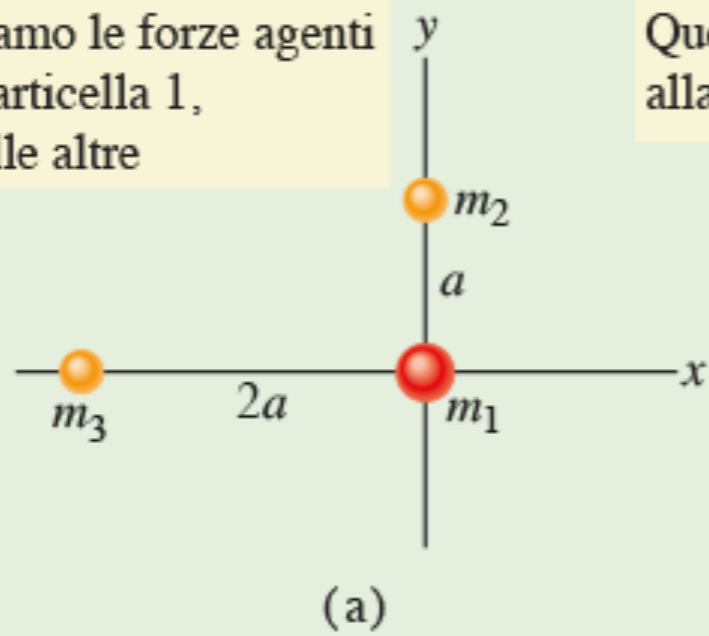


(c)

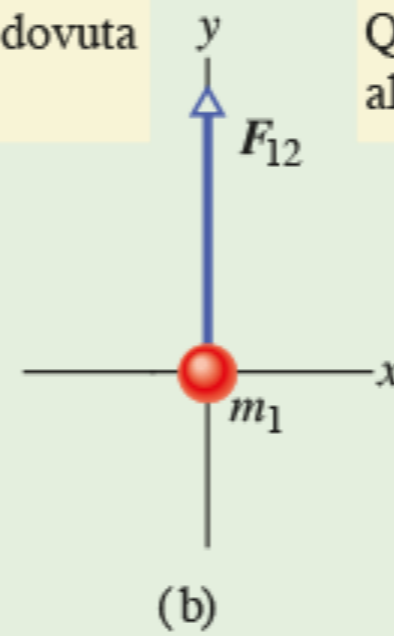




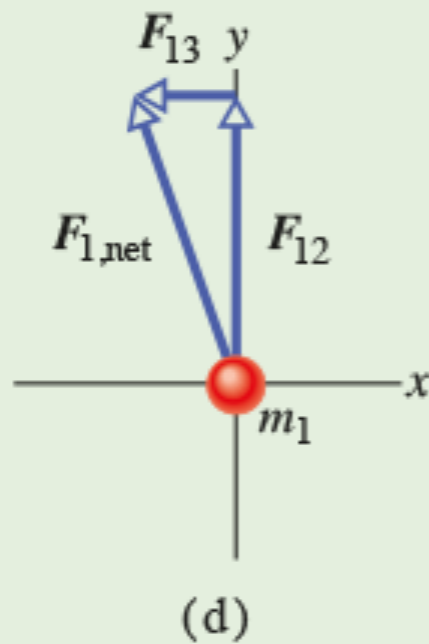
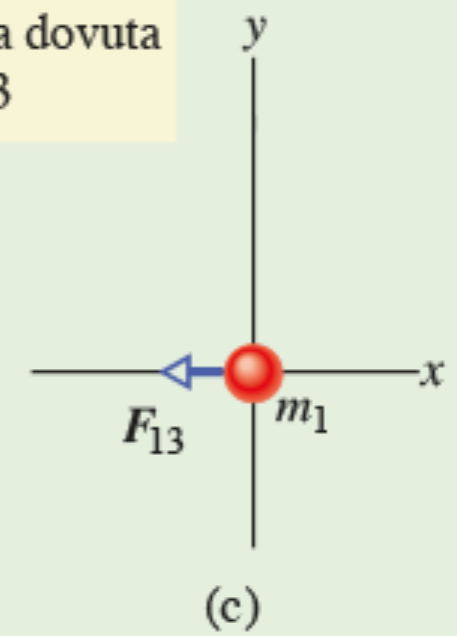
Cerchiamo le forze agenti sulla particella 1, non sulle altre



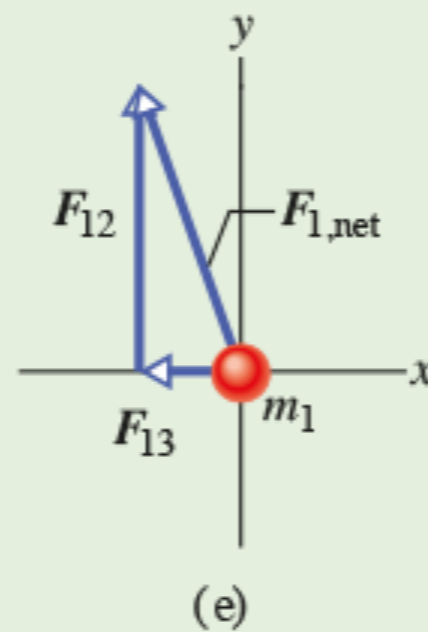
Questa è quella dovuta alla particella 2



Questa è quella dovuta alla particella 3



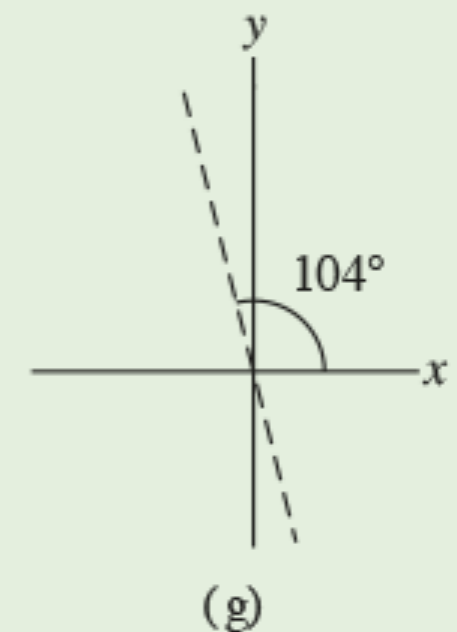
Ecco un modo per trovare la risultante sulla particella 1. In fila testa contro coda



Un altro modo, sempre in fila testa contro coda



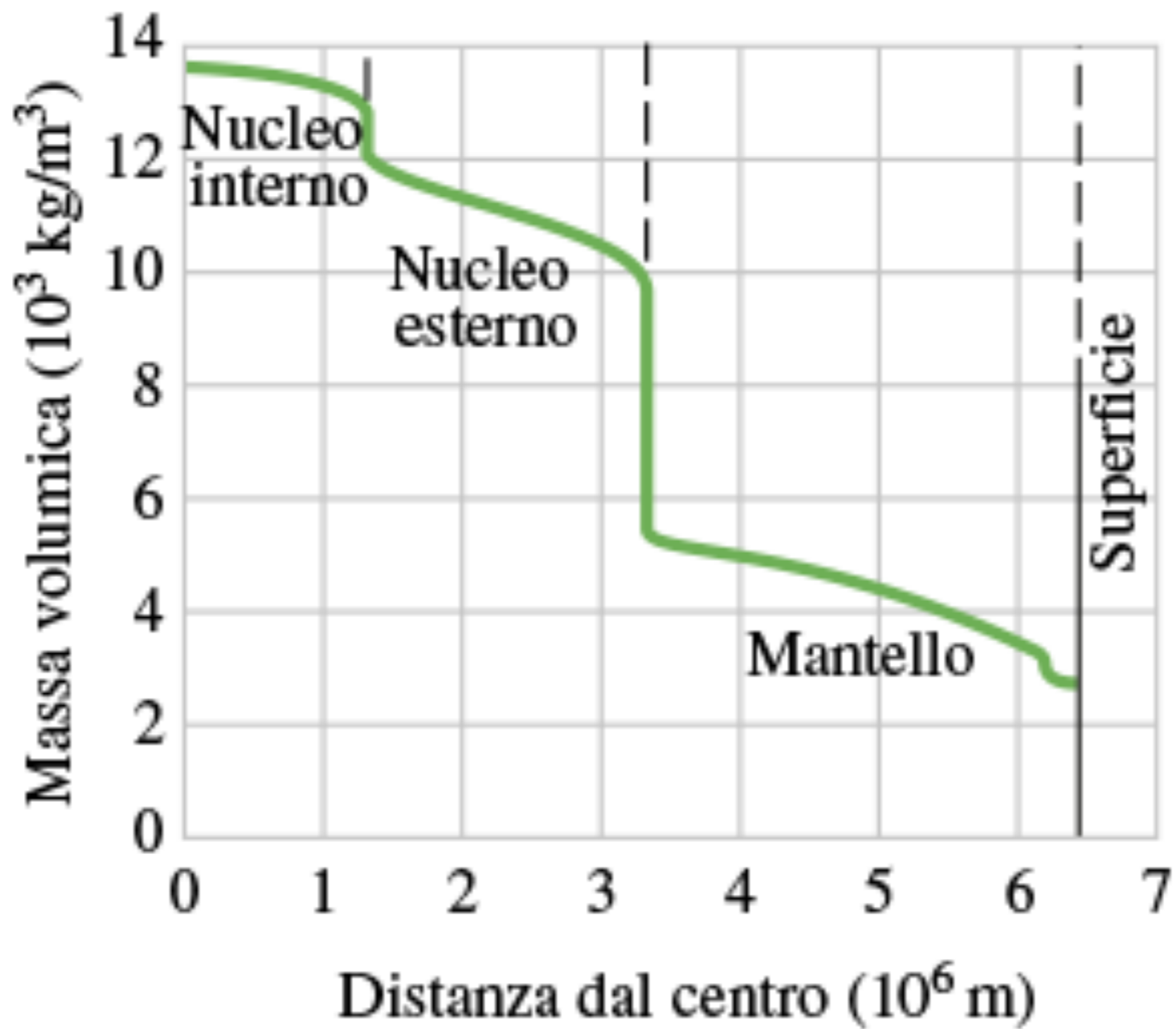
L'arcotangente mostrata dalla calcolatrice può essere quest'angolo



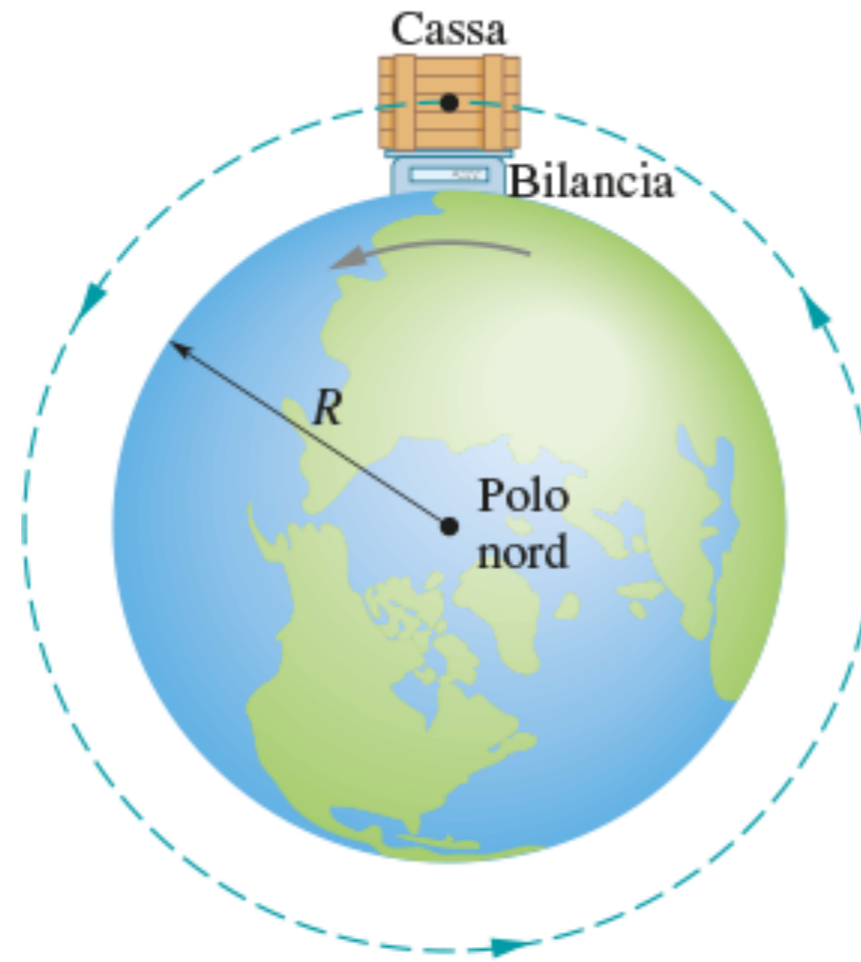
Ma questo è l'angolo cercato

TABELLA 13.1 Variazioni di a_g in funzione dell'altitudine

Altitudine (km)	a_g (m/s ²)	Esempio
0	9,83	Superficie media della Terra
8,8	9,80	Monte Everest
36,6	9,71	Massima quota raggiunta da un pallone con equipaggio
400	8,70	Orbita dello <i>space shuttle</i>
35 700	0,225	Satellite per telecomunicazioni



Sulla cassa agiscono due forze



(a)

