**Physics 30 – Lesson 4**

**Graphing for Fun and Profit**

/ 49

**Practice problems**

1)

|  |  |
| --- | --- |
| FN (N) | Ff (N) |
| **2.0**  **4.0**  **6.0**  **8.0**  **10.0**  **12.0** | **0.72**  **1.3**  **2.1**  **2.9**  **3.4**  **4.2** |

Ff (N)

Ff vs. FN

4

3

2

1

0

0 2 4 6 8 10 12

FN (N)

•

•

•

•

•

FN = 6.0 N

Ff = 2.0 N

•



2)

|  |  |  |
| --- | --- | --- |
| r(m) |  |  |
| **0.20**  **0.40**  **0.60**  **0.80**  **1.0** | **25**  **6.25**  **2.8**  **1.6**  **1.0** | **45**  **11**  **5.0**  **2.8**  **1.8** |



vs. 1/r

40

30

20

10

0

0 5 10 15 20 25 30

1/r2 (1/m2)

•

•

•

•

checkmark

checkmark

checkmark

checkmark

checkmark

checkmark

checkmark



•



**Assignment**

1)

checkmark

|  |  |  |
| --- | --- | --- |
| Force (N) | Speed (m/s) | v2 (m2/s2) |
| **0.60**  **2.40**  **5.40**  **9.60**  **15.0** | **1.0**  **2.0**  **3.0**  **4.0**  **5.0** | **1.0**  checkmark  **4.0**  **9.0**  **16**  **25** |

Fc (N)

Force vs. speed2

20

15

10

5

0

0 5 10 15 20 25 30 35

v2 (m2/s2)

•

•

•

•

•

v2 = 15.0 m2/s2

Fc = 9.0 N

checkmark

checkmark

checkmark

checkmark

checkmark

checkmark

checkmark

/12

checkmark



checkmark

checkmark

2)

Note inverse relation

checkmark

checkmark

|  |  |  |
| --- | --- | --- |
| f (Hz) |  (m) | 1/ (1/m) |
| **5**  **10**  **15**  **20**  **25**  **30** | **2.4**  **1.2**  **0.8**  **0.6**  **0.5**  **0.4** | **0.42**  **0.83**  **1.25**  **1.67**  **2.0**  **2.5** |

f (Hz)

Frequency vs. 1/

40

30

20

10

0

0 .5 1.0 1.5 2.0 2.5

1/ (1/m)

checkmark

•

•

•

•

•

•

 = 1.17 1/m

f = 14.1 1/s

checkmark

checkmark

checkmark

checkmark

checkmark

/10



checkmark

checkmark

3)

checkmark



checkmark

Force ()

Force vs. Mass

4

3

2

1

0

0 5 10 15 20 25

Mass (kg)

checkmark

•

•

•

•

•

•

•

•

•

•

•

F = 2.0 x 10-6 N

m = 15 kg

checkmark

checkmark

checkmark

checkmark

/13

checkmark

checkmark



checkmark

checkmark

4)

checkmark

checkmark

|  |  |  |
| --- | --- | --- |
| r(m)  checkmark |  |  |
| **0.02**  **0.03**  **0.04**  **0.05**  **0.06**  **0.07**  **0.08**  **0.09**  **0.10**  **0.11**  **0.12** | **2500**  **1111**  **625**  **400**  **278**  **204**  **145**  **123**  **100**  **83**  **69** | **66.7**  checkmark  **29.6**  **16.7**  **10.7**  **7.41**  **5.44**  **4.17**  **3.29**  **2.67**  **2.20**  **1.85** |

/14

checkmark

Force ()

Force vs. 1/r

80

60

40

20

0

0 1000 2000 3000

1/r(1/m)





checkmark

checkmark

checkmark

checkmark

•

•

•

checkmark

checkmark

checkmark

•

checkmark

checkmark

checkmark

checkmark

checkmark

checkmark

checkmark



checkmark

checkmark

checkmark

checkmark