

Physics 20

Skill Booklet

![C:\Users\michelle.wotherspoon.WOLFCREEK\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\NOAFO7E2\little-shop-of-physics[1].jpg]()

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| **What is your reason for taking Physics 20?** | **What do you want to get from this class?** |
| **How do you plan to be successful?** | C:\Users\michelle.wotherspoon.WOLFCREEK\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\NOAFO7E2\Blue-waves[1].jpg**If you could do anything, what would you do?** |

**SI Units**

International system of physical units ( *SI Units* ) based on the meter, kilogram, second, ampere, kelvin, candela, and mole, together with a set of prefixes to indicate multiplication or division by a power of ten.

Mass is measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Length is measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Time is measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Scientific Notation**

Scientific Notation is a way of writing numbers that are too big or too small to be conveniently written in decimal form. Scientific notation is commonly used in calculators and by scientists, mathematicians and engineers. Note the TI Calcualtors as E instead of 

|  |  |
| --- | --- |
| **Decimal notation** | **Scientific notation** |
| 2 | 2×100 |
| 300 | 3×102 |
| 4,321.768 | 4.321768×103 |
| −53,000 | −5.3×104 |
| 6,720,000,000 | 6.72×109 |
| 0.2 | 2×10−1 |
| 0.000 000 007 51 | 7.51×10−9 |

Express the following in scientific notation

1. 4 320 000
2. 0.0048
3. 43 200
4. 0.000065
5. 18 500 000 000
6. 103
7. 15.3
8. 0.2058

**Conversions**

|  |  |
| --- | --- |
|  | TimeVelocity |

Convert the following

1. 35 mm = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m
2. 450 cm = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ m
3. 1596 km = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_m
4. 1560 g = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_kg
5. 543 mg = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_kg
6. 4 hours = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_s
7. 3 days =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_s
8. 75 minutes = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_s
9. 30 km/h = \_\_\_\_\_\_\_\_m/s
10. 12.5 m/s = \_\_\_\_\_\_\_\_km/h

**Significant Digits (Sig Digs)**

* All non-zero digits are significant
* Zeros between non-zero digits are significant.
* Leading zeros are never significant.
* In a number with a decimal point, trailing zeros, those to the right of the first non-zero digit, are significant.
* In a number without a decimal point, trailing zeros may or may not be significant. More information through additional graphical symbols or explicit information on errors is needed to clarify the significance of trailing zeros.

Examples

|  |  |
| --- | --- |
| **Value** | **Sig Digs** |
| 91 | 2 |
| 101.1203 | 7 |
| 12.2300 | 6 |
| 0.00058 | 2 |
| 1300 | 4 |
|  | 3 |
|  | 2 |

State the number of significant digits

|  |  |
| --- | --- |
| **Value** | **Sig Digs** |
| 563 |  |
| 9.0503 |  |
| 0.00698 |  |
| 5.00 |  |
| 9000 |  |
|  |  |
|  |  |

Working with measurements

* **multiplication** and **division**, the calculated result should have as many significant figures as the *measured* number with the *least* number of significant figures. For example,

1.234 × 2.0 = 2.468… ≈ 2.5,

* **addition** and **subtraction**, the last significant [*decimal place*](https://en.wikipedia.org/wiki/Positional_notation) (hundreds, tens, ones, tenths, and so forth) in the calculated result should be the same as the*leftmost* or largest *decimal place* of the last significant figure out of all the *measured* quantities in the terms of the sum. For example,

100.0 + 1.234 = 101.234… ≈ 101.2

**ALWAYS ROUND AT THE END OF EVERY CALCULATION**

Complete the following and round to the correct amount of significant digits

1. 59.65g + 100.3 g
2. 432.2 m + 24.04 m
3. 
4. =
5. =

**Graphing**

When graphing data remember to always include the following

 - a title

 - label axes, include units

 - uniform scale on the axes

 - plot points; draw a line of best fit if needed.

Graph the following data and determine the slope of the line of best fir

|  |  |
| --- | --- |
| **Time (s)** | **Distance (m)** |
| 0.0 | 0.0 |
| 1.2 | 6.0 |
| 5.8 | 27.5 |
| 12.5 | 62.5 |
| 18.9 | 94.5 |
| 23.4 | 117 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Solving Equations**

Determine the value of *x* in the following equations.

1. 
2. 
3. 

**Manipulating Equations**

Isolating a specified variable in a formula, for example isolate the *t* in the distance formula



Solve the following equations for the indicated variable.

* 1.  for *m*
	2. 

c. 

 d. 