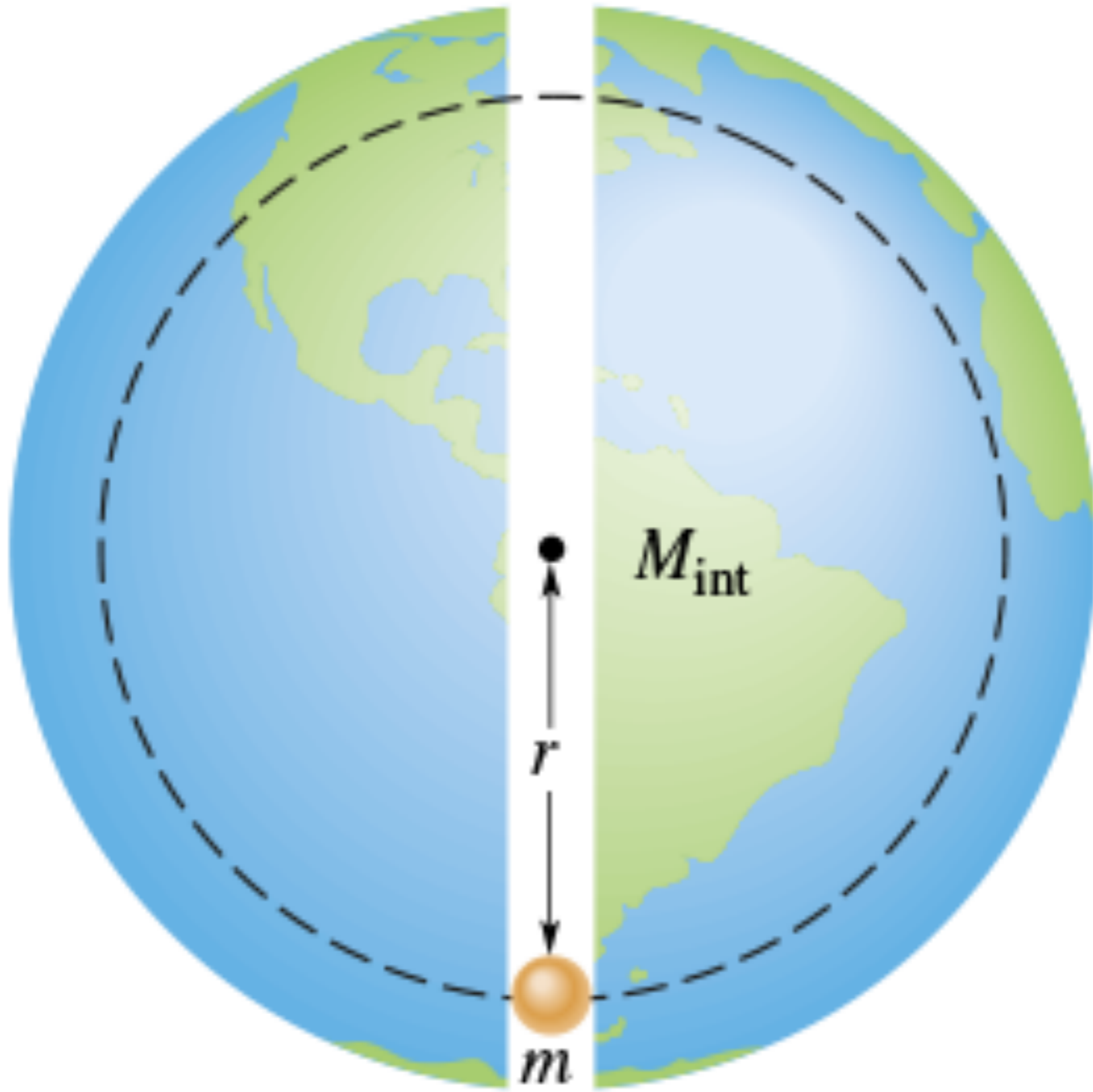
La forza normale è rivolta verso l'alto

La forza gravitazionale verso il basso

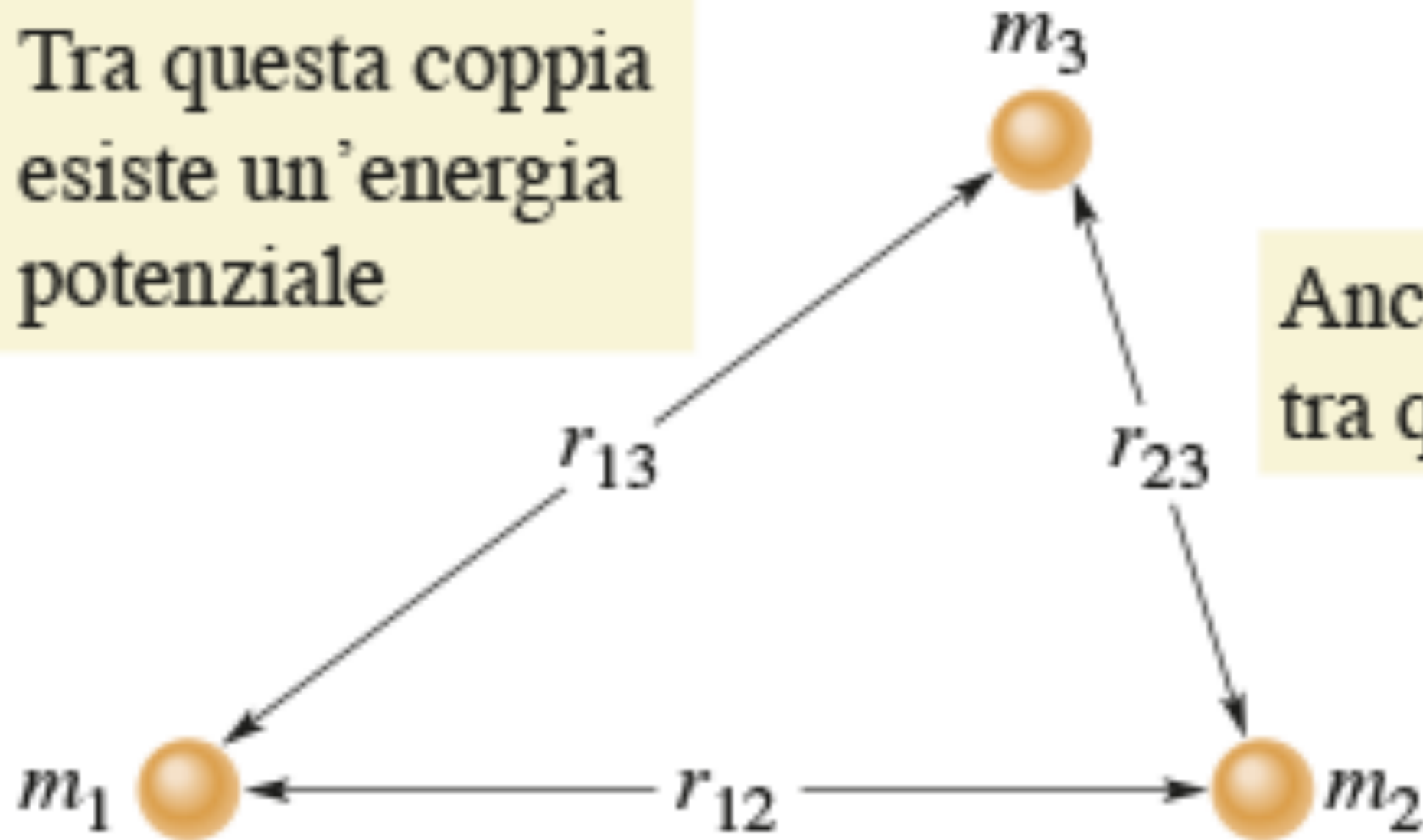


La forza netta è verso il basso e così l'accelerazione

(b)

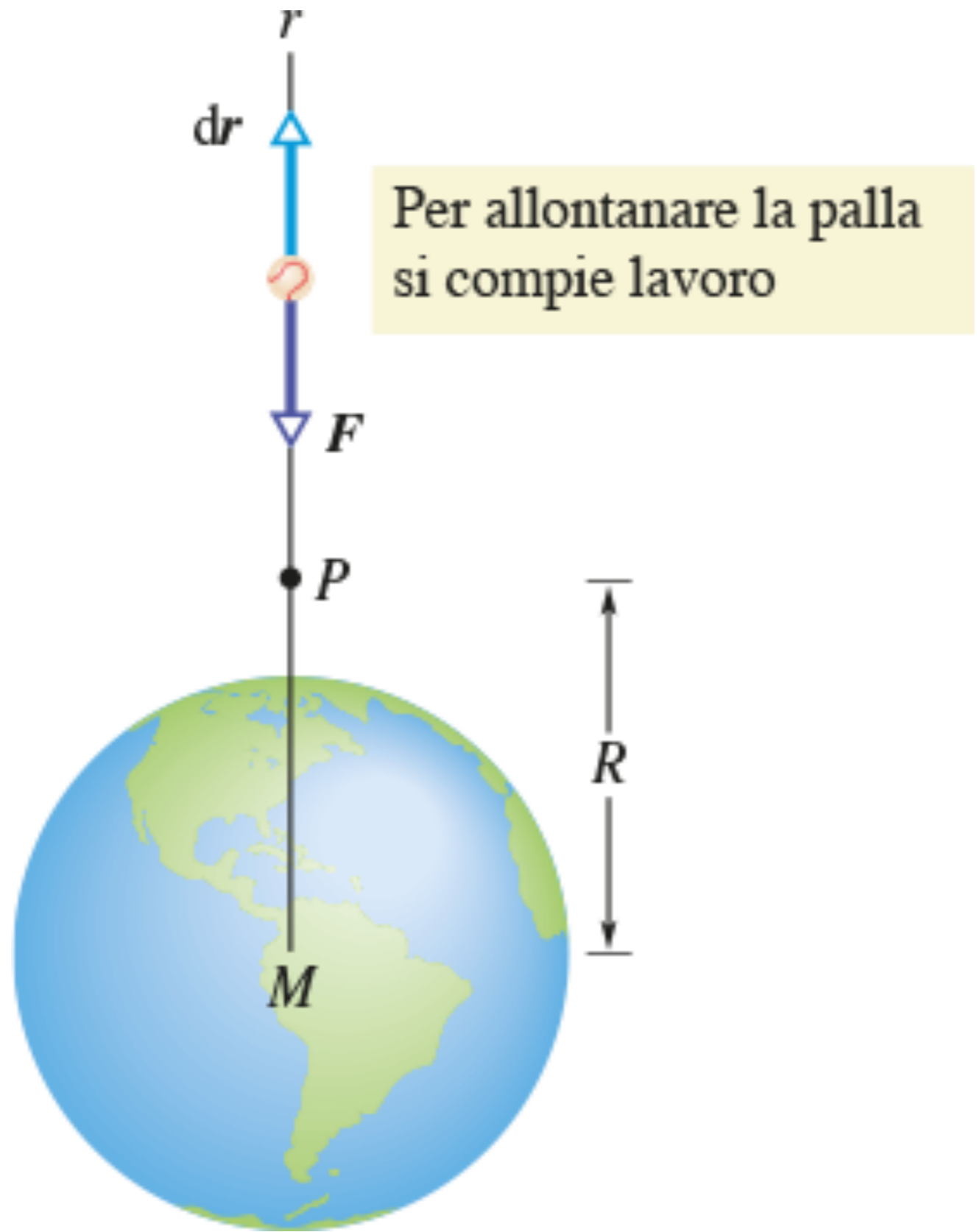


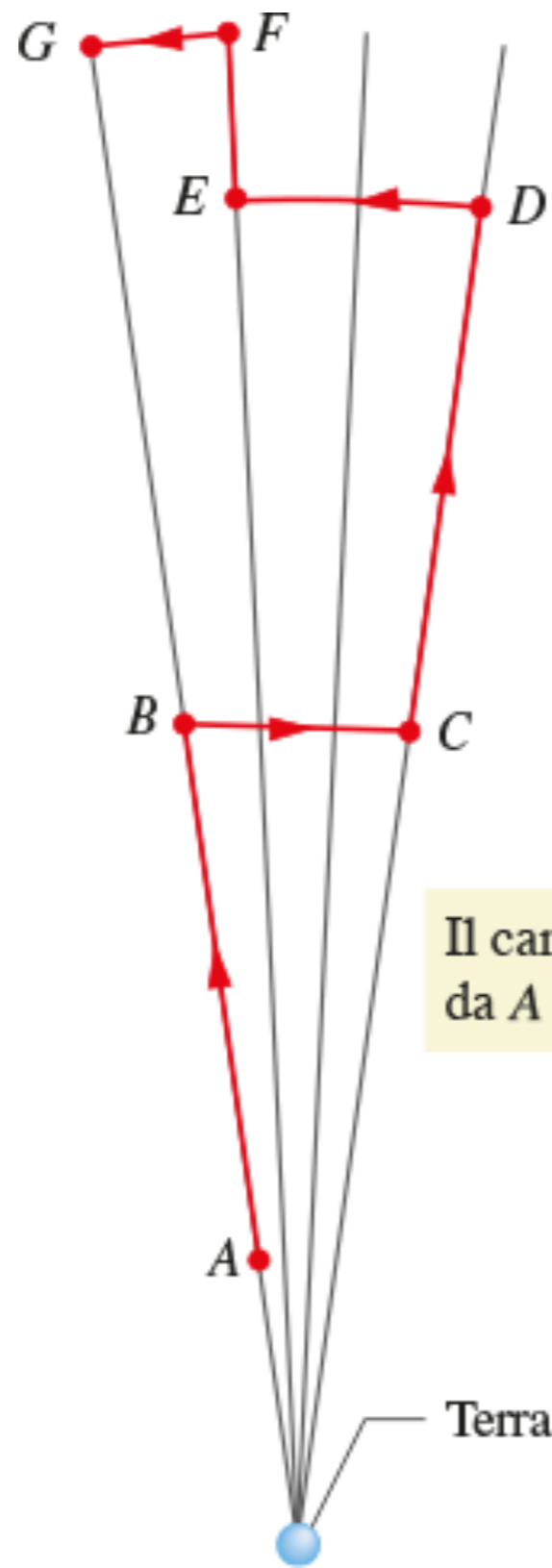
Tra questa coppia
esiste un'energia
potenziale



Anche
tra questa

Anche tra questa





Il cammino per andare da A a G è irrilevante

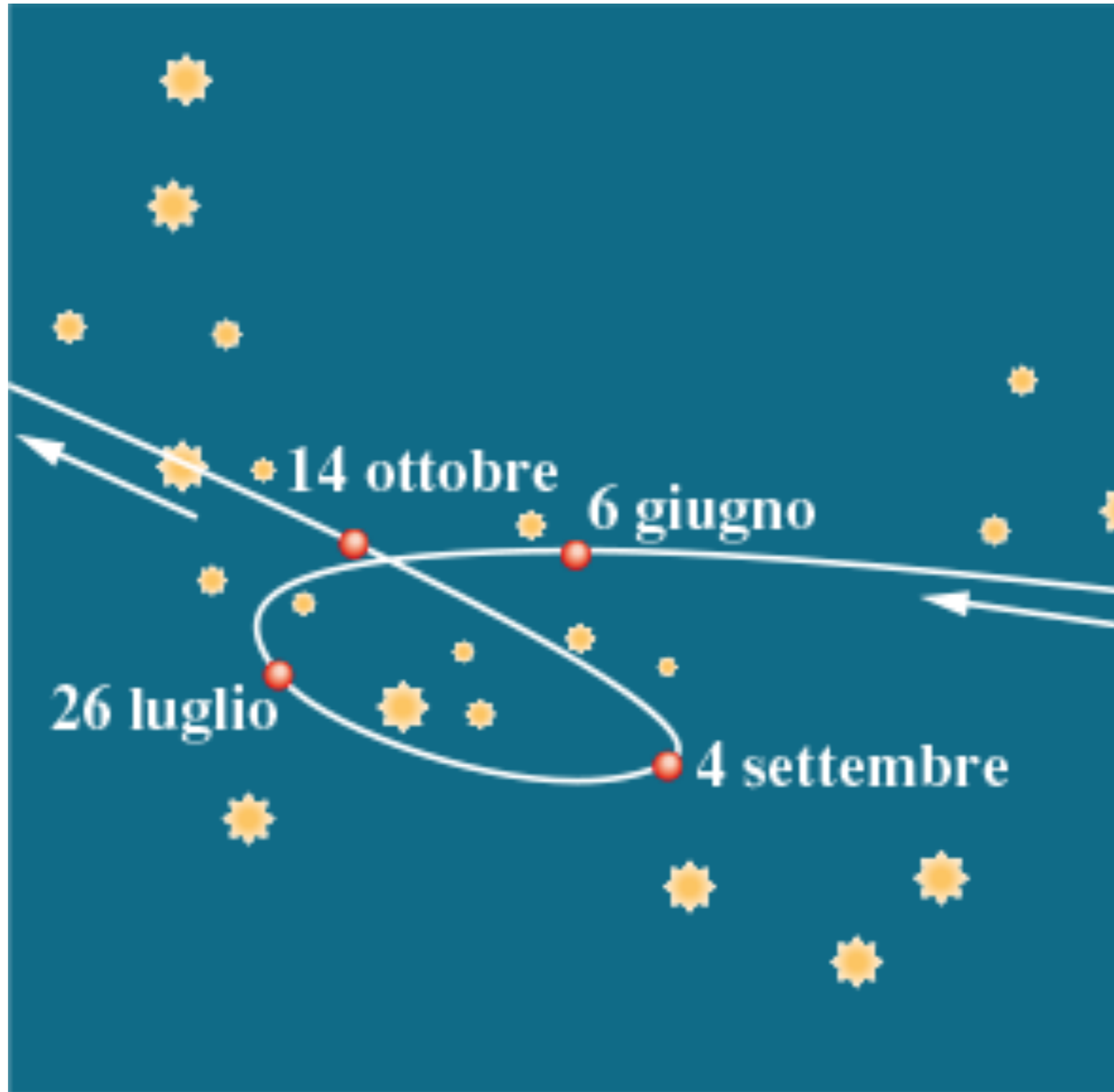
TABELLA 13.2 Velocità di fuga da alcuni corpi celesti

