Algebra Questions Set 1: 1/3/12 *www.askmath.weebly.com*

1. Ima Quick goes to 2 grocery stores. Grocery A sells apples for \$4.00. The average cost of the apples from the 2 stores is \$7.25. How much do B sell their apples for?

They are asking about the average. The average(arithmetic mean) is $\text{Avg} = \dfrac{a_1 + a_2 + ... + a_n}{n}$. You basically add all the numbers together and divide it by the number of things that you added.

$$\begin{aligned}
\text{Avg} &= \frac{a_1 + a_2 + ... + a_n}{n} \\
7.25 &= \frac{A + B}{2} \\
7.25 &= \frac{4 + B}{2} \\
2 \cdot 7.25 &= \left(\frac{4 + B}{2}\right) \cdot 2 \\
14.5 &= 4 + B
\end{aligned}$$

$\boxed{B = 10.5}$

2. Tom and Rudy are twins. They have a sister named Sandy who is 3 times as old as Tom. The product of the 3 sibling's ages is 648. How old are they?

$$\begin{aligned}
648 &= T \cdot R \cdot S \\
648 &= T \cdot T \cdot 3T \\
648 &= 3T^3 \\
\sqrt[3]{216} &= \sqrt[3]{T^3}
\end{aligned}$$

$\boxed{T = 6, R = 6, S = 18}$

3. The area of circle A has a radius r is equal the circumference of circle B whose radius is 5 more than A's. What is the radius of A?

$$\begin{aligned}
A_a &= C_b \\
\pi r_a^2 &= 2\pi r_b \\
\frac{\pi r_a^2}{\pi} &= \frac{2\pi r_b}{\pi} \\
r_a^2 &= 2r_b \\
r_a^2 &= 2(r_a + 5) \\
r_a^2 &= 2r_a + 10 \\
r_a^2 - 2r_a - 10 &= 0
\end{aligned}$$

You have to use the quadratic formula:

$$\begin{aligned}
x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\
x &= \frac{2 \pm \sqrt{(-2)^2 - 4(1)(-10)}}{2}
\end{aligned}$$

$\boxed{r_a \approx 4.316}$ The radius cannot be negative.

4. Two runners A and B are in a race. A is running 12 mph and B is running 16 mph. Both are at constant speed. However since A is slower, the judges allow him to be 15 miles ahead of B. How long (in minutes) will B catch up with A?

$$A = 12x + 15$$
$$B = 16x$$

To find when B will catch up with A, you have to set the two equations equal each other because you want to know when they are the same distance from the start.

$$12x + 15 = 16x$$
$$4x = 15$$
$$x = \frac{15}{4}$$

It will take B $\frac{15}{4}$ hours to reach A.

$\frac{15\ hr}{4} \times \cdot \frac{60\ min}{1\ hr} \boxed{= 225\ min}$

5. Drew drops a ball 9 ft from the ground. Each time the ball bounces up, it goes up 40% of thedistance it when it went down. What is the total distance the ball traveled in the fourth bounce?

The ball goes 9 ft down, then bounces up 40% of the 9 ft and then drops down 40% of 9 ft. Then it bounces up 40% of the 40% of 9 ft.

$D = 9 + (.40)9 \cdot 2 + (.40)^2 9 \cdot 2 + (.40)^3 9 \cdot 2$

$D = 9\left[1 + 2(.40) + 2(.40)^2 + 2(.40)^3\right] = \boxed{20.232\ ft}$