

# Gestione della privacy (GDPR)

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Si consiglia in via generale di:

- silenziare il microfono e disattivare la videocamera se non necessari;
- prestare attenzione nell'utilizzo della funzione di condivisione dello schermo, onde evitare la visualizzazione di contenuti personali;
- non registrare le lezioni con dispositivi esterni alla piattaforma (es. il cellulare); si ricorda che è vietato registrare esami o sessioni di laurea.
- non utilizzare la piattaforma o la chat per comunicazioni non pertinenti al contenuto delle lezioni, per finalità estranee o per domande relative a carriera universitaria o altre situazioni personali;
- prestare attenzione all'inserimento di documenti, onde evitare di condividere contenuti protetti da copyright, non pertinenti alle lezioni o comunque personali;
- utilizzare la funzione di sfocatura dello sfondo se la videocamera è attivata e la partecipazione avviene da ambiente domestico.

Si raccomanda di visualizzare all'inizio della registrazione delle lezioni le indicazioni sopra riportate o comunque richiamarle.

# Link 31/03/2020

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- Link alle due lezioni registrate:
  - <https://drive.google.com/open?id=1AqCayGonzXsH5MtUzKFIUhIpacWcmYBN>
  - <https://drive.google.com/open?id=10T7FptU-DWUpuY5FUqYa6sOQRDsaKgwG>

# Lavagna 1 31/3

29 Mar 2020

$2.4\text{ s}, 2.3, 2.5, 2.4\text{ s}$  31/03/2020

$t = 2.4\text{ s}$   
 $2.3\text{ e } 2.5\text{ s}$

TEMPO MISURATO

$x_{\text{best}} - \delta x$

$x_{\text{best}} + \delta x$

$(2.4 \pm 0.1)\text{ s}$

$x_{\text{best}}$   $\delta x$

# Lavagna 2 31/3

09:36 Mar 31 mar

$g = (9,82 \pm 0,02) \text{ m s}^{-2}$

①

$\frac{0,01885}{0,02}$

$v = \frac{d}{t}$

$v_b = \frac{d_b}{t_b}$

$\delta v = f \begin{pmatrix} \delta d \\ \delta t \end{pmatrix}$

0,01 | 0,010 - 0,015 | 0,06 → 0,2

# Lavagna 3 31/3

The image shows a green chalkboard with handwritten mathematical work. At the top, the text "v41 Mar 31 mar" is visible. The main work consists of several lines of equations and corrections:

$$N_{\text{mis}} = \underline{\underline{6051.78}} \pm \underline{\underline{30}} \text{ m s}^{-1}$$
$$\underline{\underline{6051.78}} - \underline{\underline{6051.78}}$$
$$605X, \cancel{78}$$
$$\uparrow$$
$$6050 \pm 30$$
$$6056 \pm 30 \rightarrow 6060 \pm 30$$

# Lavagna 4 31/3

Handwritten mathematical notes on a green chalkboard. The notes are as follows:

- Top line:  $92, \underline{8} \pm 0,3^a$
- Second line:  $9\underline{3} \pm 3, \cancel{\times}$
- Third line: A box containing  $90 \pm 30$
- Fourth line:  $93 \cancel{\times} 30$  circled in white, with an arrow pointing up to the '3' in '93'.

The chalkboard interface includes a top status bar with the text '09:46 Mar 31 mar', a battery icon at 68%, and various utility icons (eraser, settings, trash, stars) on the left and right sides.