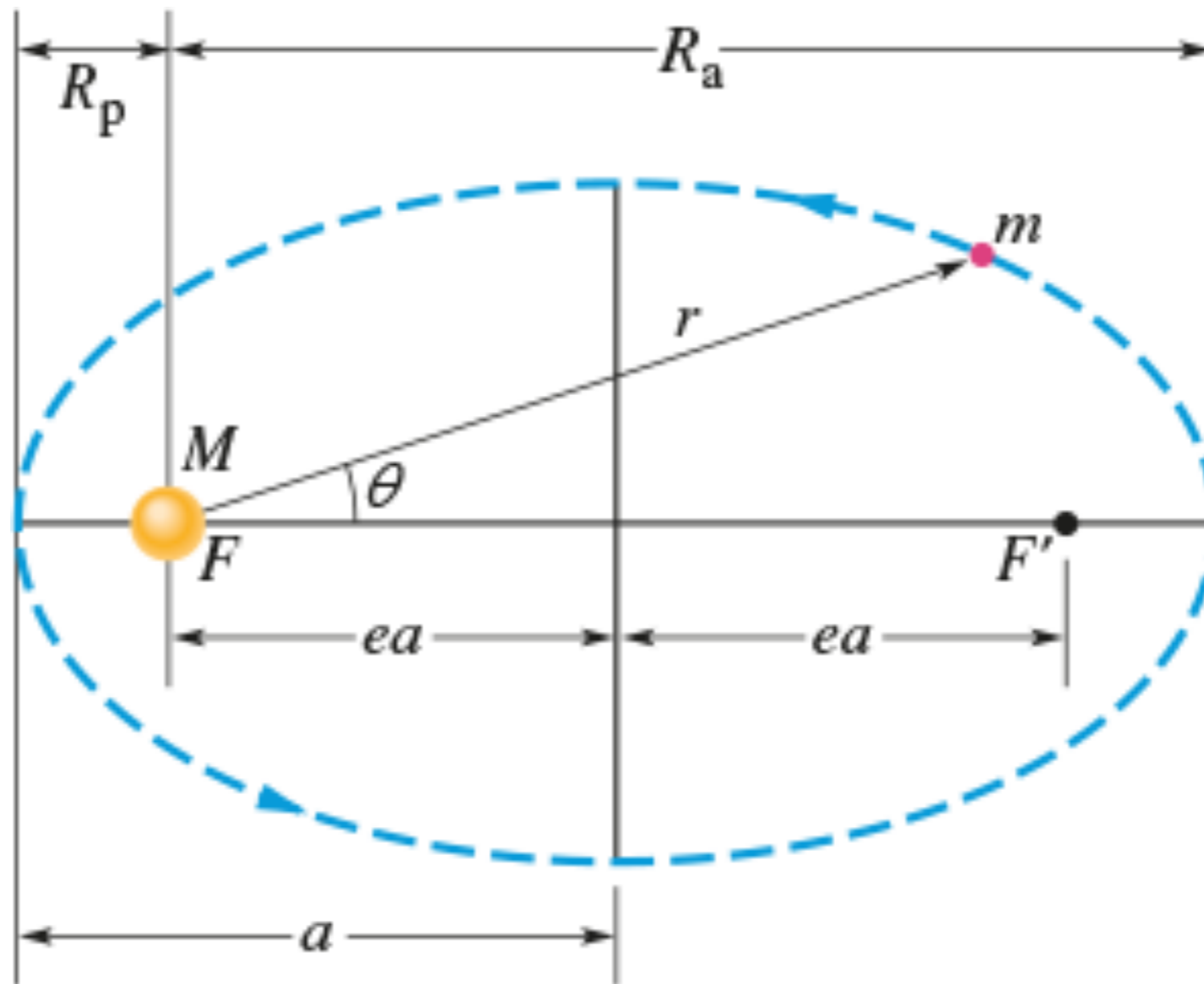
Corpo	Massa (kg)	Raggio (m)	Velocità di fuga (km/s)
Cerere ^a	$1,17 \cdot 10^{21}$	$3,8 \cdot 10^5$	0,64
Luna terrestre	$7,36 \cdot 10^{22}$	$1,74 \cdot 10^6$	2,38
Terra	$5,98 \cdot 10^{24}$	$6,37 \cdot 10^6$	11,2
Giove	$1,90 \cdot 10^{27}$	$7,15 \cdot 10^7$	59,5
Sole	$1,99 \cdot 10^{30}$	$6,96 \cdot 10^8$	618
Sirio B ^b	$2 \cdot 10^{30}$	$1 \cdot 10^7$	5200
Stella di neutroni ^c	$2 \cdot 10^{30}$	$1 \cdot 10^4$	$2 \cdot 10^5$

^a L'asteroide di massa maggiore

^b La compagna di Sirio, una delle stelle più brillanti; Sirio B è una *nana bianca* (una stella nello stadio finale della sua evoluzione).

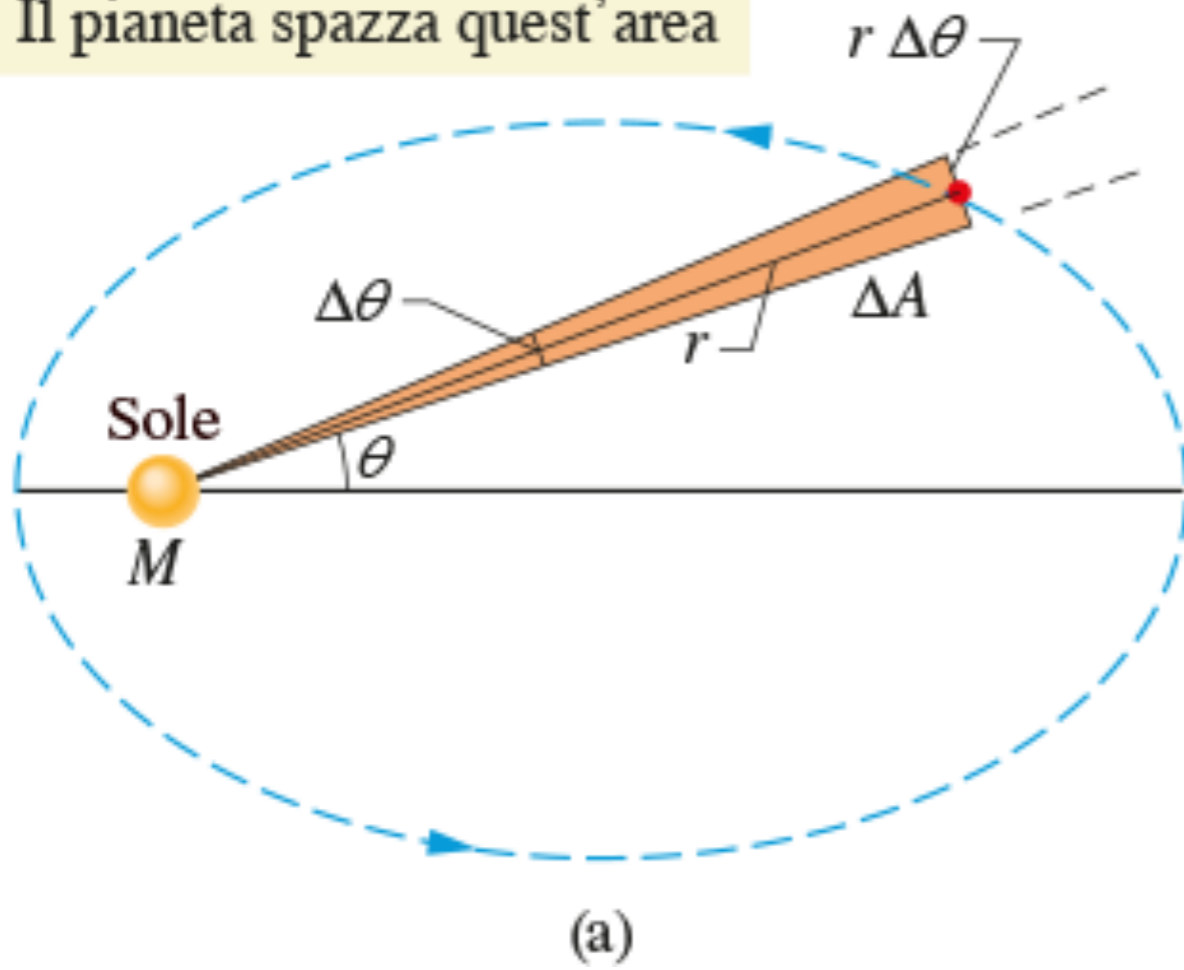
^c Il nucleo residuo di una stella che ha subito un collasso, dopo essere esplosa in una *supernova*.



