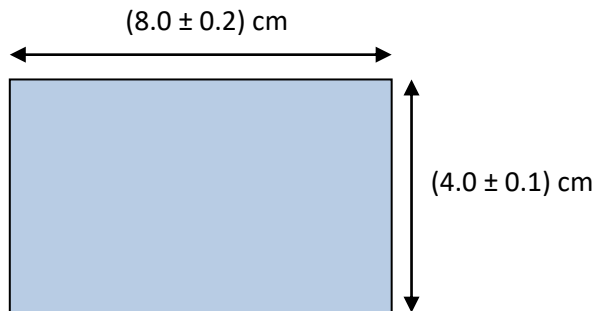


Quiz 0

Uncertainties and vectors

- The average number of beats of the heart of a person is 80 per minute. The person will live for 90 years. How many times will the heart of this person beat?
 A 10^5 B 10^7 C 10^9 D 10^{11}
- A grain of sand has a radius of 1 mm. The radius of a planet is 2×10^3 km. How many grains of sand fit in the volume of this planet?
 A 10^{18} B 10^{19} C 10^{27} D 10^{28}
- Jupiter is a distance 8×10^8 km from the Sun. How long does light from the Sun take to reach Jupiter?
 A 27 min B 44 min C 270 s D 440 s
- A rectangle is measured to have the dimensions shown.



What is the perimeter of the rectangle?

- (24 ± 0.6) cm
 - (24.0 ± 0.6) cm
 - (24.0 ± 0.60) cm
 - (24.0 ± 0.3) cm
- The radius of a circle is measured as (25.0 ± 0.5) cm. What is the percentage uncertainty in the area of the circle?
 A $2\pi\%$ B $4\pi\%$ C 2% D 4%

6. The radius of a sphere and the length of a side of a cube are both measured to be $10 \text{ cm} \pm 5 \%$.

What are the ratios $\frac{\text{volume of sphere}}{\text{volume of cube}}$ and $\frac{\text{percentage uncertainty in volume of sphere}}{\text{percentage uncertainty in volume of cube}}$?

	$\frac{\text{volume of sphere}}{\text{volume of cube}}$	$\frac{\text{percentage uncertainty in volume of sphere}}{\text{percentage uncertainty in volume of cube}}$
A	1	1
B	1	$\frac{4\pi}{3}$
C	$\frac{4\pi}{3}$	1
D	$\frac{4\pi}{3}$	$\frac{4\pi}{3}$

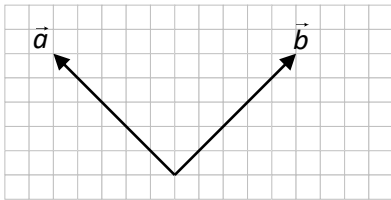
7. A distance of about 5 cm needs to be measured with a precision of 0.01 cm. What instrument should be used for this measurement?

- A** Vernier calipers
- B** Micrometer
- C** Ruler
- D** Tape measure

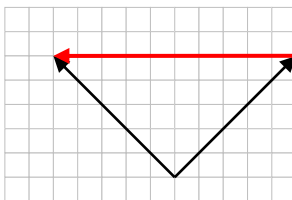
8. Which will likely reduce random and systematic errors in a measurement?

	Random	Systematic
A	Average over many trials	Average over many trials
B	Average over many trials	Check calibration of instrument
C	Check calibration of instrument	Average over many trials
D	Check calibration of instrument	Check calibration of instrument

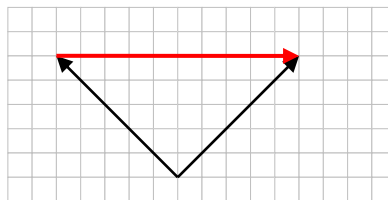
9. The diagram shows two vectors \vec{a} and \vec{b} .



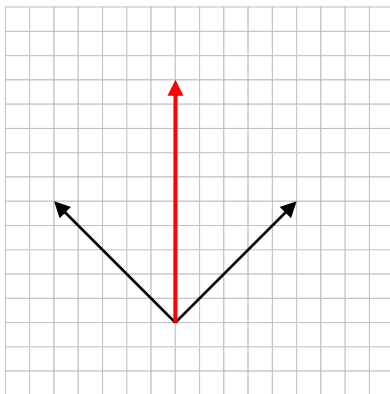
Which vector is $\vec{a} - \vec{b}$?



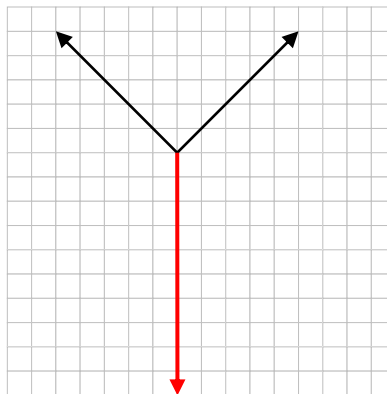
A



B

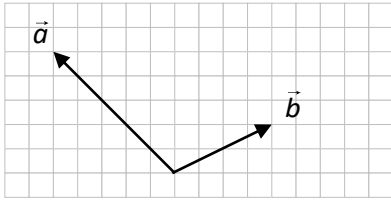


C

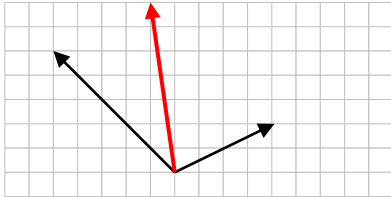


D

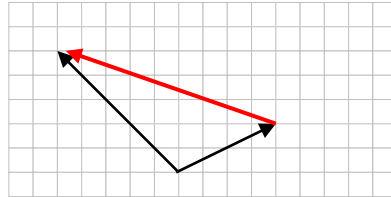
10. The diagram shows two vectors \vec{a} and \vec{b} .



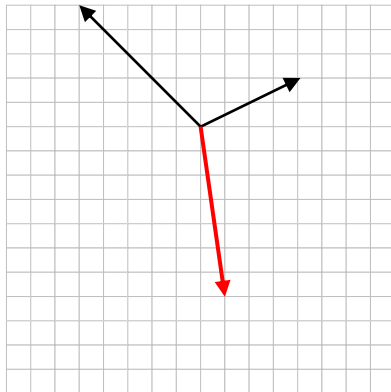
Which vector \vec{c} is such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$?



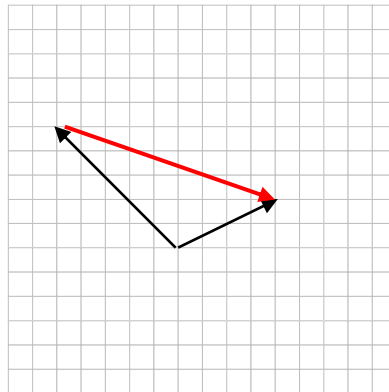
A



B



C



D

Answers Quiz 0	
1	C
2	D
3	B
4	B
5	D
6	C
7	A
8	B
9	A
10	C