

October 2007

The Mr. Short / Mr. Tall Puzzle

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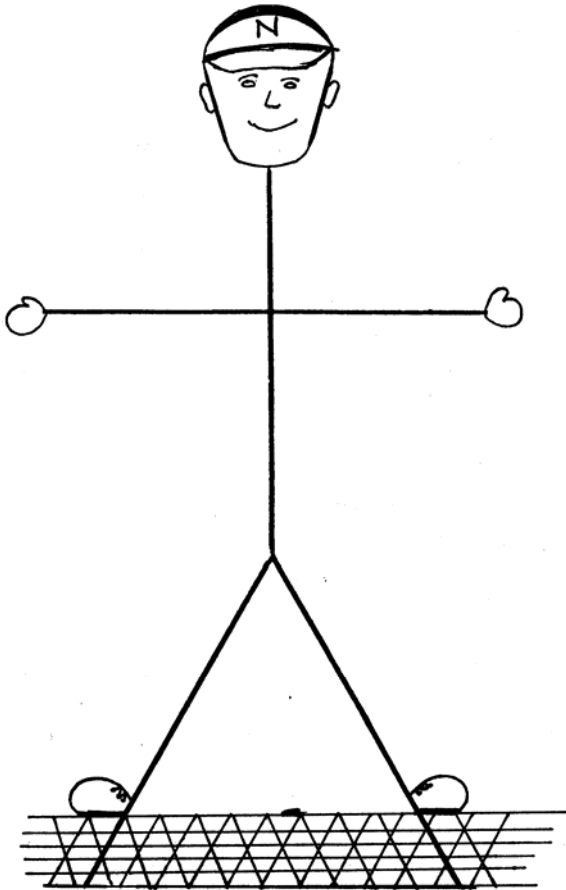
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The Mr. Short / Mr. Tall Puzzle

The figure below is called Mr. Short. We used large round buttons laid side-by-side to measure Mr. Short's height, starting from the floor between his feet and going to the top of his head. His height was four buttons. Then we took a similar figure called Mr. Tall and measured it in the same way with the same buttons. Mr. Tall was six buttons high.

Mr. Short



Now please do these things:

1. Measure the height of Mr. Short using paper clips in a chain provided.

The height is _____

2. Predict the height of Mr. Tall if he were measured with the same paper clips.

3. Explain how you figured out your predictions. (You may use diagrams, words, or calculations. Please explain your steps carefully.)

When you have completed this puzzle, examine the collection of student responses.

Mr. Short/Mr. Tall - Students' Responses

Student A1 (Age 16)

Prediction for Mr. Tall: 9

Explanation: "Figured it out by seeing that Mr. Tall is half again as tall as Mr. Short, so I took half of Mr. Short's height in clips and added it on to his present height in clips and came up with my prediction."

Student A2 (Age 16)

Prediction for Mr. Tall: 9 paper clips

Explanation: "I figured that the ratio of paper clips to buttons to be approximately 1-1/2; so two more buttons would make approximately 3 more clips. Since it's 1-1/2:1, he is approximately 9 clips tall."

Student A3 (Age 16)

Prediction for Mr. Tall: 9 clips

Explanation: "I took the relationship of the clips to the buttons on Mr. Short and the unknown clips to buttons of Mr. Tall and found the unknown, algebraically."

Student A4 John Blake (Age 16)

Prediction for Mr. Tall: 9 paper clips

Explanation: "Mr. Tall is 1.5 times the height of Mr. Short, as measured with buttons, and if the measurement techniques were identical, would be 1.5 times Mr. Short's height with any measurement medium. Assuming that the measurement techniques are identical, Mr. Tall's height in clips is 1.5×6 , which is 9."

Student A5 Barbara Downing (Age 21)

Prediction for Mr. Tall: 9 paper clips

Explanation: "The ratio using buttons of height of Mr. Short and Mr. Tall is 2.3. Figuring out algebraically and solving for x : $\frac{2}{3} = \frac{6}{x}$, gives you 9 as the height in paper clips."

Student A6 Delores Johnson (Age 19)

Prediction for Mr. Tall: 9 paper clips tall

Explanation: "I figured this out by figuring that Mr. Small is $\frac{2}{3}$ as tall as Mr. Tall."

Student B1 (Age 16)

Prediction for Mr. Tall: 8 clips

Explanation: "If he is 2 buttons taller, I guess he is 2 clips bigger, which would make it 8."

Student B2 (Age 18)

Prediction for Mr. Tall: 8 clips

Explanation: "Because he is two times as high as Mr. Short."

Student B3 David Kenting (Age 19)

Prediction for Mr. Tall: 9

Explanation: "I figured the buttons the same size as the clips."

Student B4 (Age 16)

Prediction for Mr. Tall: 12 clips

Explanation: "Mr. Tall was 12 buttons taller than Mr. Short. The buttons must be larger than the paper clips. So I doubled Mr. Short's height in paper clips for Mr. Tall's height."

Student B5 Norma Kuhn (Age 20)

Prediction for Mr. Tall: 8 clips

Explanation: "Mr. Tall is 8 paper clips tall because when using buttons as a unit of measure he is 2 units taller. When Mr. Short is measured with paper clips as a unit of measurement he is 6 paper clips. Therefore, Mr. Tall is 2 units taller in comparison, which totals 8."

Student B6 Harold (Age 20)

Prediction for Mr. Tall: 8 paper clips tall

Explanation: "If Mr. Short measures 4 buttons or 6 paper clips (2 pieces more than buttons), then Mr. Tall should be 2 paper clips more than buttons."

Student B7 (Age 25)

Prediction for Mr. Tall: 8 paper clips tall

Explanation: "4 buttons reached top of Mr. Short's head. Mr. Tall is 6 buttons tall. 6 paper clips Mr. Short. Mr. Tall is 8 paper clips tall. Paper clips are approximately 1 inch long and the buttons were probably the same."

Student B8 (Age 15)

Prediction for Mr. Tall: 8 paper clips tall

Explanation: "As 4 is to 6, 6 is to 8."

Questions:

1. What comparisons can you make between your response and those of the students?
Record those comparisons here.

2. Center your attention on several of those responses which were different from yours.
See if you can detect any common elements among the responses that disagree with
yours. Record those common elements here.

3. Center your attention on those responses which agree with yours and see if you can
detect any common elements among the student responses and your response.

4. Compare Type A responses to Type B responses.

Now proceed to another puzzle or the self-check on page Module 1, Page 2.