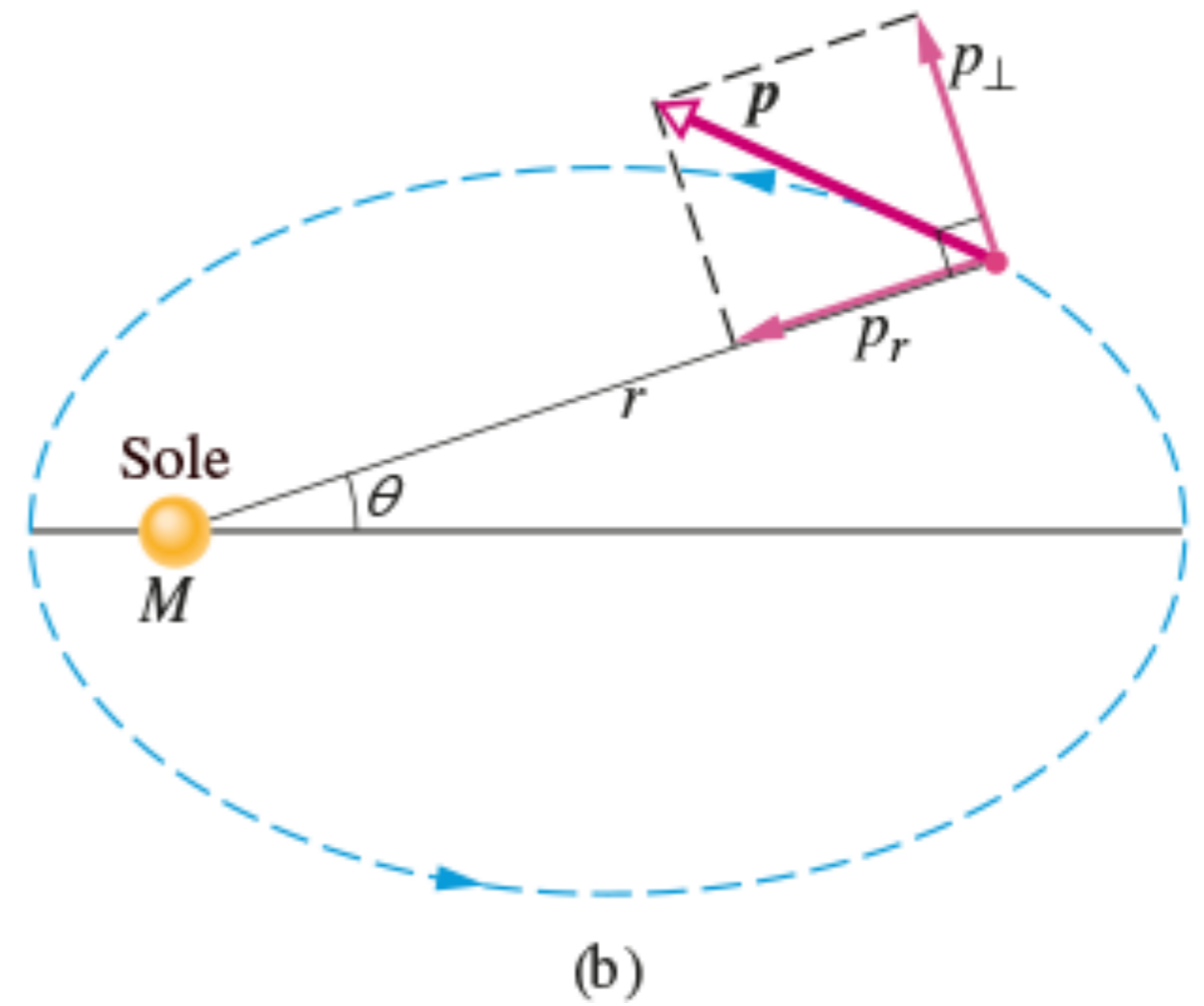


Il Sole sta in uno dei due fuochi

Il pianeta spazza quest'area



Le due componenti della quantità di moto



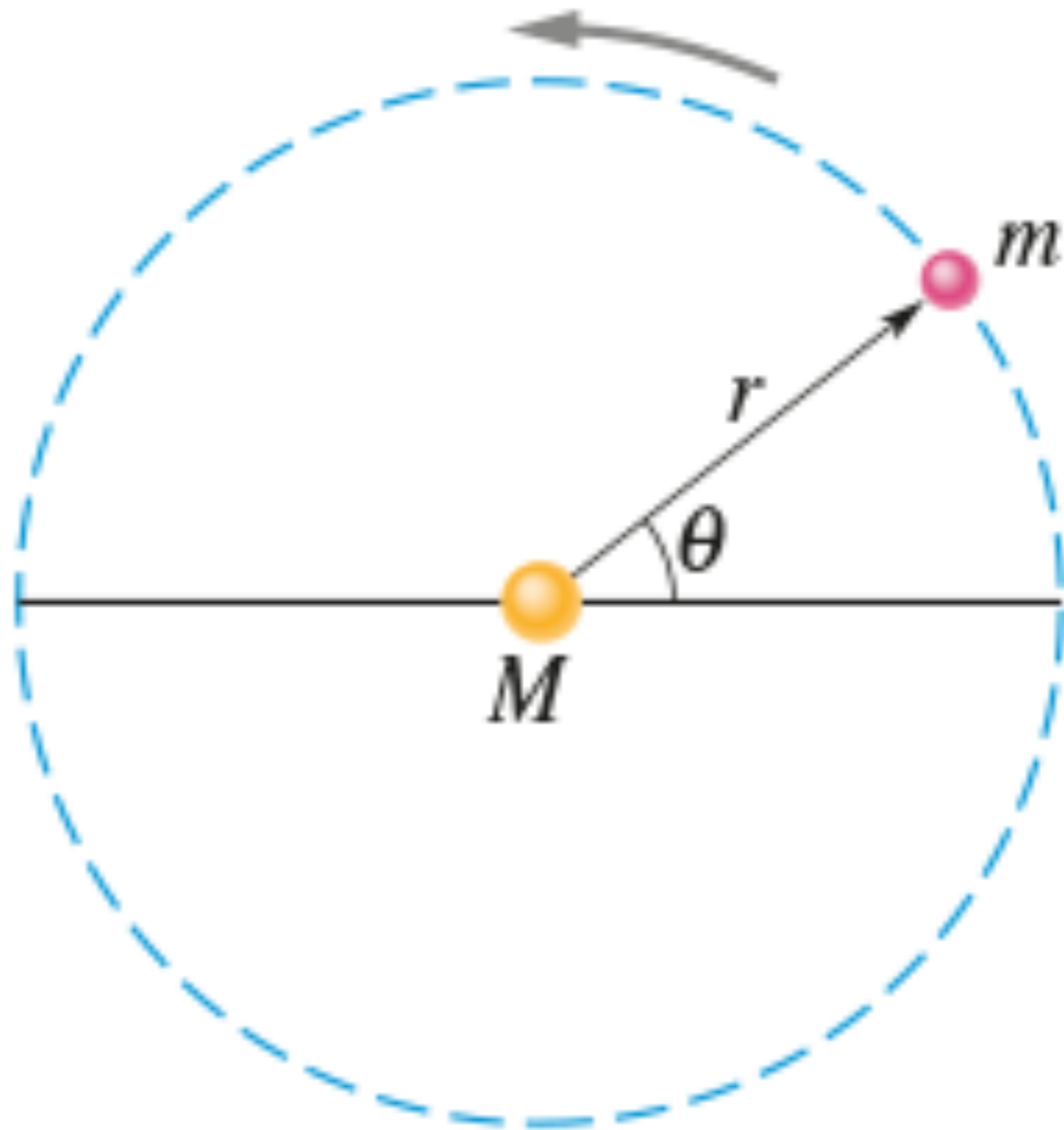


TABELLA 13.3 Terza legge di Keplero per il sistema solare*

Pianeta	Semiassse maggiore a (10^{10} m)	Periodo T (a)	T^2/a^3 (10^{-34} a ² /m ³)
Mercurio	5,79	0,241	2,99
Venere	10,8	0,615	3,00
Terra	15,0	1,00	2,96
Marte	22,8	1,88	2,98
Giove	77,8	11,9	3,01
Saturno	143	29,5	2,98
Urano	287	84,0	2,98
Nettuno	450	165	2,99
Plutone	590	248	2,99

* a = semiassse maggiore
a = anni

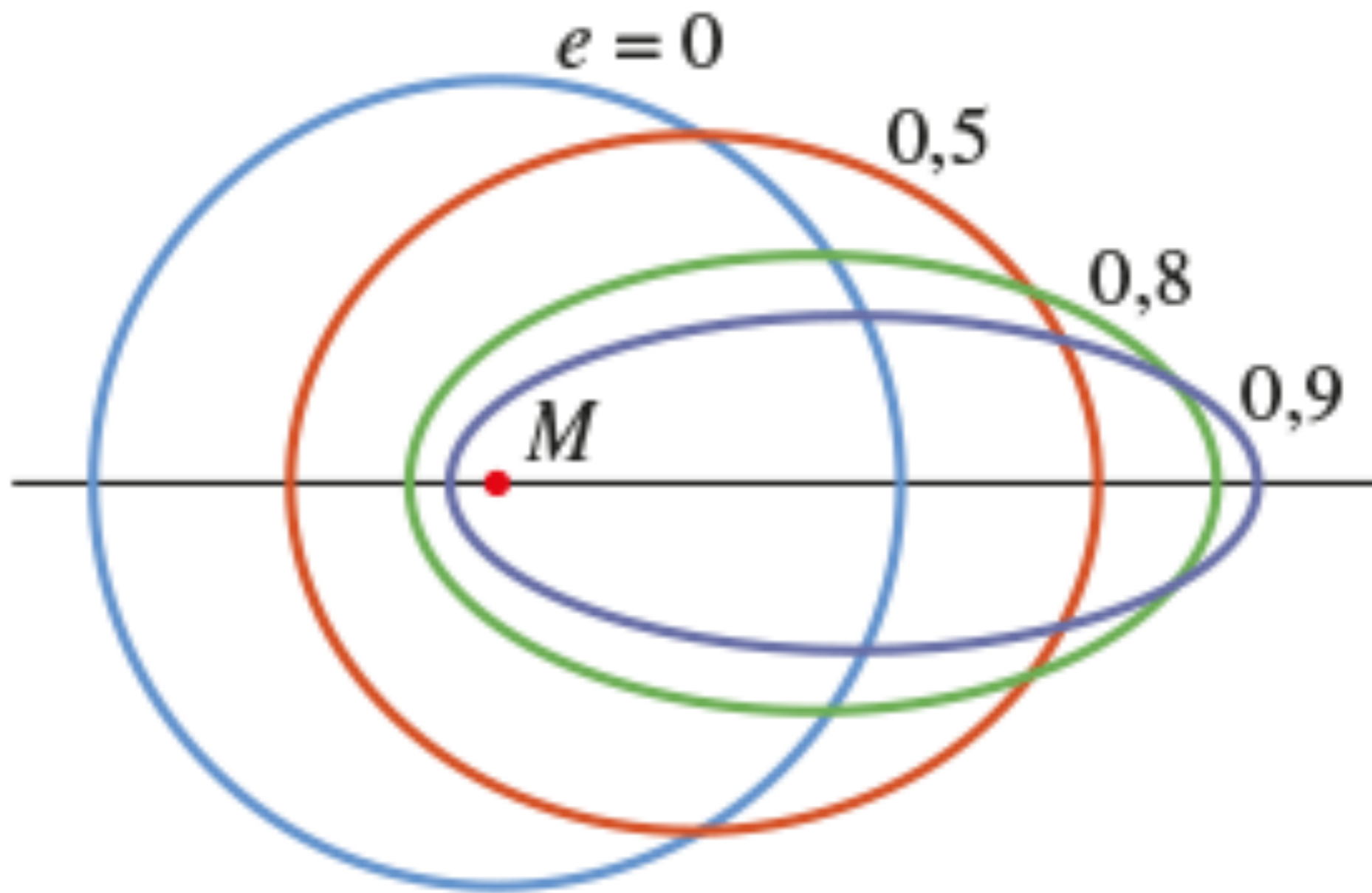
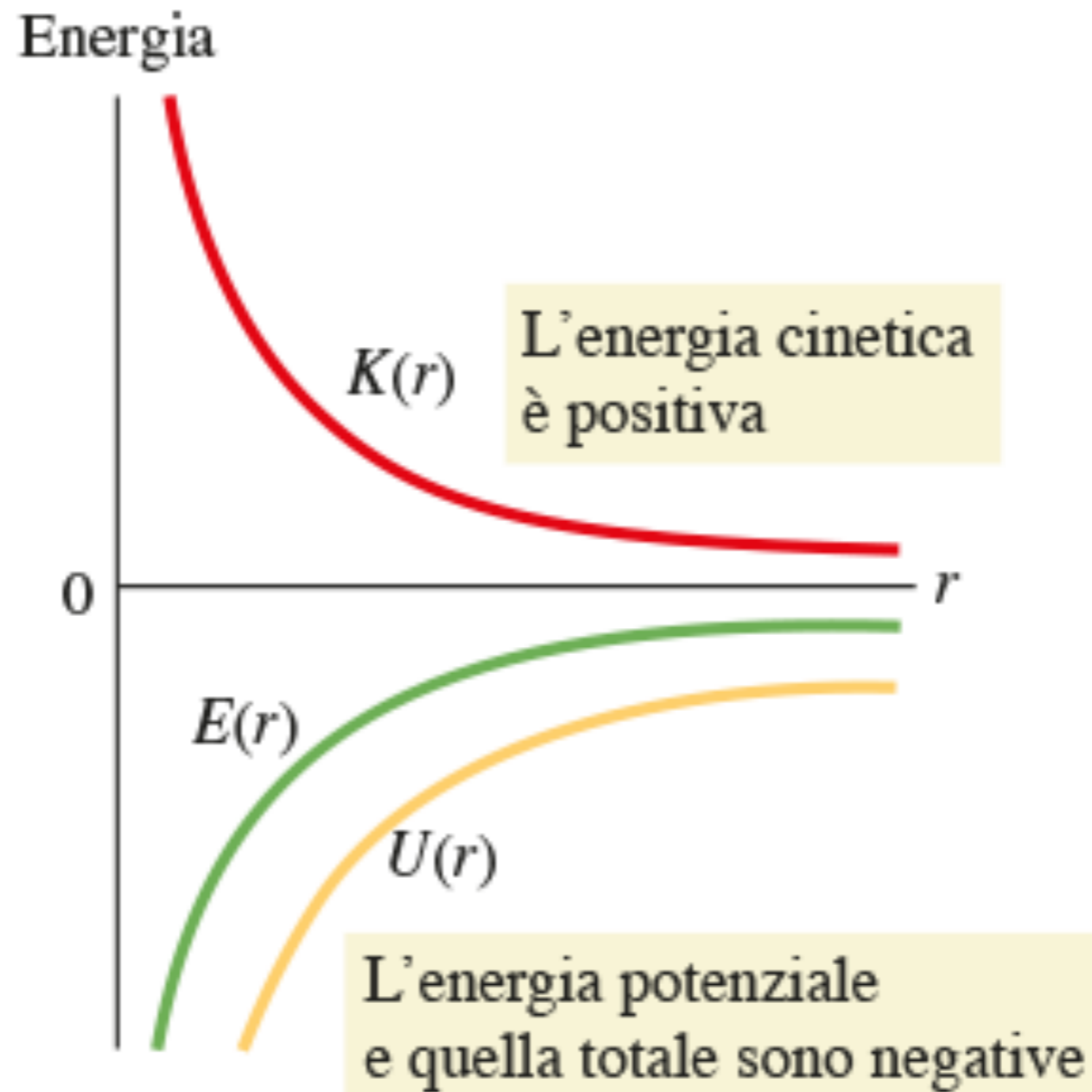
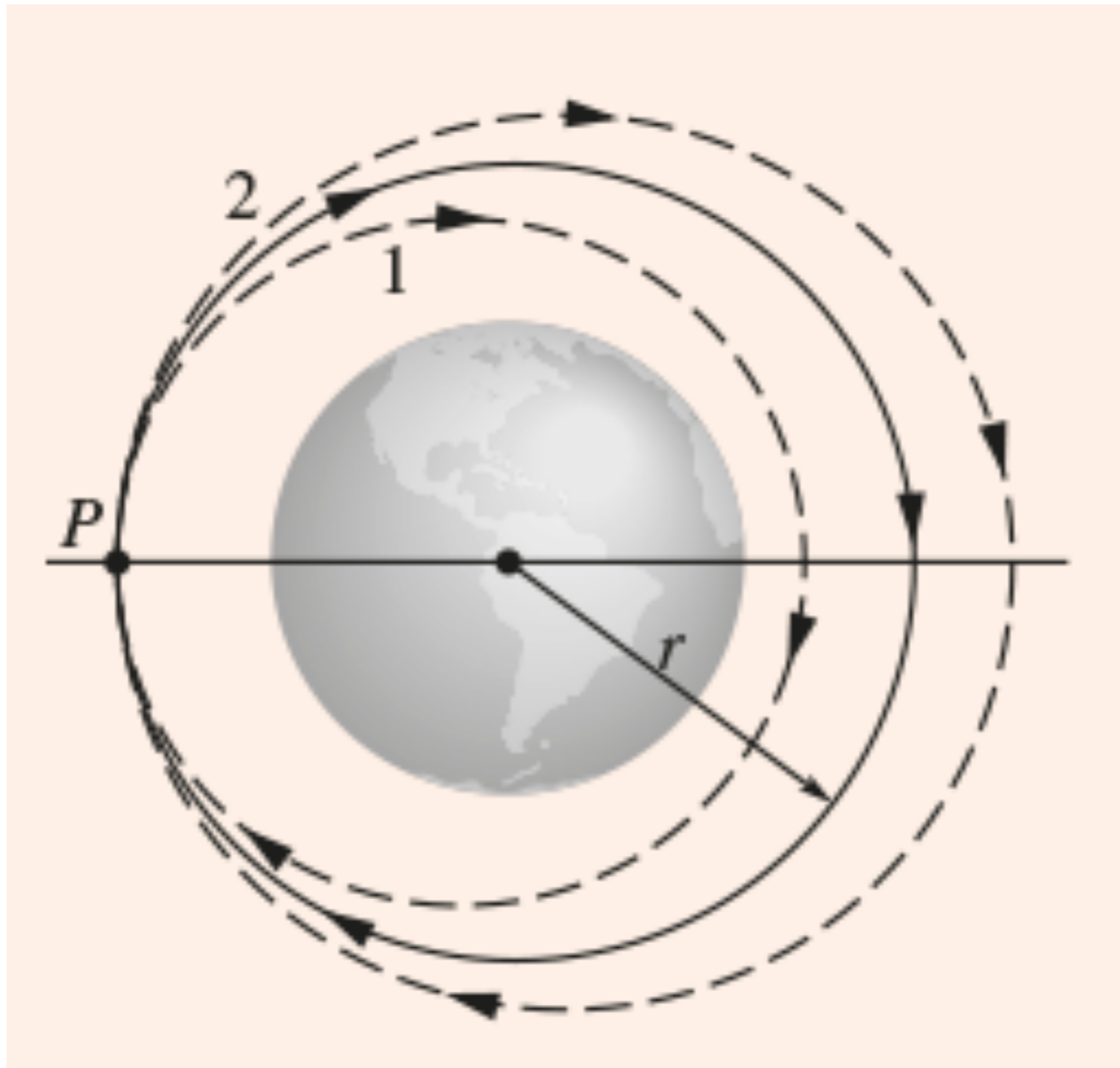
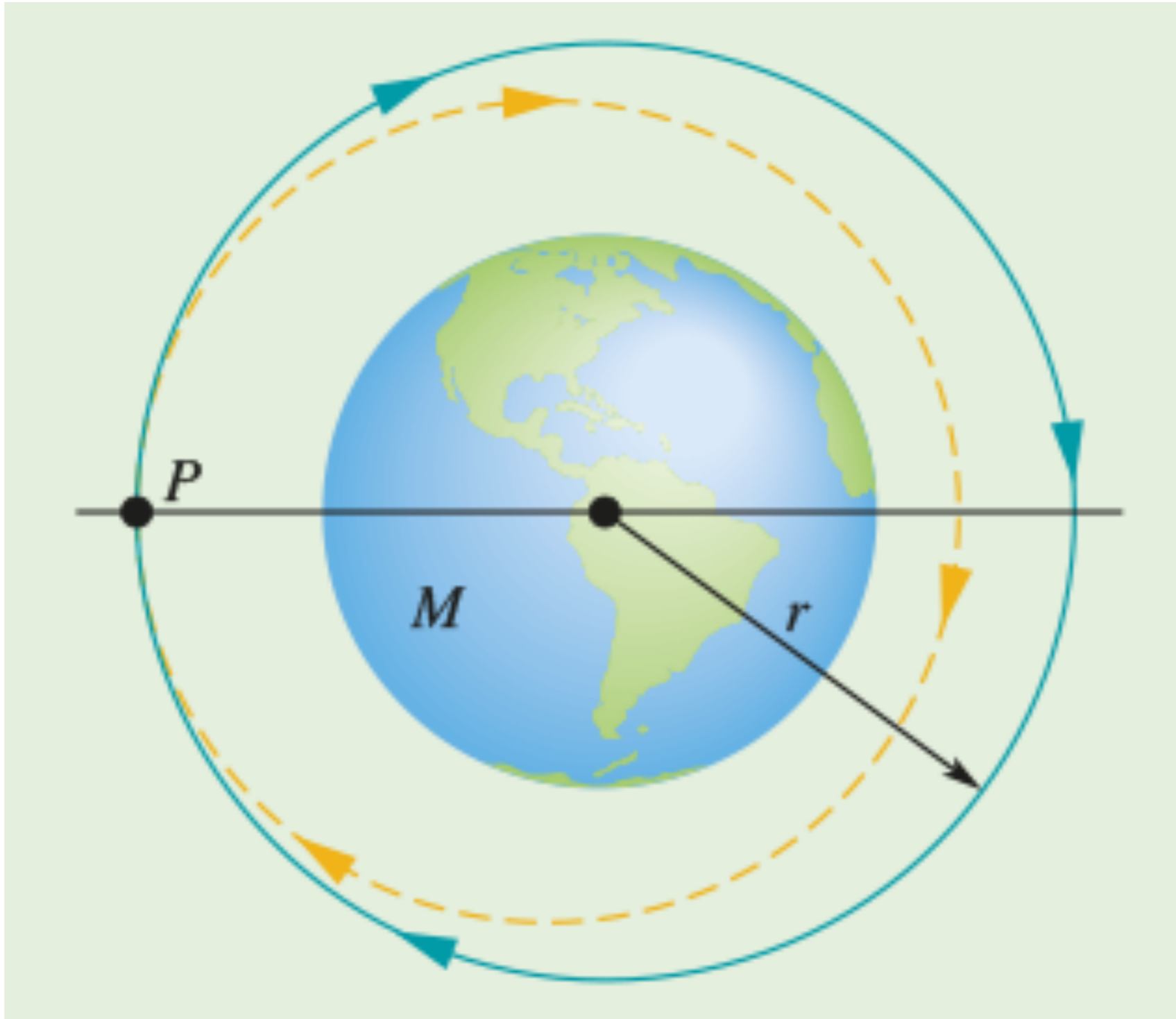
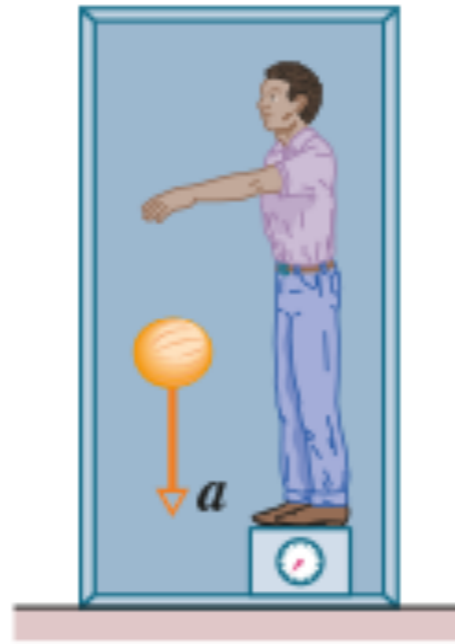


