

Population Ecology

OPEN BOOK QUIZ_A

Formulas:

$$gr = \frac{\Delta N}{t}$$

$$cgr = \frac{\Delta N}{N}$$

$$D_p = \frac{N}{A}$$

$$D_p = \frac{N}{V}$$

$$\Delta N = (\text{factors that increase pop.}) - (\text{factors that decrease pop.})$$

1. A biologist studied the number of caribou in the area surrounding Jasper for a period of **20 years**. The initial population was 46 caribou. She determined that the natality averaged 2 caribou **per year**, the mortality averaged 4 caribou **per year**, while the immigration was 2 caribou **per year** and the emigration was 3 caribou **per year**.

- a) Calculate the growth rate of this population in the **first year** of the study.

	VERSION A	VERSION B
$gr = \frac{\Delta N}{t}$	$= \frac{(2+2) - (4+3)}{1}$ $= -3 \text{ per year}$	$= \frac{(3+3) - (5+4)}{1}$ $= -3 \text{ per year}$

- b) Calculate the per capita growth rate (cgr) for this population of caribou during the **entire study period**.

-Which is 20 years...so 20 years of ΔN

VERSION A

$cgr = \frac{\Delta N}{N}$	 $= \frac{(2+2) - (4+3)}{46}$ 	$= \frac{(40+40) - (80+60)}{46}$ $= \frac{-60}{46} = -1.30$
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VERSION B

$cgr = \frac{\Delta N}{N}$	 $= \frac{(3+3) - (5+4)}{52}$ 	$= \frac{(60+60) - (100+80)}{52}$ $= \frac{-60}{52} = -1.15$
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