(5.3)

(Q8) $N(t) = 2^{\frac{t}{5}} - e^{\frac{t-60}{3}}$, $t \geqslant 60$

(a) $N'(t) = \ln 2 \cdot 2^{\frac{t}{5}} \left(\frac{1}{5}\right) - e^{\frac{t-60}{3}} \cdot \left(\frac{1}{3}\right)$

So, $N'(t) = 0$ when

$$\frac{(\ln 2)\left(2^{\frac{t}{5}}\right)}{5} = \frac{e^{\frac{t-60}{3}}}{3}$$

$$\frac{3}{5} \ln 2 = e^{\frac{t-60}{3}} \div 2^{\frac{t}{5}}$$

$$\ln(0.6 \ln 2) = \frac{t}{3} - 20 - \frac{t}{5} \ln 2$$

$$\ln(0.6 \ln 2) + 20 = t\left(\frac{1}{3} - \frac{1}{5}\ln 2\right)$$

So, $t = \left[\ln(0.6\ln 2) + 20\right] \div \left(\frac{1}{3} - \frac{1}{5}\ln 2\right)$

$$= 98.2$$

So, pop'n is at max. 38.2 min after drug.

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(b) $2^{\frac{t}{5}} = e^{\frac{t-60}{3}}$

$\frac{t}{5} \ln 2 = \frac{t}{3} - 20$

$t\left(\frac{1}{5} \ln 2 - \frac{1}{3}\right) = -20$

$t \doteq 102.7$

So, after 42.7 min, <u>ALL</u> are <u>dead</u> !