Diagramma dell'energia del satellite in funzione del raggio orbitale

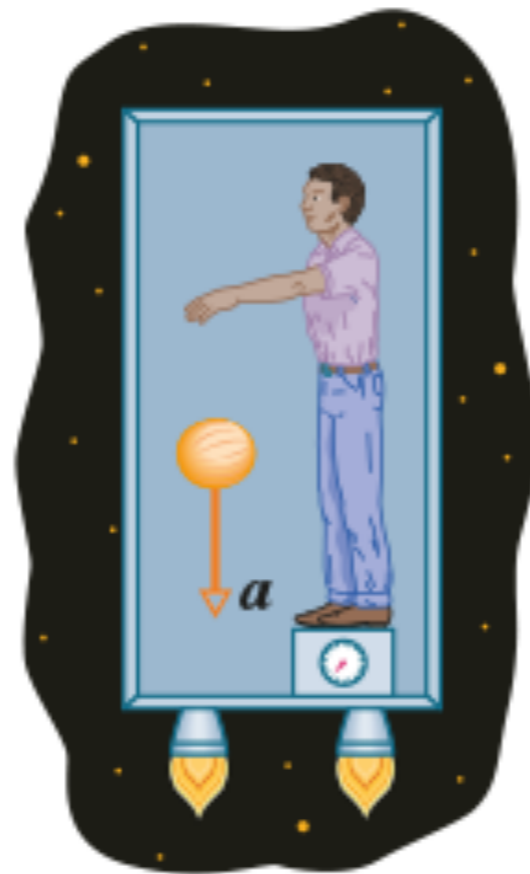




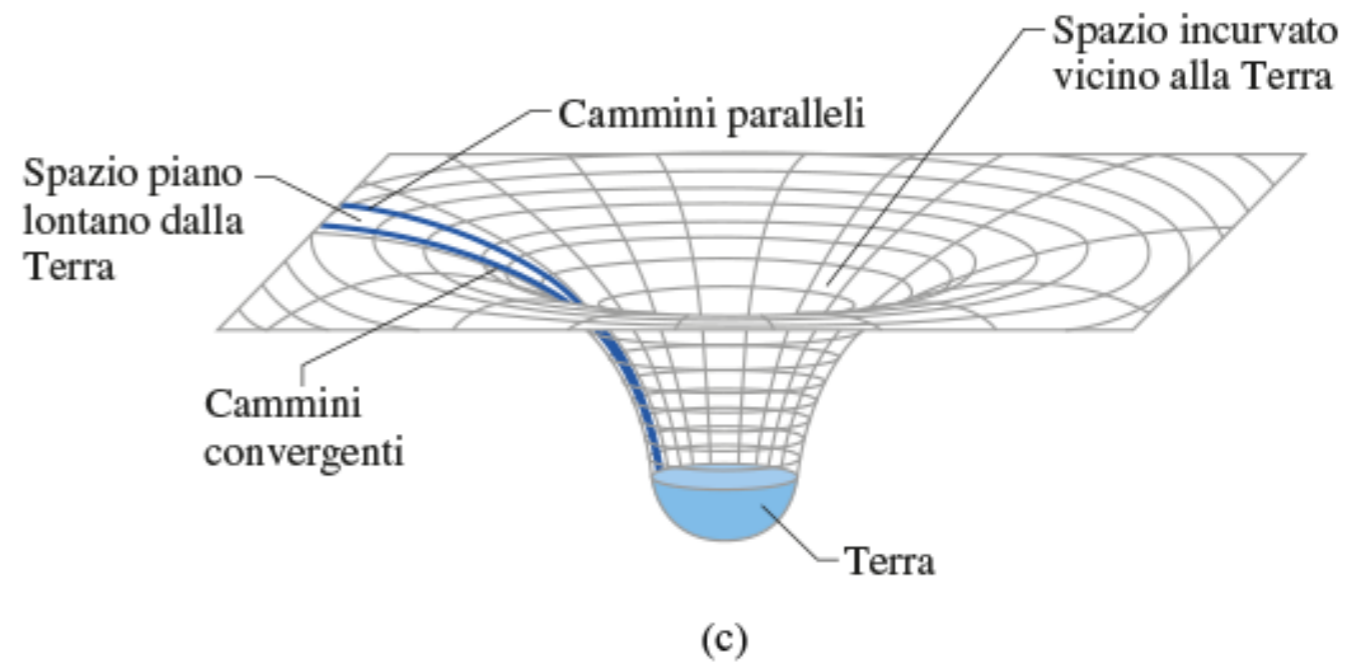
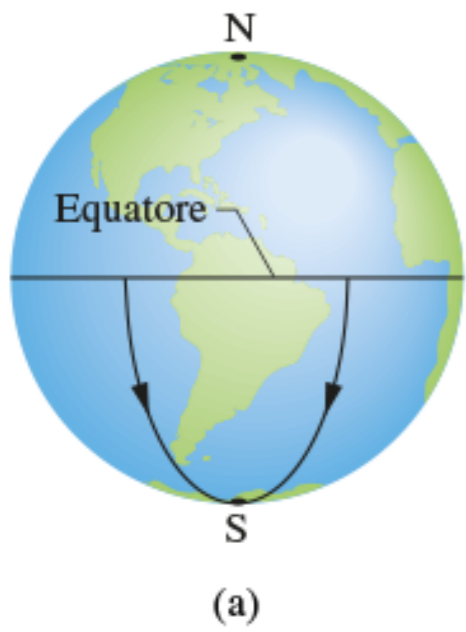


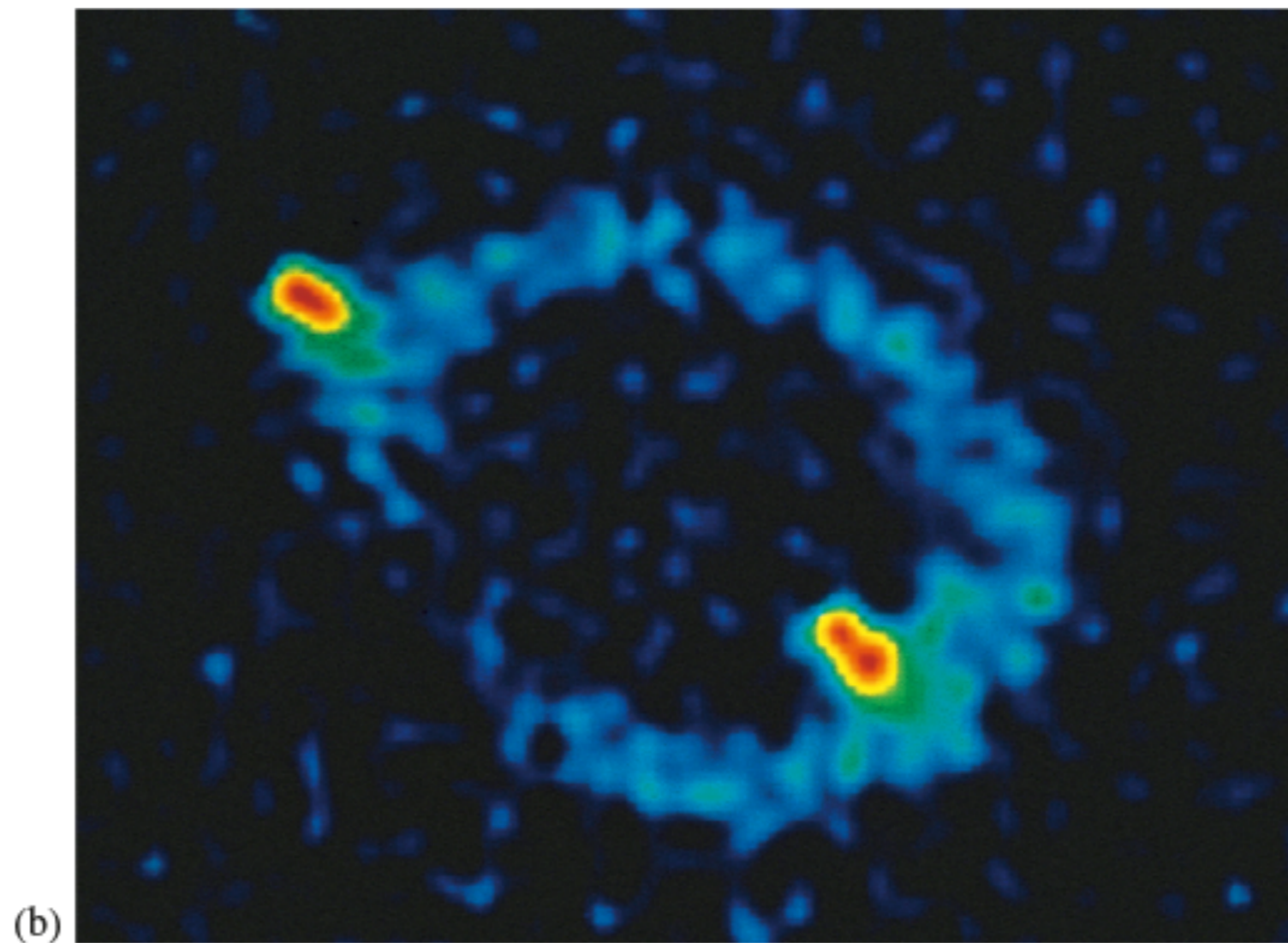
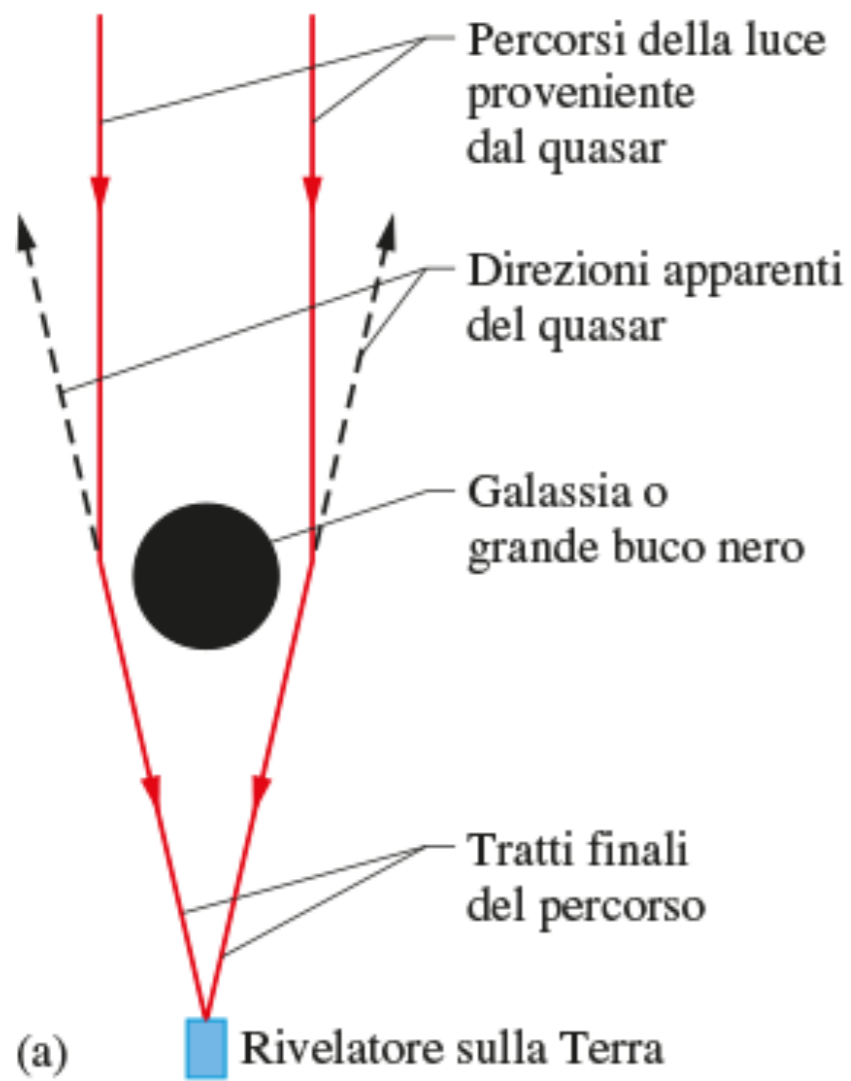


