3.8 Hw Solutions

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Question 1:

Solution: ☺

If:

$$y = Ce^{kt}.$$

And:

$$C = 3.5$$
$$k = 0.4249$$
$$t = 5.$$

Then:

$$p(5) = 3.5e^{0.4249(5)}$$
$$= 29.3.$$

> **Note:-**
>
> They gave us k

Question 2:

Solution: ☺

$$980 = 790e^{k(1800-1750)}$$
$$\frac{980}{790} = e^{50k}$$
$$k = \frac{\ln \frac{980}{790}}{50}$$
$$\approx 0.0043104.$$

Now:

$$p(1900) = 790e^{0.0043104(1900-1750)}$$
$$\approx 1508.$$

$$p(1950) = 790e^{0.0043104(1950-1750)}$$
$$\approx 1871.$$

Question 3:

Solution: ☺

If:

$$C = 180.$$

And we have:

$$(30, 90).$$

As (t,y)

Then:

$$90 = 180e^{k(30)}$$
$$\frac{1}{2} = e^{30k}$$
$$\ln \frac{1}{2} = 30k$$
$$k = \frac{\ln \frac{1}{2}}{30}.$$

Therefore:

$$y(t) = 180e^{\frac{\ln \frac{1}{2}}{30}t}.$$

Part 2.) Plug 130 in for t:

$$y(130) = 180e^{\frac{\ln \frac{1}{2}}{30}130}$$
$$\approx 8.93.$$

Part 3. set equation y(t) = 1 and solve

$$1 = 180e^{\frac{\ln \frac{1}{2}}{30}t}$$
$$\frac{1}{180} = e^{\frac{\ln \frac{1}{2}}{30}t}$$
$$\ln \frac{1}{180} = \frac{\ln \frac{1}{2}}{30}t$$
$$t = \frac{\ln \frac{1}{180}}{\frac{\ln \frac{1}{2}}{30}}$$
$$t = \frac{\ln \frac{1}{180} \cdot 30}{\ln \frac{1}{2}}$$
$$\approx 224.8.$$

Question 4:

Solution: ☺

if:

$$y(t) = Ae^{kt}.$$

Then:

$$0.738 = Ae^{kt}.$$

Question 5:

Solution: ☺

Question 6:

Solution: ☺

Question 7:

Solution: ☺

Question 8:

Solution: ☺

Question 9:

Solution: ☺