

# PHYS 211 College Physics I

## Exam 1B

September 20, 2017

Name J. G. DALY

1. The length of an object is divided into 3 parts. Each part is measured to determine the total length. The first part is 313 cm long. The second part is 70.1 m long, and the third part is 45.6 mm long.

- a. What is the total length of the object? 73.3 m
- b. How many significant digits should be used to describe the total length? 3

### Grades

100	100,100,100,100 100,100,100,100
98	
	96,96,96,96 95,95
	94 93
90	91
	88 87
	85
80	80,80

$$\begin{array}{r} 313 \text{ cm} = 3.13 \text{ m} \\ 70.1 \text{ m} = 70.1 \text{ m} \\ 45.6 \text{ mm} = 0.0456 \text{ m} \\ \hline 73.2756 \end{array}$$

Not known with  
certainty

$$\text{Total Length} = 73.3 \text{ m}$$

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## Exam 1A

September 20, 2017

2. Mary Smart is 5ft 5in tall. How tall is she in meters? \_\_\_\_\_

$$1 \text{ ft} = 0.3048 \text{ m}$$

$$1 \text{ in} = 0.0254 \text{ m}$$

$$5 \text{ ft} \times \frac{0.3048 \text{ m}}{\text{ft}} + 5 \text{ in} \times \frac{0.0254 \text{ m}}{\text{in}}$$

$$= 1.524 + 0.127$$

$$5 \text{ ft } 5 \text{ in} = \begin{array}{r} 1.524 \\ + 0.127 \\ \hline 1.651 \text{ m} \end{array}$$

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## Exam 1B

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3. A hiker walks 1.50 km west. He then turns around and walks 2.30 km due east. He turns again and walks 0.50 km west.

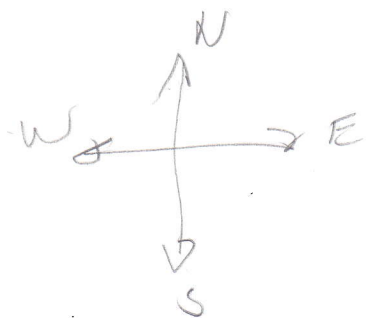
a. What distance did he walk? 4.30 km

b. What is his final displacement relative to his initial displacement? 0.30 km EAST

$$\text{DISTANCE} = 1.50 + 2.30 + 0.50 = 4.30 \text{ km}$$

$$\text{DISPLACEMENT} = -1.50\hat{x} + 2.30\hat{x} - 0.50\hat{x} = 0.3\text{km}\hat{x}$$

EAST



# Conversion Factors to SI Units

Google is great for converting units. For example, to convert 10 feet to meters, type "10 ft in m" into google.

## Acceleration

$$1 \text{ ft/s}^2 = 0.3048 \text{ m/s}^2$$

$$g = 9.807 \text{ m/s}^2$$

## Area

$$1 \text{ acre} = 4046.86 \text{ m}^2$$

$$1 \text{ ft}^2 = 9.290 \times 10^{-2} \text{ m}^2$$

$$1 \text{ in}^2 = 6.45 \times 10^{-4} \text{ m}^2$$

$$1 \text{ mi}^2 = 2.59 \times 10^6 \text{ m}^2$$

## Density

$$1 \text{ g/cm}^3 = 10^3 \text{ kg/m}^3$$

## Energy

$$1 \text{ Btu} = 1054 \text{ J}$$

$$1 \text{ calorie (cal)} = 4.184 \text{ J}$$

$$1 \text{ electron volt (eV)} = 1.602 \times 10^{-19} \text{ J}$$

$$1 \text{ foot pound (ftlb)} = 1.356 \text{ J}$$

$$1 \text{ kilowatt hour (kWh)} = 3.60 \times 10^6 \text{ J}$$

## Force

$$1 \text{ dyne} = 10^{-5} \text{ N}$$

$$1 \text{ lb} = 4.448 \text{ N}$$

## Length

$$1 \text{ angstrom (\AA)} = 10^{-10} \text{ m}$$

$$1 \text{ ft} = 0.3048 \text{ m}$$

$$1 \text{ in} = 2.54 \times 10^{-2} \text{ m}$$

$$1 \text{ light year} = 9.461 \times 10^{15} \text{ m}$$

$$1 \text{ mile} = 1609 \text{ m}$$

## Mass

$$1 \text{ atomic mass unit (u)} = 1.60606 \times 10^{-27} \text{ kg}$$

$$1 \text{ gram} = 10^{-3} \text{ kg}$$

## Power

$$1 \text{ Btu} = 1054 \text{ W}$$

$$1 \text{ cal/s} = 4.184 \text{ W}$$

$$1 \text{ ftlb/s} = 1.356 \text{ W}$$

$$1 \text{ horsepower (hp)} = 746 \text{ W}$$

## Pressure

$$1 \text{ atmosphere (atm)} = 1.013 \times 10^5 \text{ pascal (Pa)}$$

$$1 \text{ bar} = 10^5 \text{ Pa}$$

$$1 \text{ cmHg} = 1333 \text{ Pa}$$

$$1 \text{ lb/ft}^2 = 47.88 \text{ Pa}$$

$$1 \text{ lb/in}^2 \text{ (psi)} = 6895 \text{ Pa}$$

$$1 \text{ N/m}^2 = 1 \text{ pascal (Pa)}$$

$$1 \text{ torr} = 133.3 \text{ Pa}$$

## Speed

$$1 \text{ ft/s (fps)} = 0.3048 \text{ m/s}$$

$$1 \text{ km/h} = 0.2778 \text{ m/s}$$

$$1 \text{ mi/hr (mph)} = 0.44704 \text{ m/s}$$

## Temperature

$$T_{\text{Kelvin}} = T_{\text{Celsius}} + 273.15$$

$$T_{\text{Kelvin}} = (9/5) * (T_{\text{Fahrenheit}} + 459.67)$$

$$T_{\text{Celsius}} = (5/9) * (T_{\text{Fahrenheit}} - 32)$$

$$T_{\text{Kelvin}} = (5/9) * T_{\text{Rankine}}$$

## Time

$$1 \text{ day} = 86400 \text{ s}$$

$$1 \text{ year} = 3.16 \times 10^7 \text{ s}$$

## Volume

$$1 \text{ ft}^3 = 2.832 \times 10^{-2} \text{ m}^3$$

$$1 \text{ gallon} = 3.785 \times 10^{-5} \text{ m}^3$$

$$1 \text{ in}^3 = 1.639 \times 10^{-5} \text{ m}^3$$

$$1 \text{ liter} = 10^{-3} \text{ m}^3$$