(a)



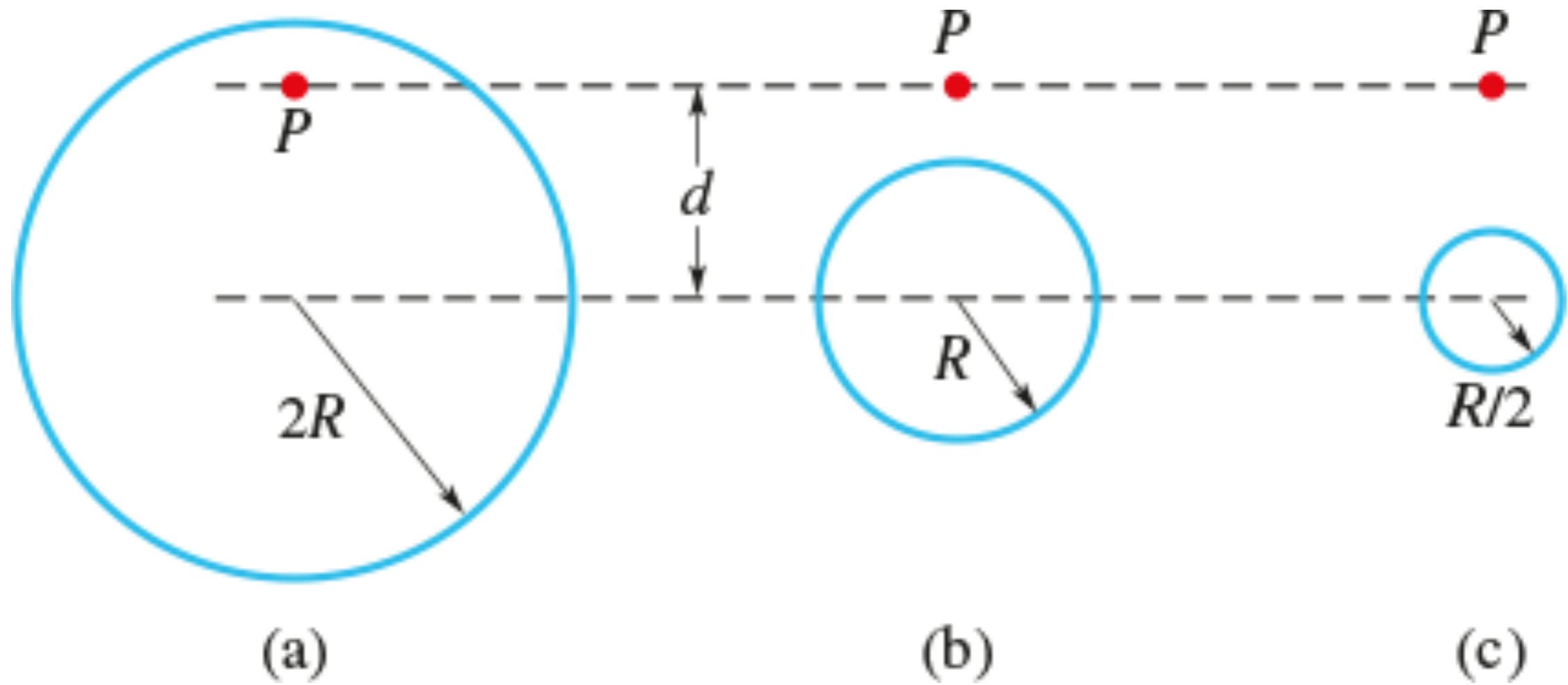
(b)

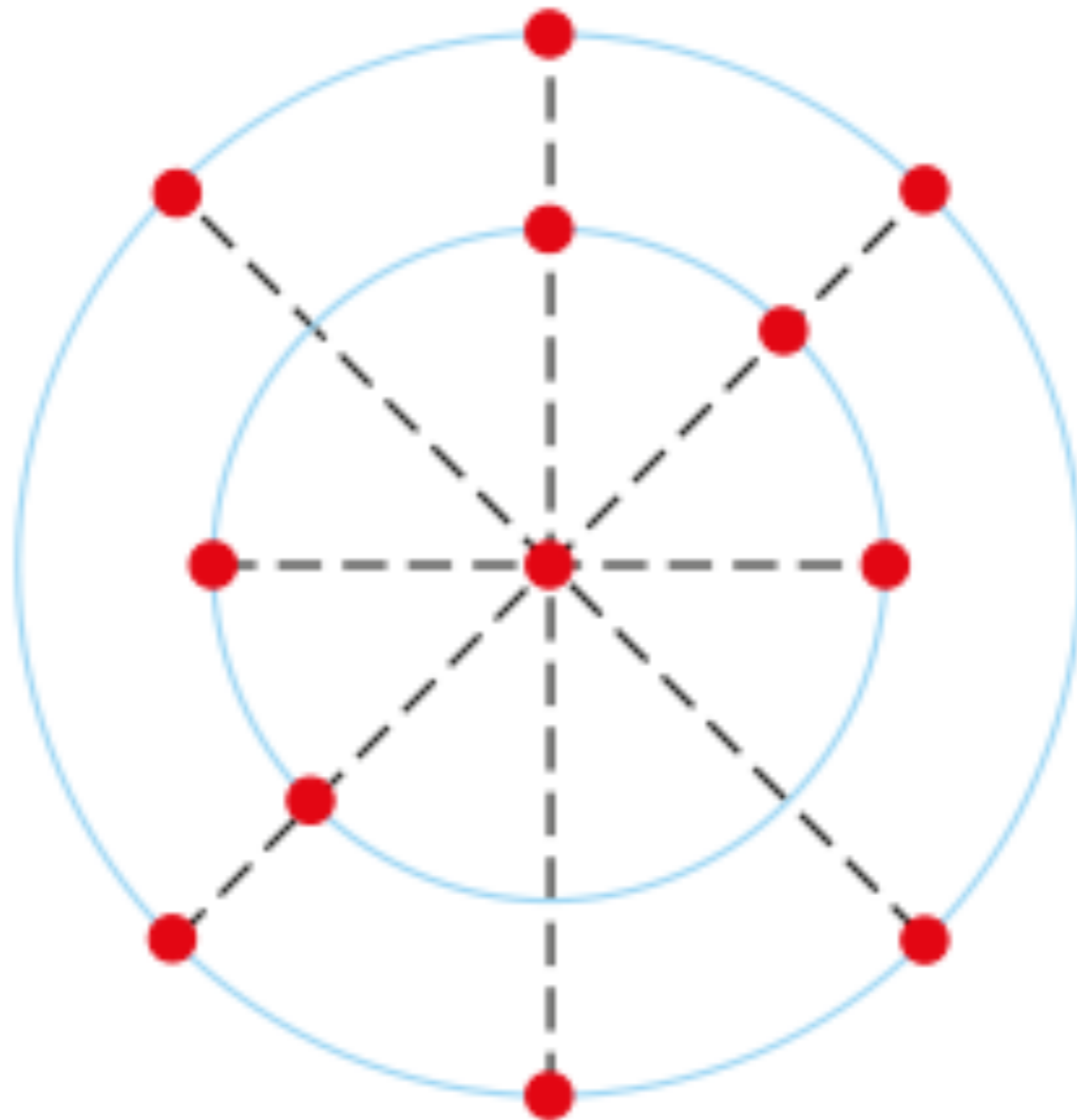


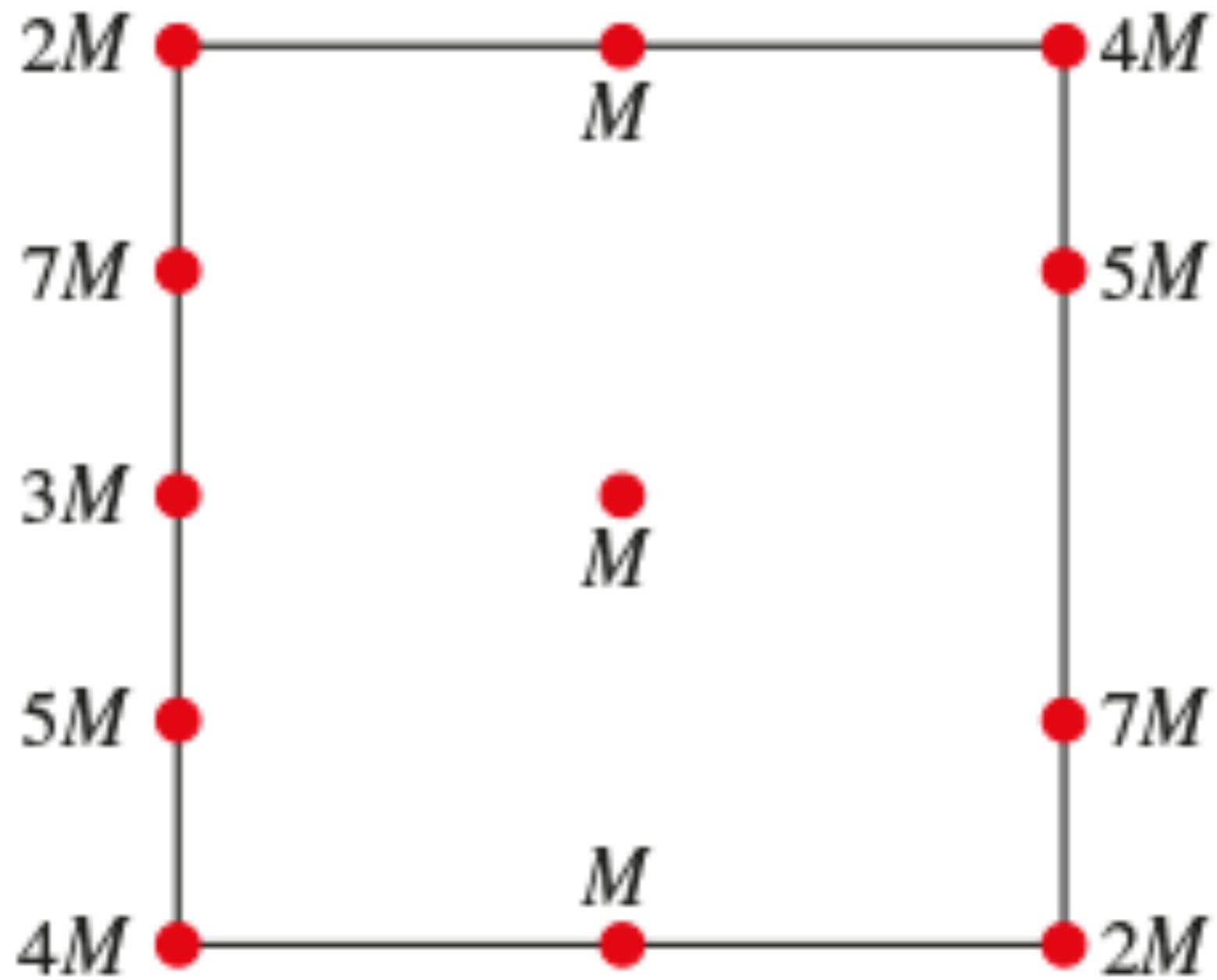


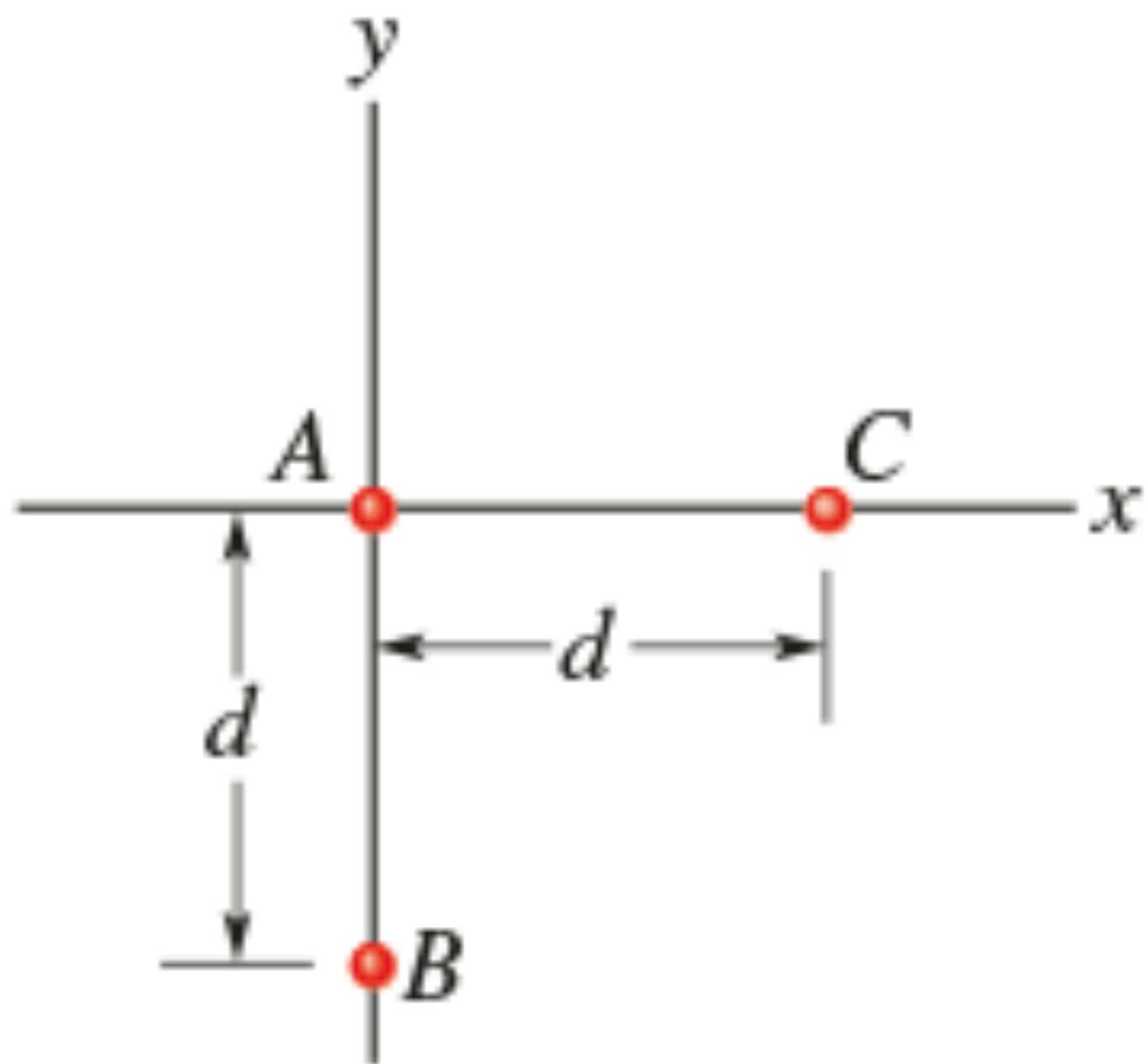
Per gentile concessione di National Radio Astronomy Observatory.

