7. [13 points] Jada is riding on a train to visit Emerald Beach. Her friend Eva is also traveling to Emerald Beach, but she left on an earlier train. Eva has been tracking her remaining distance to Emerald Beach in sprites, which is the elves' measurement for distance.

- The function $E(m)$ gives Eva's distance away from Emerald Beach, in sprites, m minutes after Eva's train departed.
- Jada's train left 30 minutes after Eva's train.
- When Jada's train departs, it is 25 sprites behind Eva's train.
- At any given moment, both trains are traveling at the same speed, so Jada's train is always exactly 25 sprites farther away from Emerald Beach than Eva's train.

You do not need to show work for this problem.

a. [2 points] Let $J(t)$ be Jada's distance from Emerald Beach, in sprites, t minutes after *Jada's* train departed. Find a formula for $J(t)$ in terms of the function E and the variable t.

Answer: $J(t) =$ $E(t+30)+25$

b. [2 points] Give a practical interpretation of the following equation:

$$E(90) = \frac{1}{2}J(0)$$

Interpretation:

Solution: Eva's distance from Emerald Beach 90 minutes after she left is half Jada's distance from the beach when she left.

c. [5 points] Jada prefers to use earthly measurements of distance, and she knows that one sprite is exactly three miles.
Based on the given information, fill in the following blanks:

When Jada has been traveling for 2 **hours**, Eva has been traveling for 150 minutes.

When Eva is 15 sprites from Emerald Beach, Jada is 120 miles from Emerald Beach.

Let $D(h)$ be Jada's distance from Emerald Beach, in **miles**, h **hours** after *Jada's train* departed. Find a formula for $D(h)$ in terms of the function E and the variable h.

Answer: $D(h) =$ $3E(60(h+0.5))+75 = 3(E(60h+30)+25)$

d. [4 points] Some points of the function $E(m)$ are given in the table below. Using these points, find the coordinates of points that must be on the graph of $D(h)$.

m	30	105	150
$E(m)$	185	80	15

h	0	1.25	2
$D(h)$	630	315	120