# Lavagna 5 31/3

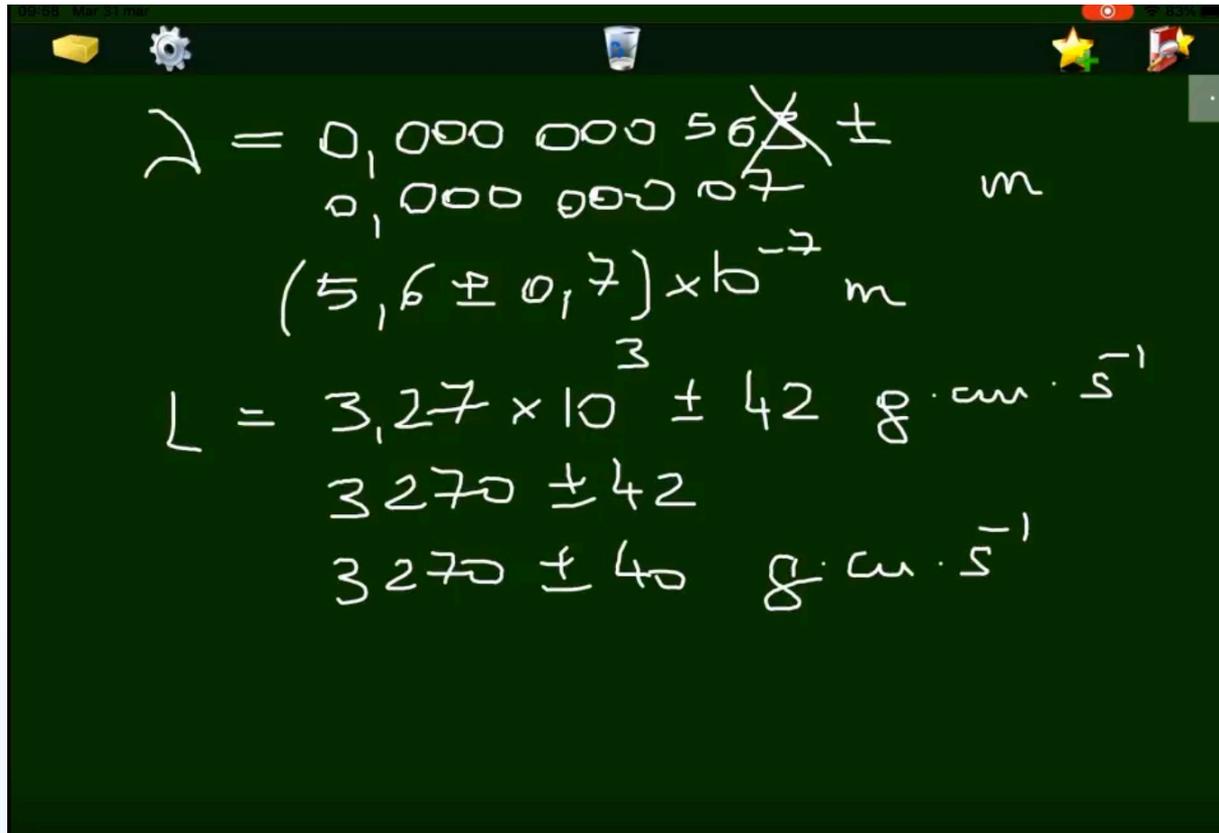
2.2  $5,03 \pm 0,04329 \text{ m}$   
 $(5,03 \pm 0,04) \text{ m}$

$19,5432 \pm 1 \text{ s}$        $20 \pm 1 \text{ s}$   
 $19 \pm 1 \text{ s}$

$19,5 \pm 1,0 \text{ s}$

$-3,21 \times 10^{-19} \pm 2,67 \times 10^{-20} \text{ C}$   
 $-32 \times 10^{-20} \pm 27 \times 10^{-20} \text{ C}$   
 $(-32 \pm 3) \times 10^{-20} \text{ C}$

# Lavagna 6 31/3



The image shows a green chalkboard with handwritten mathematical expressions. At the top, there are several small icons: a yellow cube, a gear, a glass of water, a yellow star, and a red star. The main content consists of three lines of text:

$$\lambda = \frac{0,000\ 000\ 56 \pm 0,000\ 000\ 07}{(5,6 \pm 0,7) \times 10^{-7}} \text{ m}$$
$$L = 3,27 \times 10^3 \pm 42 \text{ g} \cdot \text{cm} \cdot \text{s}^{-1}$$
$$3270 \pm 42$$
$$3270 \pm 40 \text{ g} \cdot \text{cm} \cdot \text{s}^{-1}$$