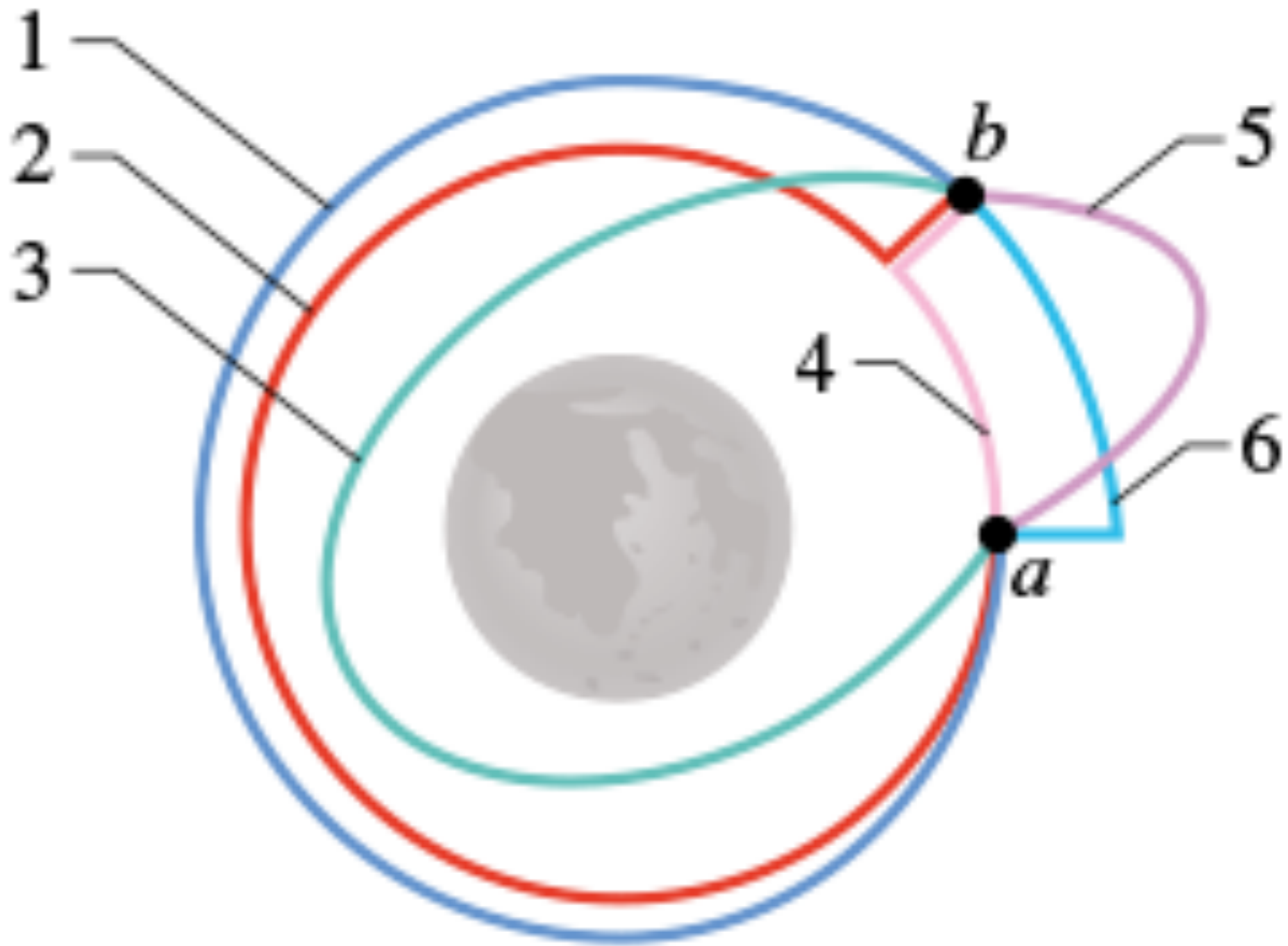


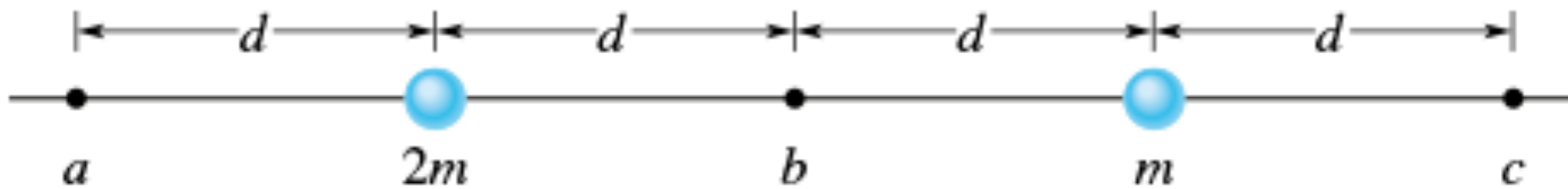


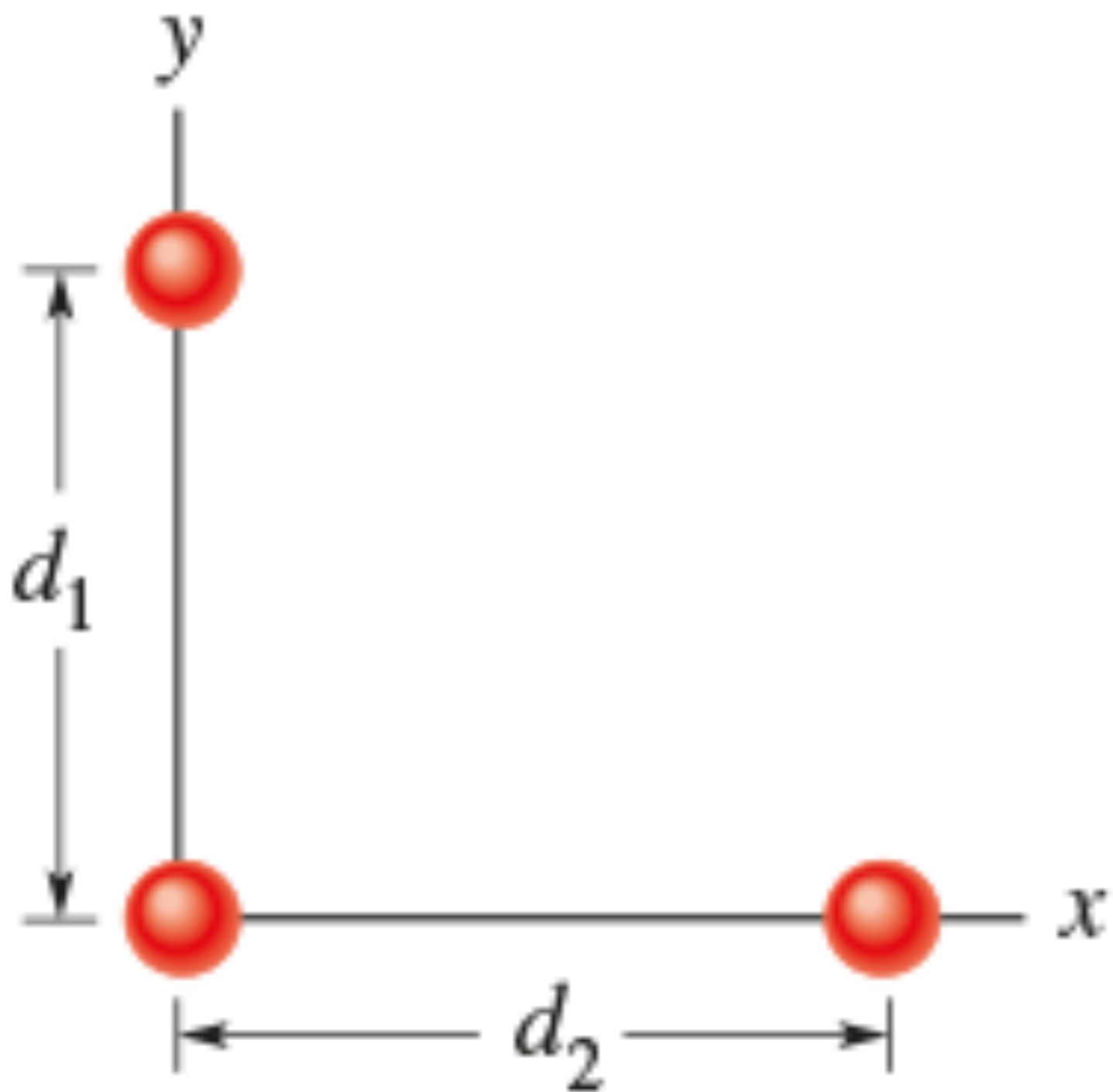


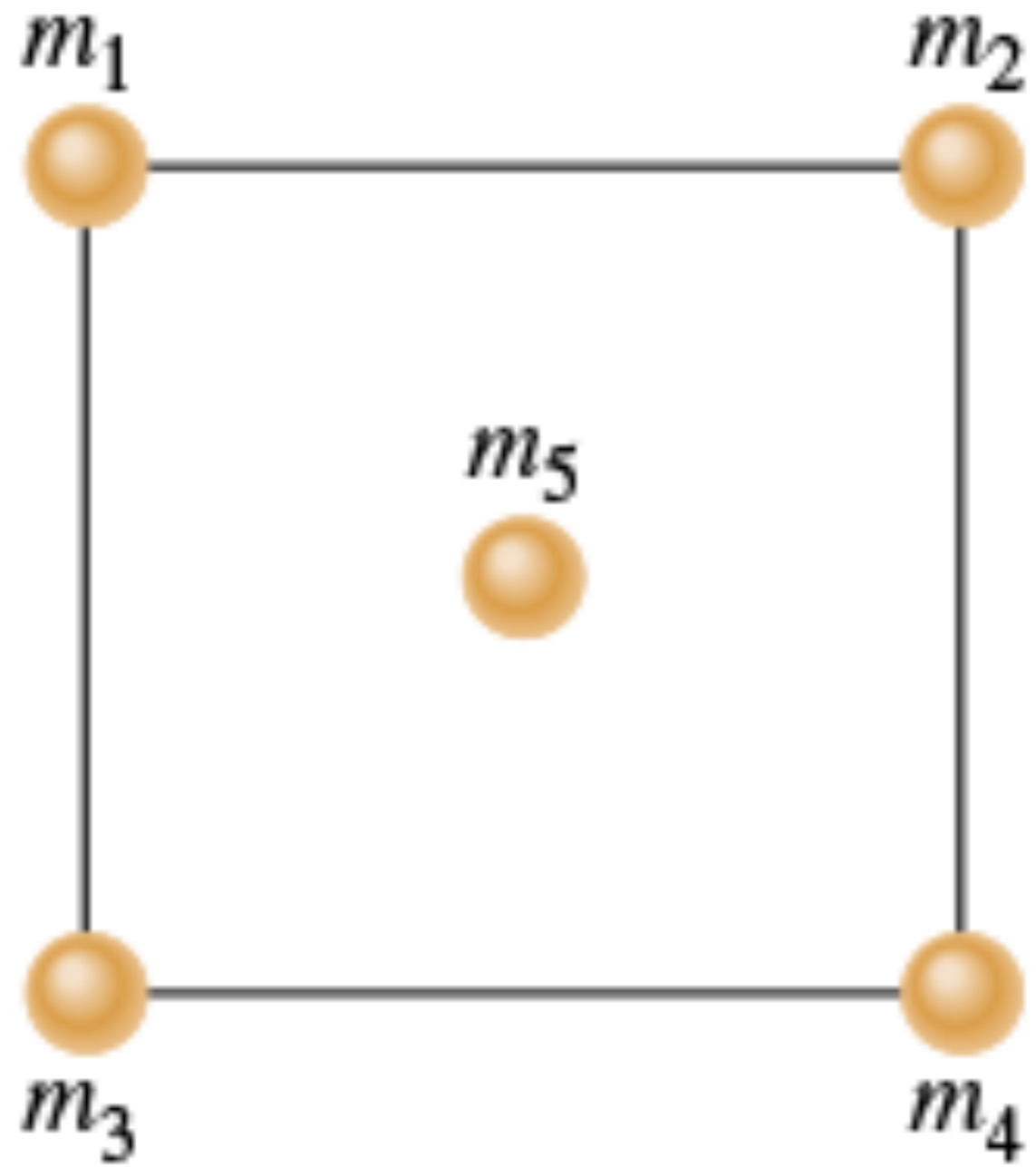


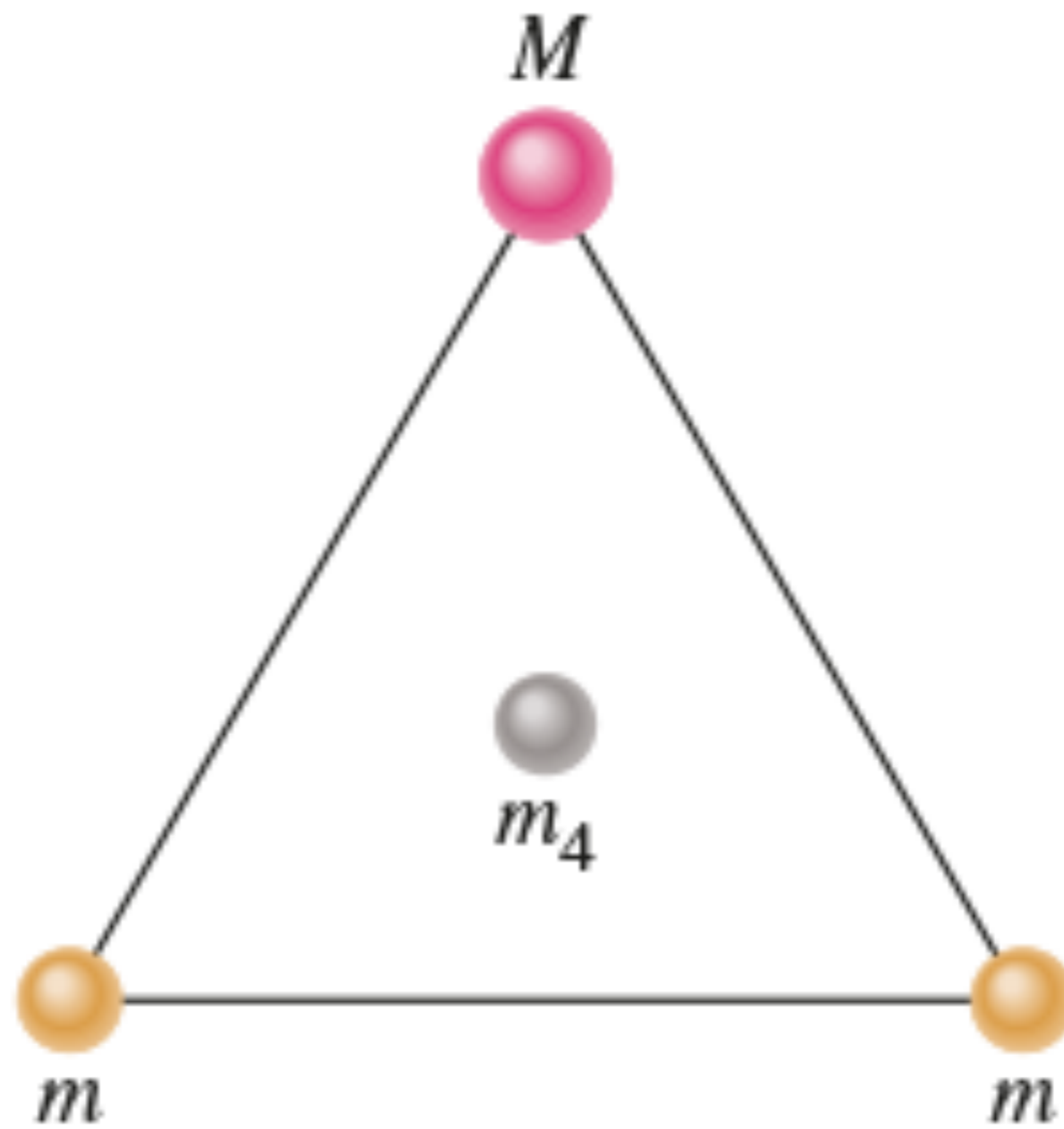


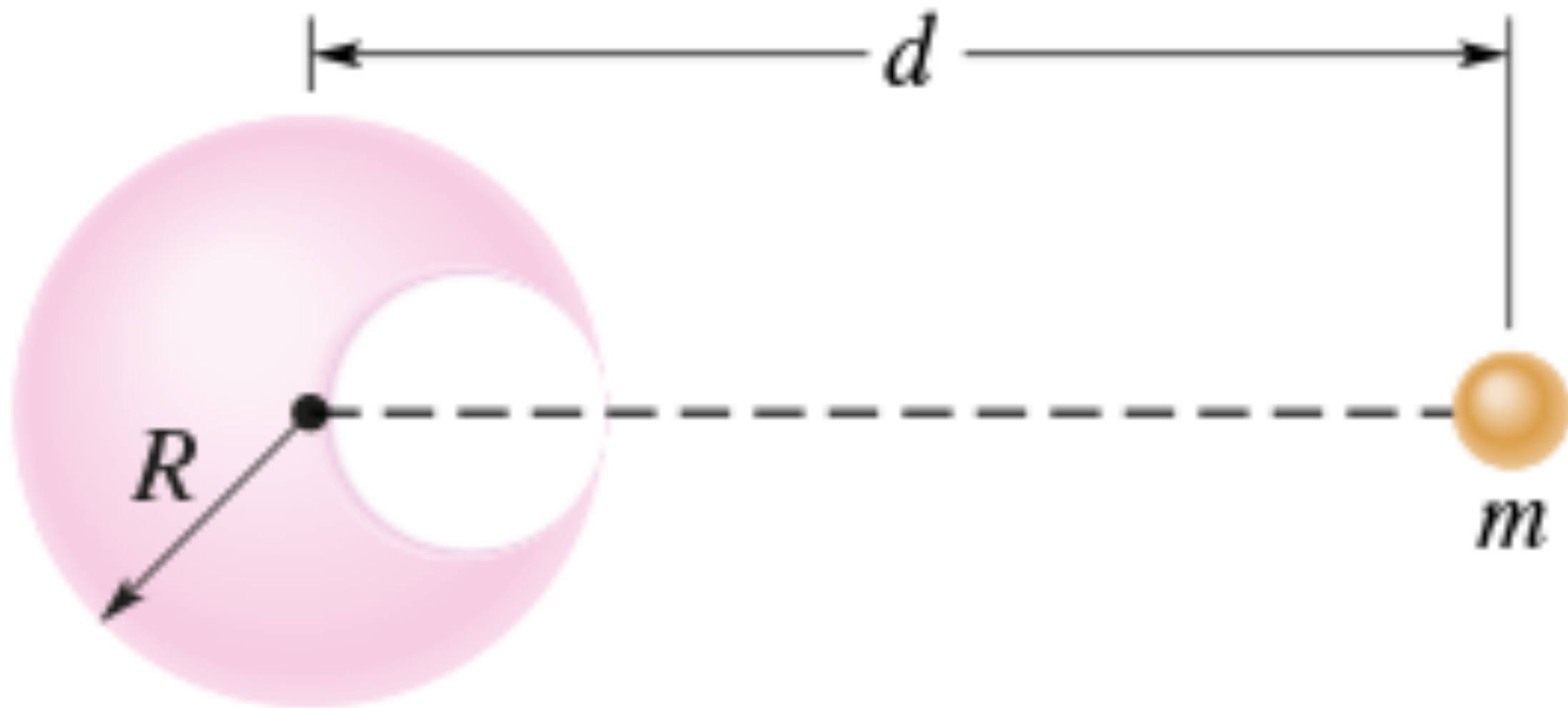


