

Algebra 1: 5.2 (Part 1) Homework

Name Answer Key Period

Write a function that represents each population as a function of time using $P(t) = P(1 \pm r)^t$ or $P(t) = P(1 - r)^t$.
 decay/decreasing + growth/increasing

1. Blueville has a population of 7000. Its population is increasing at a rate of 1.4%.

$P = 7000$
 $r = 1.4\% \text{ or } 0.014$ $P(t) = 7000(1 + 0.014)^t = 7000(1.014)^t$

2. Youngstown has a population of 12,000. Its population is increasing at a rate of 1.2%.

$P = 12000$
 $r = 1.2\% \text{ or } 0.012$ $P(t) = 12000(1 + 0.012)^t = 12000(1.012)^t$

3. Greenville has a population of 8000. Its population is decreasing at a rate of 1.75%.

$P = 8000$
 $r = 1.75\% \text{ or } 0.0175$ $P(t) = 8000(1 - 0.0175)^t = 8000(0.9825)^t$

4. North Park has a population of 14,000. Its population is decreasing at a rate of 3.1%.

$P = 14000$
 $r = 3.1\% = 0.031$ $P(t) = 14000(1 - 0.031)^t = 14000(0.969)^t$

Waynesburg has a population of 16,000. Its population is increasing at a rate of 1.5%. Write a function to represent the population as a function of time. Determine the population after a given number of years. Round your answer to the nearest whole number.

Function: $P(t) = P(1 + r)^t$ $P = 16000$ $r = 1.5\% \text{ or } 0.015$
 $P(t) = 16000(1 + 0.015)^t$

5. 3 years $t = 3$

$P(3) = 16000(1 + 0.015)^3$
 $P(3) = 16730.854 \approx 16731$

6. 5 years

$P(5) = 16000(1 + 0.015)^5$
 $P(5) = 17236.54406$
 ≈ 17237

7. 50 years

$P(50) = 16000(1 + 0.015)^{50}$
 $P(50) = 33683.87873$
 ≈ 33684

Morristown has a population of 18,000. Its population is decreasing at a rate of 1.2%. Write a function to represent the population as a function of time. Determine the population after a given number of years. Round your answer to the nearest whole number.

Function: $P(t) = P(1 - r)^t$ $P = 18000$ $r = 1.2\% \text{ or } 0.012$
 $P(t) = 18000(1 - 0.012)^t$

8. 5 years

$P(5) = 18000(1 - 0.012)^5$
 $P(5) = 16945.61082$
 ≈ 16946

9. 10 years

$P(10) = 18000(1 - 0.012)^{10}$
 $P(10) = 15952.98478$
 ≈ 15953

10. 25 years

$P(25) = 18000(1 - 0.012)^{25}$
 $P(25) = 13310.55364$
 ≈ 13311