49. Let $d$ be the distance, in miles, from the earth to the sun. Then $\tan 89.95° = \dfrac{d}{240{,}000}$ $\Leftrightarrow$ $d = 240{,}000 \cdot \tan 89.95° \approx 91.7$ million miles.

51. Let $r$ represent the radius, in miles, of the earth. Then $\sin 60.276° = \dfrac{r}{r + 600}$ $\Leftrightarrow$

$(r + 600)\sin 60.276° = r$ $\Leftrightarrow$ $600 \cdot \sin 60.276° = r(1 - \sin 60.276°)$ $\Leftrightarrow$

$r = \dfrac{600 \cdot \sin 60.276°}{1 - \sin 60.276°} \approx 3960.099$. So the radius of the earth is approximately 3960 mi.

53. $x = \dfrac{100}{\tan 60°} + \dfrac{100}{\tan 30°} \approx 230.9$

55. Let $h$ be the length of the shared side. Then $\sin 60° = \dfrac{50}{h}$ $\Leftrightarrow$ $h = \dfrac{50}{\sin 60°} \approx 57.735$ $\Leftrightarrow$

$\sin 65° = \dfrac{h}{x}$ $\Leftrightarrow$ $x = \dfrac{h}{\sin 65°} \approx 63.7$