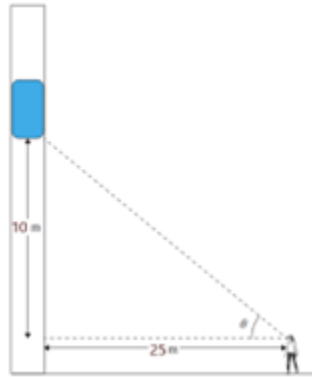


Term 1 Week 2

1. A building has an external elevator. The elevator is raising at a constant rate of $3ms^{-1}$. Sarah is stationary, watching the elevator from a point 25m away from the base of the elevator shaft.

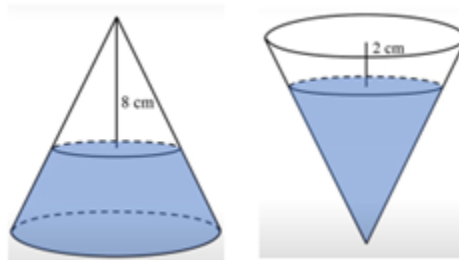


Find the rate at which θ , the angle of elevation, is increasing when the elevator floor is 10m above Sarah's eye level.

2. When a conical bottle rests on its flat base, the water in the bottle is 8 cm from its vertex.

When the same conical bottle is turned upside down, the water level is 2 cm from its base.

What is the height of the bottle?



3. If $x^5 = 1$, find the sum of $\frac{x}{1+x^2} + \frac{x^2}{1+x^4} + \frac{x^3}{1+x} + \frac{x^4}{1+x^3}$