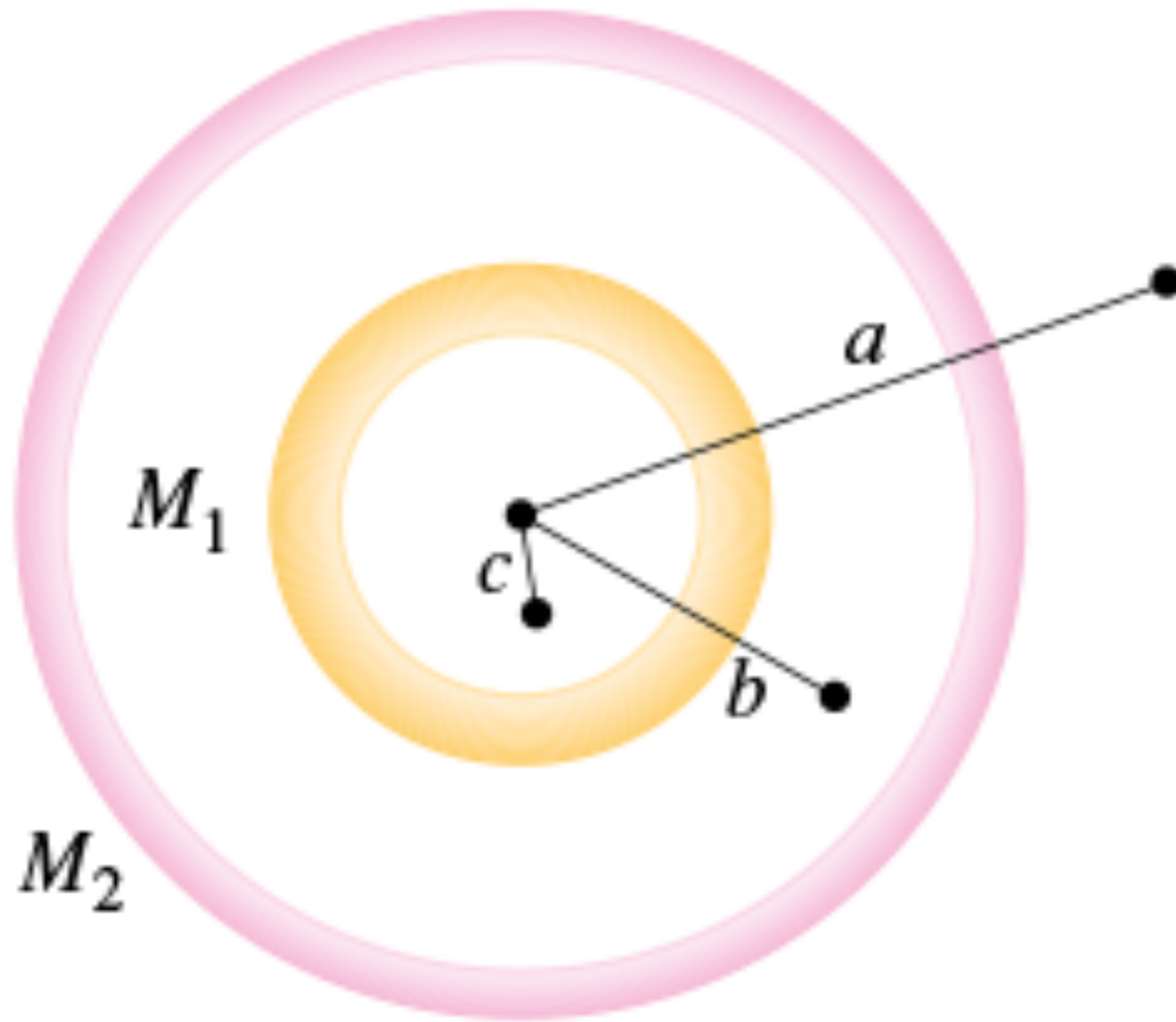


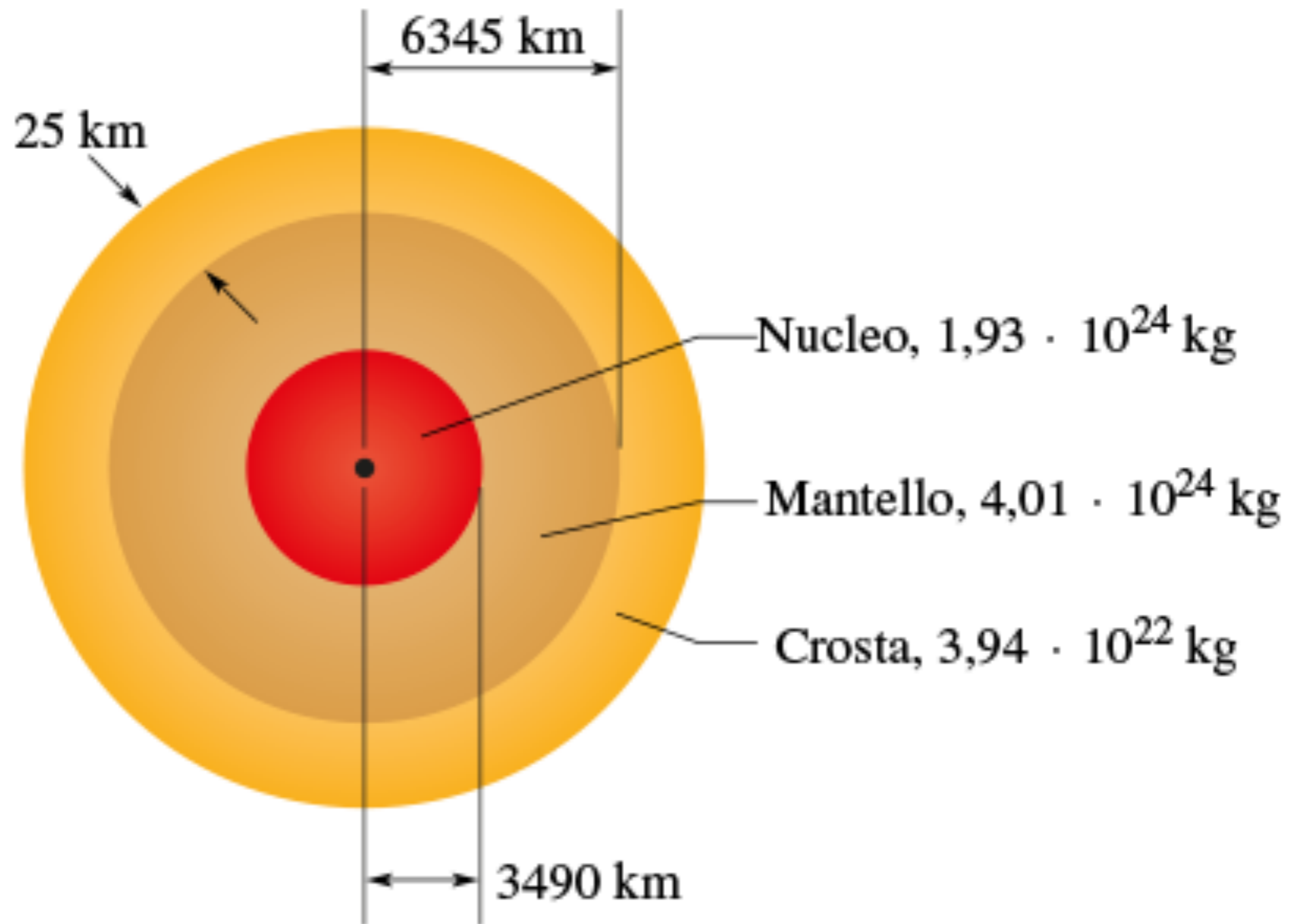


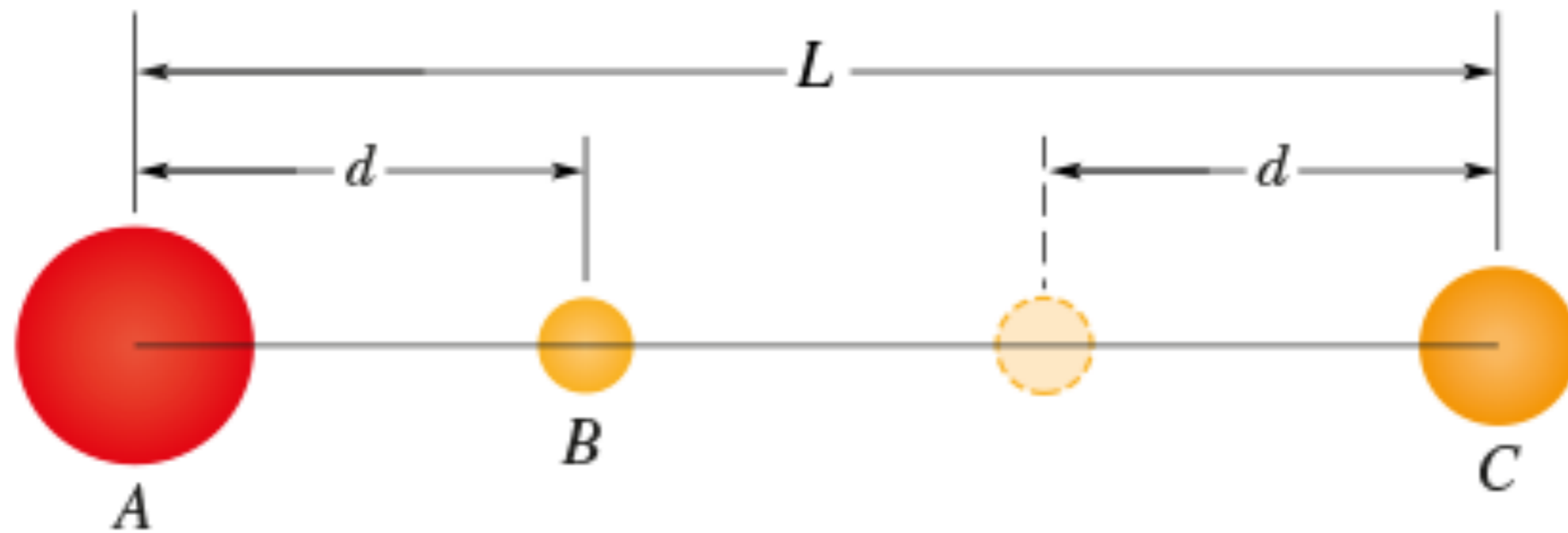












Nome	a (10^8 m)	T (d)
Io	4,22	1,77
Europa	6,71	3,55
Ganimede	10,7	7,16
Callisto	18,8	16,7

