3–1. Let b be the shorter base. Then $12b = \frac{h}{2}(b + 3b) \Rightarrow h = 6$.

3–2. Start with $11100111 = 111 \cdot 100001 = 111(10^5 + 1)$. Now $10^5 + 1 = 10^5 + 1^5$ must have a factor of $10 + 1 = 11$, giving $111 \cdot 11 \cdot 9091 = 3 \cdot 37 \cdot 11 \cdot 9091$.

3–3. $4000 \cdot 0.05 = 200$, and $3500 \cdot 0.04 = 140$, so $\frac{P}{100} \cdot 2500 = 160 \Rightarrow P = 6.4$.

$$12 = AM = CM = x + x\sqrt{3}$$
$$\Rightarrow x = 6\left(\sqrt{3} - 1\right)$$

The side length is $2x = 12\left(\sqrt{3} - 1\right)$

3–4.
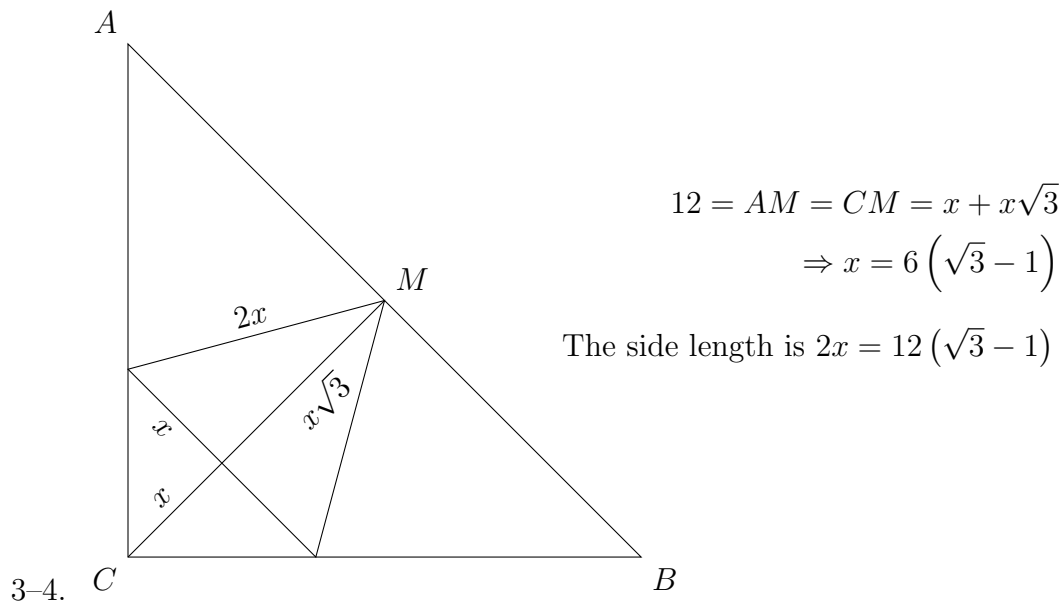
3–5. If f is the number of female student-athletes and m the number of male student-athletes, then
$$\frac{0.55f + 0.48m}{f + m} = 0.54 \Rightarrow \frac{m}{f} = \frac{3}{4}$$

3–6. First note that
$$\frac{1}{x^2} + \frac{1}{y^2} = \frac{x^2 + y^2}{x^2 y^2} = \frac{a^2}{b^2} \Rightarrow x^2 + y^2 = a^2$$

Now make x and y as small as possible to make $\frac{1}{x}$ and $\frac{1}{y}$ as large as possible. So $x = 3$, $y = 4$, and the unit fractions are $\frac{1}{9}$ and $\frac{1}{16}$.