AMTNJ's 2nd Annual Middle School Math Contest
December 4, 2013 - Solutions

1.) 5.2 ; $\frac{!\,!"\#\$}{!!.!\,!"\#\$\%\&'} \cdot \frac{!"\,!"\#\$\%\&'}{!\,!!.} = \frac{!"\,!"\#\$\%}{!!.!\,!!.} \approx 5.2$

2.) 3, 36, 350; 3 for the number of people; 3*12 = 36; 350 lbs was the maximum weight

3.) 5; $3 \div \frac{!}{!}$

4.) $c, e, -\frac{2}{5}$ **or** $e, c, -\frac{!}{5}$**;** Slopes for other lines are line a: $\frac{!}{!}$; line b: $\frac{!}{!}$; line d: $\frac{!}{!}$; line f: zero; line g: undefined

5.) $m = \frac{E}{c^2}$ **or** $\frac{E}{c^2} = m$**;** Divide both sides by c^2

6.) *y*-axis, (0, 12) or vertical axis, (0, 12); y---axis cuts parabola in half; highest point is (0, 12)

7.) 6; 48 divided by 6 trapezoids ➔➔ Using 30---60---90 ⊗, base of triangle =2. There are two triangles which = 4 cm and add 2 cm from rectangle. The sum then is 6 cm.

8.) $y, -2x$ **or** $-2x, y$; $8(4x + 3y) = 32x + 24y + 5x + 3y = 37x + 27y$; add y and subtract 2x

9.) $\frac{77}{18}$**;** 11*7 = 77 and 6*3 = 18

10.) 3, $-\frac{1}{4}$**, 1 or 3, 1,** $-\frac{1}{4}$**;** Factor out a 3 to get 3(4x---1); so, $3V = V^2$; $V^2 - 3V = 0$; $V(V - 3) = 0$; V = 0, 3; V = 4x---1; 4x---1 =0; x = ¼. 4x---1=3; 4x=4; x=1

11.) $156.58, $174.66; 169 *.8 = 135.2; 135.2 * 1.07=144.66+30 and 169*.7 = 118.3*1.07=126.58+30

12.) 3 ft. 6 in.; $2^2 + h^2 = 4^2$; $h = 2\sqrt{3} \approx 3.46$

13.) 1.33014×10^{27}; $56.846 * 10^{26} - 10.243 * 10^{26} = 13.3014 * 10^{26} = 1.33014 * 10^{27}$

14.) 25 blocks; $5^2 + 12^2 = d^2$; d = 13 to Maggie's house 13 + 12 = 25 blocks

15.) 3; mean weight of professional baseball team = 200.25; mean weight of middle school team = 66.75; $\frac{!""\,.!"}{!!.!"} = 3$

16.) ---300; **(**0, 2400) & (8, 0); $\frac{!"\#\#!!}{} = \frac{!"\#\#}{} = -300$

17.) 84; The median score for Class A is 78. So, $\frac{!"!!}{!} = 78$. Then x = 84.

18.) 70; $\frac{80\ in}{22.4\ cm} = \frac{x\ in}{19.6\ cm}$; 1568=22.4x; x = 70

19.) 648; $\frac{18cm}{1\,sec} \cdot \frac{3600\,sec}{1\,hr} \cdot \frac{1\,m}{100\,cm}$

20.) 5, 4; $\frac{28\ chess\ club}{140\ math\ club} = \frac{1}{5}$; $\frac{102!x}{140} = \frac{7}{10}$ x = 4

* There are many ways to do these problems. The above is just one solution.