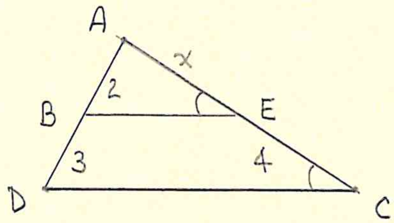
Pg. 5, #4

The two triangles are $\boxed{\text{ALWAYS}}$ similar since they are both 30°-60°-90° triangles.

Pg. 6, #13



Note that $\Delta ABE \sim \Delta ADC$

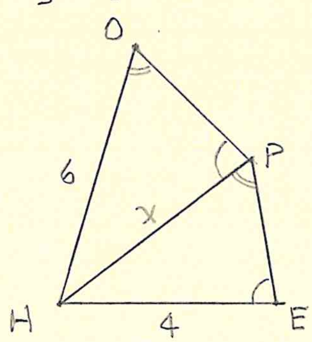
So that $\dfrac{AB}{AD} = \dfrac{BE}{DC} = \dfrac{AE}{AC}$

Now, $AB = 2$ and $BD = 3 \Rightarrow AD = 5$

If $AE = x$ then $AC = x + 4$

Thus, $\dfrac{2}{5} = \dfrac{x}{x+4} \Rightarrow 2x + 8 = 5x \Rightarrow 8 = 3x \Rightarrow \boxed{AE = x = \frac{8}{3}}$

Pg. 6, #14



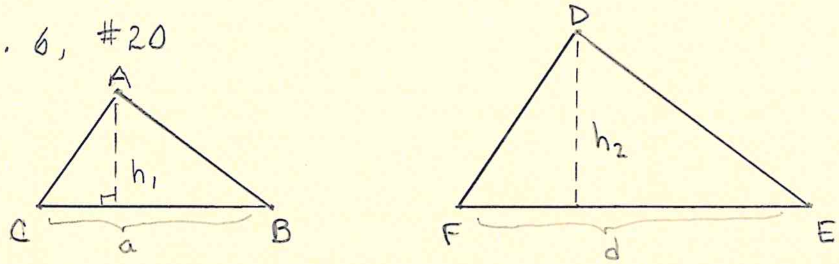
Note that $\Delta HPO \sim \Delta HEP$

So that $\dfrac{HP}{HE} = \dfrac{PO}{EP} = \dfrac{HO}{HP}$

Let $HP = x$. Then $\dfrac{x}{4} = \dfrac{6}{x}$

$\Rightarrow x^2 = 24 \Rightarrow \boxed{x = \sqrt{24} = 2\sqrt{6}}$

Pg. 6, #20



Now, $\dfrac{\text{Area}(\Delta ABC)}{\text{Area}(\Delta DEF)} = \dfrac{\frac{1}{2}a \cdot h_1}{\frac{1}{2}d \cdot h_2} = \dfrac{a \cdot h_1}{d \cdot h_2} = \dfrac{a \cdot a}{d \cdot d} = \boxed{\dfrac{a^2}{d^2}}$

Since $\Delta ABC \sim \Delta DEF$, $\dfrac{h_1}{h_2} = \dfrac{a}{d}$