

f r q

$$1225a + 35b = 43$$

$$2025a + 45b = 32$$

$$-3150a = 163$$

$$a = -\frac{163}{3150} = -0.051746$$

$$b = 3.039683$$

$$I(t) = -0.052t^2 + 3.040t + 14 \text{ OR } I(t) = -0.051t^2 + 3.039t + 14$$

Part B

Select a point value to view scoring criteria, solutions, and/or examples to score the response.



0	1	2	3
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The student response includes all three of these criteria.

- Correct average rate of change based on quadratic $I(t)$ from Part A
- Correct estimate for $t = 40$ based on average rate of change found in (i)
- Correct answer with explanation

Model Solution

$$(i) \frac{I(45) - I(35)}{45 - 35} = \frac{(46 - 57)}{10} = -1.1$$

The average rate of change is -1.1 cones per day.

$$(ii) \text{ The average rate of change is } r = \frac{I(45) - I(35)}{45 - 35} = -1.1.$$

The secant line between point $(35, I(35))$ and point $(45, I(45))$ is given by, $y = y_1 + \left(\frac{I(45) - I(35)}{45 - 35} \right)(x - x_1)$, where (x_1, y_1) can be either one of the points.

Estimates using the average rate of change are given by

$$y = I(35) + r(x - 35)$$

OR

$$y = I(45) + r(x - 45).$$

Both of these produce the same estimate.

For $x = 40$,