**Center Of Mass**

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|  | Teeter Totter Equation: |
| .73 Kg | 1. The center of mass between two objects is 12 cm from the one with a mass of 3.4 Kg. What is the mass of the other one if it is 56 cm from the COM? |
| 1.02 x 1032 Kg | 2.A star is seen rotating about a point that is 4.2 x 109 m from its center. We can tell by its light output that it has a mass of 7.5 x 1031. What is the mass of the black hole in orbit around the star if it is 3.1 x 109 m from the COM? |
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|  | The COM Equation |
| 22.7 cm | 3. How far is the COM from the larger of a 12 lb bowling ball and a 10 lb bowling ball that are 50 cm distant?  |
| 37.5 cm | 4. A 5 Kg mass is on the 0 end of a meter stick, and a 3 Kg mass is on the 100 and of the stick. Where is the COM? (Neglect the mass of the meter stick) |
| 18.5 feet | 5. A 165 lb and 120 lb person sit on a see saw that is 32 feet long. How far is the balance point from the lighter person? |
| 7.43 x 105 km | 6. How far is the center of mass of the sun and Jupiter from the center of the sun? (Look up info on the table I gave you - the sun has a mass of 1.99 x 1030 Kg, and remember, Earth has a mass of 5.98 x 1024 Kg.) |
| At the 36.3 cm mark | 7. Someone clamps a 50 gram mass to the 15 cm mark of a 78 gram meter stick. Where is the center of mass of the meter stick and mass? (Treat the meter stick as a 78 gram mass at the 50 cm mark) More than two objects: (Use equation 8-7) |
| At the 45.2 cm mark | 8. Someone puts a 45 gram clamp at the 12 cm mark and a 75 gram clamp at the 60 cm mark of a 82 gram meter stick. Where is the COM of the system now? |
| 7.98 x 105 m | 9. How far is the COM of the four inner planets and the sun from the center of the sun? (If they all lined up |
| 66 feet from the ground | 10. Where is the COM of a 120 foot, 495 lb ladder with a 220 lb fireman 12 feet up, a 170 lb fireman 50 feet up and a 150 lb fireman all the way at the top? (The COM of the ladder is 80 feet from the ground) |
| 8.4 feet from the stern | 11. Where is the COM of a loaded 89 lb 18 foot canoe when there is a 160 lb person 1.5 feet from the stern, a 90 lb pack 9 feet from the stern, and a 140 lb bow person 15.5 feet from the stern? (Consider the canoe to be symmetric) |
|  | 12. (Extra credit) Devise a way to find the center of mass of any triangle using a straight edge, a compass, and a divider. Explain this method. (Cut out your triangle from cardboard, and see if it balances on that point you've found. If it doesn't...try again) |