Soluzione con i valori numerici (B) (1)

NOTA vedere soluzioni (A) per maggiori dettagli

1) $\frac{\Delta t}{t} = \frac{0.2}{1,8} = 0,111 \simeq \boxed{0,11}$ 11 %

$\frac{\Delta R}{R} = \frac{0.1}{18.3} = 0,00546 \simeq \boxed{0,005}$ 0,5 %

$g = \frac{2h}{t^2}$ $g = 11,2963 \ m/s^2$

$\frac{\Delta g}{g} = 0,222 \rightarrow \Delta g = 2,51 \ m/s^2 \simeq 2,5 \ m/s^2$

$$\boxed{g = (11 \pm 2,5) \ m/s^2}$$

2) $v = \sqrt{2gR}$ $v = 20,333 \ m/s$

$\frac{\Delta v}{v} = 0.114$ $\Delta v = 2,312 \ m/s \simeq 2,3 \ m/s$

$$\boxed{v = (20,3 \pm 2,3) \ m/s}$$

3) $\Delta(\sin\theta_1) = |\cos\theta_1| \cdot \Delta\theta_1 = 0,00636$

$\Delta\theta_1 = \Delta\theta_2 = 0,009$ rad

$$\boxed{\Delta(\sin\theta_1) = 0,006}$$

$$\boxed{\Delta(\sin\theta_2) = 0,008}$$

4) $n_2 = 2,06744$

$\frac{\Delta n_2}{n_2} = 0,02488 \rightarrow \Delta n_2 = 0,0514 \simeq 0,05$

$\boxed{n_2 = 2,07 \pm 0,05}$

5) $w_{best} = \overline{x} = 24,5$

$\Delta w = \sigma_{\overline{x}} = \frac{\sigma_x}{\sqrt{N}}$

$\Delta w = 0,1$

$\boxed{(24,5 \pm 0,1)\ g}$

6) $\frac{\Delta m_{sist}}{m} = 0,02 \qquad \Delta m_{sist} = 0,49\ g \simeq 0,5\ g$

$\Delta m_{tot} = 0,50\ g$

$\boxed{(24,5 \pm 0,5)\ g}$

7) Gli stessi del conto A

8) e 9) " " " "

10) $P(A) = \left(\frac{1}{2}\right)^8 = 0,0039$ $\qquad \boxed{P(A) \simeq 0,004}$

$P(B) = P(k=4, N=8)$ con $p = \frac{1}{2}$

$$P(B) = \frac{8!}{4!\,4!}\left(\frac{1}{2}\right)^4 \cdot \left(\frac{1}{2}\right)^4 = 70\left(\frac{1}{2}\right)^8 = 0{,}273$$

$$\boxed{P(B) = 0{,}273}$$

$$P(C) = \left(\frac{1}{2}\right)^8 = 0{,}0039$$

$$\boxed{P(C) \cong 0{,}004}$$

11) $\mu = 20$

$$\int_{-\infty}^{25} p(x)\,dx = 0.84 \qquad \text{ou} \qquad z_1 = \frac{25-20}{\sigma} = \frac{5}{\sigma}$$

$$\int_{-\infty}^{z_1} g(z)\,dz = 0.5 + \int_{0}^{z_1} g(z)\,dz = 0{,}84$$

$$\int_{0}^{z_1} g(z)\,dz = 0{,}34 \quad \rightarrow \quad z_1 = 1$$

$$1 = \frac{5}{\sigma} \quad \Rightarrow \quad \boxed{\sigma = 5} \qquad \sigma = 5\,kg$$

12)

$$\int_0^3 a(4x - x^2)\,dx = 1$$

$$2\,4a\left[\frac{x^2}{2}\right]_0^3 - a\left[\frac{x^3}{3}\right]_0^3 = 2a \cdot 9 - \frac{a}{3}\,{}^{9}\!\not{27} =$$

$$= 18a - 9a = 9a$$

$$9a = 1 \qquad \boxed{a = \frac{1}{9}}$$

13) $\mu = \int_0^3 x \cdot a(4x - x^2)\,dx =$ (4)

$= a\int_0^3 (4x^2 - x^3)\,dx =$

$= 4a\left[\frac{x^3}{3}\right]_0^3 - a\left[\frac{x^4}{4}\right]_0^3 =$

$= 4a \cdot \frac{27}{3_1}^{9} - a\,\frac{243}{5} = \left(36 - \frac{81}{4}\right)a =$

$= \frac{1}{9}\left(36 - \frac{81}{4}\right) = 4 - \frac{9}{4} = \frac{16-9}{4} = \frac{7}{4}$

$\boxed{\mu = \frac{7}{4}}$

$\sigma^2 = E[x^2] - \mu^2 = E[x^2] - \frac{49}{16}$

$E[x^2] = \int_0^3 a x^2(4x - x^2)\,dx =$

$= a\int_0^3 (4x^3 - x^4)\,dx =$

$= 4a\left[\frac{x^4}{4}\right]_0^3 - a\left[\frac{x^5}{5}\right]_0^3 =$

$= a \cdot 81 - a \cdot \frac{243}{5} = \frac{1}{9}\left(81 - \frac{243}{5}\right) =$

$= 9 - \frac{27}{5} = \frac{45-27}{5} = \frac{18}{5}$

$\sigma^2 = \frac{18}{5} - \frac{49}{16} = \frac{288-245}{80} = \frac{43}{80}$

$\boxed{\sigma^2 = \frac{43}{80}}$

14) $p = \frac{1}{6}$ $\qquad \mu = Np = 300 \cdot \frac{1}{6} = 50$

$$\sigma = \sqrt{Np(1-p)} = \sqrt{300 \cdot \frac{1}{6} \cdot \frac{5}{6}} = 6{,}455 \simeq 6{,}5$$

$$P(49{,}5 \leq x \leq 50{,}5) = \int_{49{,}5}^{50{,}5} p(x)\,dx = \int_{z_1}^{z_2} g(z)\,dz$$

$$z_1 = \frac{49{,}5 - 50}{6{,}5} = \frac{-0{,}5}{6{,}5} = -0{,}077 \simeq -0{,}08$$

$$z_2 = +0{,}08$$

$$= 2 \int_0^{0{,}08} g(z)\,dz = 2 \cdot 0{,}0319 = \boxed{0{,}0638} \approx 6\%$$

15) e 16) Cave eaempto A