

Answers to WS 10

1.

$$\frac{dV}{dt} = rV - \alpha VP$$

$$\frac{dP}{dt} = -qV + \beta VP$$

2.

$$\frac{dV}{dt} = rV\left(1 - \frac{V}{K}\right) - R(V)P$$

or

$$\frac{dV}{dt} = rV - cV^2 - R(V)P$$

3.

a.

$$\frac{dV}{dt} = rV - \frac{12VP}{4 + V}$$

b. 12 victims per predator per unit of time.

c. $R(V) \equiv 3V$ when V is small

d. 4

e. the isocline for V is the line of equation

$$P = \frac{r}{12}V + \frac{r}{3}$$

this is a line of positive slope $r/12$ and vertical intercept $r/3$.

the isocline for P is the vertical line $V = q/\beta$.