ALBERT

Name _____ Date _____

Writing Functions from Context Worksheet

Algebra 1 · Common Core HSF-BF.A.1a

> Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

Practice

Builds the skill step by step.

1. A gym charges a 25-dollar joining fee plus 30 dollars a month. What is the total cost for 6 months?

2. Which function gives the gym's total cost C for m months (25-dollar fee plus 30 dollars a month)?

   A. C(m) = 30 + 25m

   B. C(m) = 25m + 30m

   C. C(m) = 55m

   D. C(m) = 25 + 30m

3. A taxi charges 3 dollars plus 2.50 dollars per mile. What does a 10-mile ride cost?

4. A candle is 12 inches tall and burns 1.5 inches per hour. How tall is it after 4 hours?

5. Mia has 50 dollars and adds 10 dollars each week. Which recursive process describes her savings?

   A. $a_0 = 60, a_n = a_{n-1} - 10$

   B. $a_0 = 50, a_n = 10a_{n-1}$

   C. $a_0 = 50, a_n = a_{n-1} + 10$

   D. $a_0 = 10, a_n = a_{n-1} + 50$

6. A population of 200 doubles every year. What is it after 3 years?

7. Which explicit function gives that population (200, doubling yearly) after t years?

   A. $P(t) = 2 \cdot 200^t$

   B. $P(t) = 200 \cdot 2^t$

   C. $P(t) = 200t^2$

   D. $P(t) = 200 + 2t$

8. A phone plan costs 40 dollars plus 0.10 dollars per text. What does a month with 150 texts cost?

9. A rectangle has a perimeter of 30 and width w, so its length is $15 - w$. What is its area when $w = 5$?

10. A rule says: take a number, double it, then add 3. What is the output for an input of 7?

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On Level

Grade-level practice.

1. Parking costs 4 dollars for the first hour and 2 dollars for each additional hour. What do 5 hours cost?

2. Which function gives that parking cost for h hours, h ≥ 1?

   A. $C(h) = 4 + 2(h - 1)$

   B. $C(h) = 4 + 2h$

   C. $C(h) = 6h$

   D. $C(h) = 2 + 4h$

3. A car worth 20,000 dollars loses 15% of its value each year. What is it worth after 2 years?

4. Which function gives that car's value after t years?

   A. $V(t) = 20{,}000(0.85)^t$

   B. $V(t) = 20{,}000 - 0.15t$

   C. $V(t) = 20{,}000(1.15)^t$

   D. $V(t) = 20{,}000 - 15t$

5. A 500-gallon tank drains 20 gallons per minute. After how many minutes is it empty?

6. A streaming service costs 12 dollars a month plus 3 dollars per movie rental. Write a function for the monthly cost and explain each part.

7. $a_1 = 1000$ and $a_n = 1.05a_{n-1}$. What is a_3?

8. Tiles cost 2 dollars each plus a 15-dollar delivery fee. With 75 dollars, what is the most tiles you can buy?

9. An elevator starts 120 feet up and goes down 8 feet per second. After how many seconds does it reach the ground?

10. A concert's attendance is $1000 - 20p$ people when tickets cost p dollars. What is the revenue at $p = 20$?

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Challenge

Multi-step and word problems that stretch it.

1. A colony of 50 bacteria triples every 2 hours. How many are there after 6 hours?

2. A loan balance starts at 1000 dollars. Each month it grows 1% and then a 50-dollar payment is made: $a_n = 1.01a_{n-1} - 50$. What is the balance after 2 months?

3. An open box is made by cutting x-by-x squares from the corners of a 20-by-20 sheet. Which function gives its volume?

   A. $V(x) = 20x^2$

   B. $V(x) = x(20 - 2x)^2$

   C. $V(x) = (20 - 2x)^3$

   D. $V(x) = x(20 - x)^2$

4. For $V(x) = x(20 - 2x)^2$, what is $V(3)$?

5. A van rents for 50 dollars per day plus 0.20 dollars per mile. What do 3 days and 400 miles cost?

6. A pool has 2,000 gallons. A hose adds 150 gallons per hour while a leak loses 30 gallons per hour. How much water is there after 5 hours?

7. Shipping costs 5 dollars for packages up to 2 pounds, plus 1.50 dollars for each pound over 2. Describe the steps to find the cost of a package that weighs w pounds ($w \geq 2$), and find the cost for 6 pounds.

8. A 400 mg dose of medicine loses 20% each hour. How much is left after 3 hours?

9. Plan A costs 30 dollars plus 0.05 dollars per minute. Plan B costs 0.15 dollars per minute. At how many minutes do they cost the same?

10. Each year a tree grows 10% taller, plus 1 more foot. Which recursive rule fits?

    A. $h_n = 1.1h_{n-1} + 1$

    B. $h_n = h_{n-1} + 1.1$

    C. $h_n = 0.1h_{n-1} + 1$

    D. $h_n = 1.1(h_{n-1} + 1)$