



19. An engineer is directed to a faulty signal, one quarter of the way into a tunnel. Whilst there, he is warned of a train heading towards the tunnel entrance. The engineer can run at 12 mph and can either run back to the tunnel entrance or forward to the exit. In either case, the engineer and the front of the train would reach the entrance or exit together. What is the speed in mph of the train?
- A 16      B 20      C 24      D 32      E more information needed

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19. C Let the length of the tunnel and the distance from the front of the train to the entrance of the tunnel when the engineer receives the warning be  $l$  and  $x$  respectively. If the engineer runs to the exit of the tunnel, he will take three times as long as he would if he ran to the entrance. So the train takes three times as long to travel a distance  $x + l$  as it does to travel a distance  $x$ . Hence  $l = 2x$ . The train, therefore, travels a distance  $x$  in the same time that the engineer would take to travel  $\frac{1}{3}l$ , that is to travel  $\frac{2}{3}x$ . So the speed of the train is twice that of the engineer.