Exponential equations growth and decay

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A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the explanation and worked example. Show your working; use a calculator only where asked.

What you will practise

• Solve simple exponential equations and model repeated proportional change.

• Explain a method and check the reasonableness of a result.

Useful starting skills: Use the prerequisite operations and representations shown in the worked example.

Repeated percentage change multiplies by the same factor each period. Compound growth uses $A=P(1+r)^n$; decay uses a factor between 0 and 1.

Simple exponential equations can be solved by expressing both sides with a common base or using a table or technology. State the time period, rate assumptions and whether the model is appropriate.

Worked example

Solve $2^x=32$ and model$1000 growing 5% for 2 years.

$32=2^5$, sox=5.

Amount=1000×1.05^2.

Answer: x=5; amount$1102.50

Try it yourself

Name: _____ Date: _____

1. Solve $3^{x}=81$.

2. Solve $5^{(x+1)}=125$.

Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. $x=4$

$81=3^4$.

2. $x=2$

$125=5^3$, so $x+1=3$.

Curriculum reference: VC2M10A14; VC2M10A15

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