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MATHEMATICS WORKSHEET

# Mathematical Modeling

Chapter: Applied Mathematics • Level ★★★ • Time: 30 min

SCORE

\_\_\_ / 20

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

## AFTER THIS WORKSHEET YOU CAN

- ✓ Translate a real situation into a mathematical model.
- ✓ Evaluate linear and exponential models.
- ✓ Follow the five steps of the modeling process.
- ✓ Judge when a model type is appropriate.



### Section A • Concept Check

• BEGINNER

$4 \times 1 = 4$

- $C(x) = 200 + 15x$ . The cost of 30 units is:  
☐ A. 650 ☐ B. 450 ☐ C. 215 ☐ D. 6200
- $P(t) = 1000 \cdot (1.05)^t$ . The population at  $t = 2$  is:  
☐ A. 1102.5 ☐ B. 1050 ☐ C. 1100 ☐ D. 2000
- A quantity growing by a constant multiple each period suits a:  
☐ A. linear model ☐ B. exponential model  
☐ C. constant model ☐ D. quadratic model
- The first step of the modeling process is to:  
☐ A. solve equations ☐ B. identify variables  
☐ C. validate ☐ D. publish



### Section B • Problem Solving

• INTERMEDIATE

$2 + 3 \times 3 = 11$

- $C(x) = 200 + 15x$  at  $x = 30$  gives \_\_\_\_\_.
- $P(t) = 1000(1.05)^t$  at  $t = 2$  gives \_\_\_\_\_.
- A cost model is  $C(x) = 200 + 15x$ . Find the cost of 30 units.  
 \_\_\_\_\_
- A population model is  $P(t) = 1000 \cdot (1.05)^t$ . Find the population at  $t = 2$ .  
 \_\_\_\_\_
- What are the five general steps of the modeling process?  
 \_\_\_\_\_



### Section C • Challenge

• CHALLENGE

5

- Why might a linear model be inappropriate for long-term population growth?  
 \_\_\_\_\_

Reflection — the most useful thing I learned: \_\_\_\_\_

A \_\_\_/4 B \_\_\_/11 C \_\_\_/5 Total \_\_\_/20

Teacher's Signature

Parent's Signature

ANSWER KEY — FOLD OR CUT BEFORE HANDING OUT

1-A 2-A 3-B 4-B | 5 650 6 1102.5 7 = 650 8 = 1102.5 9 = Identify variables, make assumptions, build equations, solve/interpret, validate and refine | 10 = Populations grow multiplicatively (exponentially), not by a constant amount