# Lavagna 7 31/3 - 2<sup>a</sup> ora

2.3

1.8 2.0 2.0 1.9 1.8

MISURA  $x_b \pm \delta x$

1.9  $\pm 0.1$  g cm<sup>-3</sup>

1.85 g cm<sup>-3</sup>

DISCREPANZA

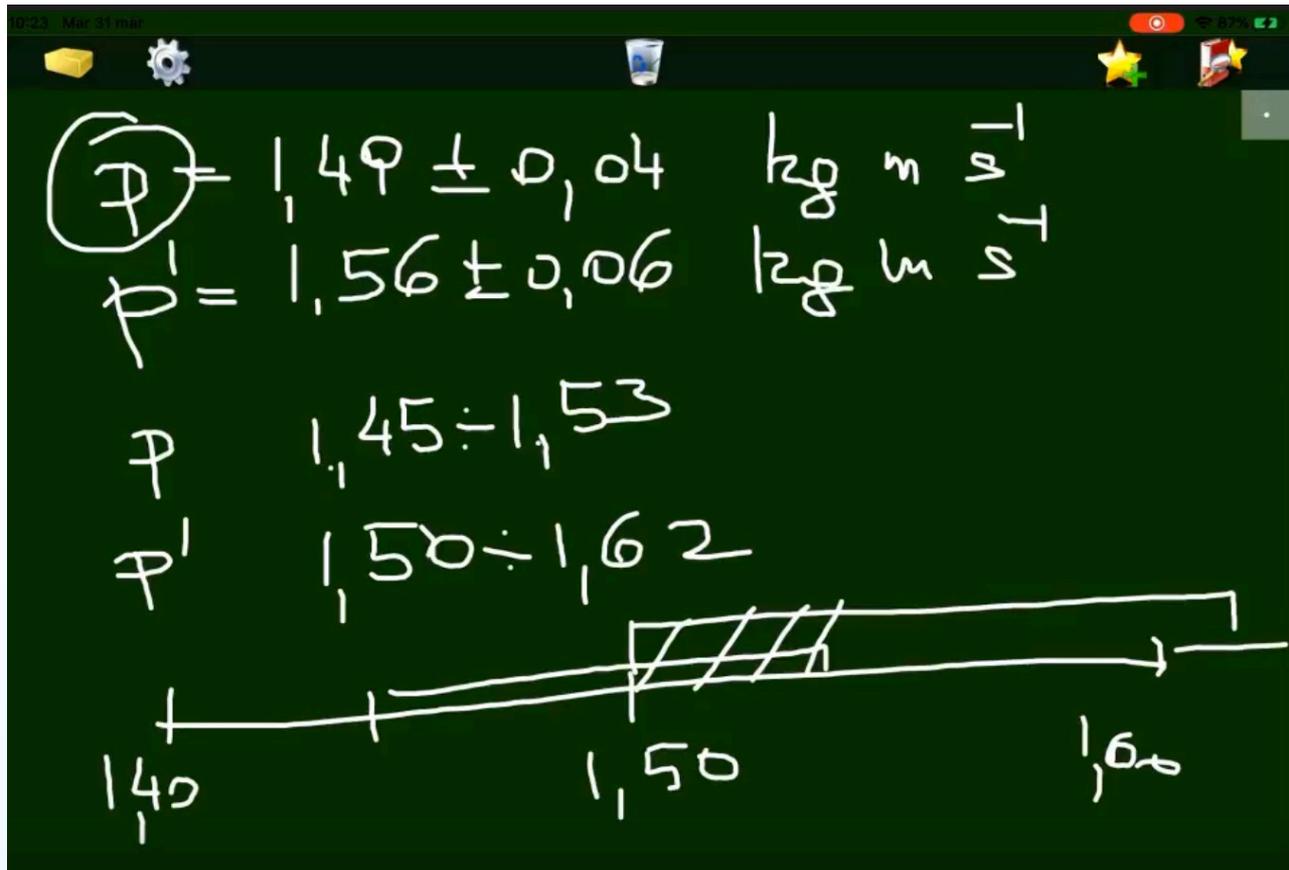
1.8 - 2.0

g cm<sup>-3</sup>

g cm<sup>-3</sup>

The image shows a green chalkboard with handwritten notes. At the top left, the number '2.3' is written. Below it, a list of five measurements is written: '1.8 2.0 2.0 1.9 1.8'. Underneath the list, the word 'MISURA' is written, followed by the mathematical expression  $x_b \pm \delta x$ . Below this, the value '1.9 ± 0.1' is written, with 'g cm<sup>-3</sup>' to its right. A white oval is drawn around the value '1.85 g cm<sup>-3</sup>'. Below this oval, the word 'DISCREPANZA' is written. To the right of 'DISCREPANZA', another white oval is drawn around the calculation '1.8 - 2.0'. To the right of this oval, the units 'g cm<sup>-3</sup>' are written. There are also some additional 'g cm<sup>-3</sup>' units written further to the right on the board. The board has a dark green background and some icons at the top, including a yellow cube, a gear, a trash can, a star, and a flag.

