

Also recall the following practice problem from section 6.1 from the last review packet. Try solving it first before checking with the solution.

1) Suppose the drilling of an oil well has a fixed cost of \$10,000 and a marginal cost $C_M(x)$ of $C_M(x) = 1000 + 50x$ dollars per foot, where x is the depth in feet. Find the expression for $C(x)$, the total cost of drilling x feet.

Solution:

Marginal cost is the rate of change, or derivative, of cost. Hence we need to integrate $C_M(x)$ to find $C(x)$.

$$\begin{aligned} C(x) &= \int C_M(x) dx = \int 1000 + 50x dx \\ &= 1000x + 25x^2 + C \end{aligned}$$

Which value of C gives us our cost function?

We have a fixed cost of \$10,000.

Hence $C(0) = 10,000$.

$$\Rightarrow 10,000 = C(0) = 1000(0) + 25(0)^2 + C = C$$

$$\Rightarrow C = 10,000.$$

Therefore, $C(x) = 25x^2 + 1000x + 10,000$