

Watch. Practice. Understand. | Lesson 006

2022 High School Algebra I Chapter 6 Exponential Functions and Sequences

Watch the matching video: <https://www.youtube.com/watch?v=Ooc-vyq5ZQc>

Practice focus: Exponential functions and models

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Solve $3^{(x + 1)} = 81$.

02 A population starts at 500 and doubles every 3 hours. Find its size after 9 hours.

03 An item worth \$800 loses 15% of its value per year. Find its value after 2 years.

04 Find the y-intercept, horizontal asymptote and range of $y = 2^x - 3$.

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Practice focus: Geometric sequences and series

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

05 Find term 6 of 3, 6, 12,

06 Find the first 6-term sum of 3, 6, 12,

07 Find the infinite sum $12 + 6 + 3 + \dots$.

08 Does $1 - 2 + 4 - 8 + \dots$ converge?

Worked answers | Lesson 006

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Practice focus: Exponential functions and models

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01 Solve $3^{(x+1)} = 81$.

$81 = 3^4$, so $x + 1 = 4$ and $x = 3$.

02 A population starts at 500 and doubles every 3 hours. Find its size after 9 hours.

$P(t) = 500(2)^{(t/3)}$. $P(9) = 500(8) = 4000$.

03 An item worth \$800 loses 15% of its value per year. Find its value after 2 years.

$V = 800(0.85)^2 = \$578$.

04 Find the y-intercept, horizontal asymptote and range of $y = 2^x - 3$.

At $x = 0$, $y = -2$. Asymptote $y = -3$; range $(-3, \text{infinity})$.

Worked answers | Lesson 006

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Practice focus: Geometric sequences and series

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05 Find term 6 of 3, 6, 12,

$$a_n = 3(2)^{(n-1)}, \text{ so } a_6 = 96.$$

06 Find the first 6-term sum of 3, 6, 12,

$$S_6 = 3(2^6 - 1)/(2 - 1) = 189.$$

07 Find the infinite sum $12 + 6 + 3 + \dots$.

$$\text{Ratio } r = 1/2 \text{ has magnitude below } 1. \text{ Sum} = 12/(1 - 1/2) = 24.$$

08 Does $1 - 2 + 4 - 8 + \dots$ converge?

No. The terms do not approach zero; also the geometric ratio has magnitude $2 > 1$.