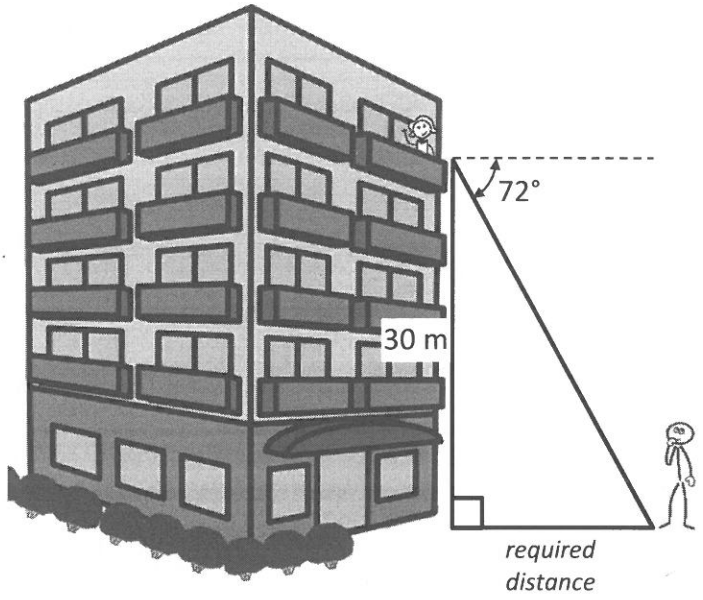
Example 7

Your friend lives in an apartment building in downtown Winnipeg. From their balcony, they spot you on the ground at an angle of depression of 72°. If your friend is 30 m from the ground, determine the distance that you are standing from the base of the building.



We only know ONE side (30 m) and ONE angle (90°) in our triangle. *Complementary angles* tells us that the 'top' angle in the triangle is $90° - 72° = 18°$. We can then determine the angle near the person: $180° - 90° - 18° = 72°$. This gives us 'partners' (the 72° and the 30 m) so this is a sine law problem.

(Two notes:
1. The angle of depression is always equal to the angle of elevation at the opposite end of the triangle – seen here with the 72° angles.
2. You could use SOHCAHTOA for this question, if you remember that from Essential Math 30S.)

$$\frac{30}{\sin 72°} = \frac{x}{\sin 18°}$$

$$x = 30 \times \sin 18° \div \sin 72°$$

$$x = \mathbf{9.75\ m}$$