# Lavagna 8 31/3 - 2<sup>a</sup> ora



# Lavagna 9 31/3 – 2<sup>a</sup> ora

The image shows a green chalkboard with handwritten notes. At the top, there are icons for a yellow eraser, a gear, a trash can, a star, and a red star. The notes are organized into two columns, labeled 'P' and 'P''.

	P	P'	
1	1,49	1,56	✓
2	2,10	2,12	✓
3	1,16	1,05	~✓
	$\pm 0,04$	$\pm 0,06$	
	$1,12 = 1,2$	$0,99 \div 1,1$	

The error bars  $\pm 0,04$  and  $\pm 0,06$  are circled in white. The calculations  $1,12 = 1,2$  and  $0,99 \div 1,1$  are also circled in white.

# Lavagna 10 31/3 - 2<sup>a</sup> ora

$(\Delta p) = p - p'$

$p_b, p'_b$   
 $\delta p, \delta p'$

$\Delta \phi = p_b - p'_b$

$\delta_{\Delta \phi}$

$(p_b + \delta p) \rightarrow p_b - \delta p$   
 $(p'_b - \delta p') \rightarrow p'_b + \delta p'$

**MAX  $\Delta \phi$**

$\Delta \phi^{\text{MAX}} = p_b + \delta p - (p'_b - \delta p')$   
 $= p_b - p'_b + (\delta p + \delta p')$

**MIN  $\Delta \phi$**

$\Delta \phi^{\text{MIN}} = p_b - \delta p - (p'_b + \delta p') =$   
 $= p_b - p'_b - (\delta p + \delta p')$

20:26 / 46:59

# Lavagna 11 31/3 - 2<sup>a</sup> ora

(misura  $\Delta p$ ) =  $\Delta p_b \pm \delta(\Delta p)$

$$\Delta p_b = p_b \cdot p'_b$$
$$\delta(\Delta p) = \delta p + \delta p'$$

1,49	1,56	$-0,02 \pm 0,10$
2,10	2,12	$-0,02 \pm 0,10$
1,16	1,05	$0,11 \pm 0,10$
		<del><math>-0,1 \pm 0,1</math></del>

▶ 🔊 24:06 / 46:59

# Lavagna 12 31/3 – 2<sup>a</sup> ora

$\Delta \phi = p - p' \rightarrow 0$   
 $R = \phi / \phi' \rightarrow 1$

$\Delta$  → in certezze  
 $\Delta$  → DIFF.

$\Delta t$        $\Delta x$

# Lavagna 13 31/3 - 2<sup>a</sup> ora

MISURA  $x \pm \delta x$

~~INCERTIZZA~~ ~~FRADIZIALE~~

ERRORE RELATIVO

$$\frac{\delta x}{x_b} \quad \ell = 50 \pm 1 \text{ cm}$$
$$x_b = 50 \text{ cm}$$
$$\frac{\delta x}{x_b} = \frac{1}{50} = 0,02$$
$$= 2\%$$

0,002	0.2%
	2%

33:41 / 46:59

# Lavagna 14 31/3 - 2<sup>a</sup> ora

11:52 Mar 31 mar 99%

$\mu_i$	$\mu_f$	$\mu_i - \mu_f$	$\mu \bar{s}'$
1) $\textcircled{14.0}$	18.0	$-4.0 \pm 0.3$	$\delta \bar{i}_0$
2) 19.0	19.6	$-0.6 \pm 0.4$	
		<u><u><math>-4.0 \pm 0.3</math></u></u>	
		$\frac{0.3}{ -4.0 } = \frac{0.3}{4} = 0.075$	$\frac{0.15}{1/2} = 0.075$
			$= 0.075 = 0.08 = 8\%$
		$-0.6 \pm 0.4$	
		$\frac{0.4}{0.6} = \frac{4}{6} = 0.67 = 0.7$	$= 70\%$