ALBERT

Name _____ Date _____

Domain in Context Worksheet

Algebra 1 · Common Core HSF-IF.B.5

> Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

Practice

Builds the skill step by step.

1. h(n) gives the person-hours needed to assemble n engines. What is a sensible domain?
   A. the negative numbers
   B. numbers between 0 and 1
   C. all real numbers
   D. the positive integers

2. A ball is in the air from t = 0 to t = 4 seconds. What is the domain of its height function h(t)?
   A. $-4 \le t \le 4$
   B. $0 \le t \le 4$
   C. $t \ge 0$
   D. all real numbers

3. C(p) is the cost of p pizzas. What kind of numbers belong in the domain?
   A. fractions only
   B. all real numbers
   C. whole numbers
   D. negative numbers

4. A 60-gallon tank drains 5 gallons per minute. V(t) is the water left after t minutes, until the tank is empty. What is the largest value in the domain?

5. f(x) = 3x is the cost of x tickets. Does a negative x make sense?

   A. No: you can't buy a negative number of tickets.

   B. Yes: any number works.

   C. Only for refunds.

   D. Only if x is a fraction.

6. A rectangle has a perimeter of 20 units and width w. Its area is A(w) = w(10 − w). The width must be greater than 0 and less than what number?

   _____

   _____

7. T(h) gives the temperature h hours after midnight on one day. What is a sensible domain?

   A. $h \geq 0$

   B. $0 \leq h \leq 100$

   C. $0 \leq h \leq 24$

   D. all real numbers

8. B(n) is the number of students that n buses can carry. What kind of numbers belong in the domain?

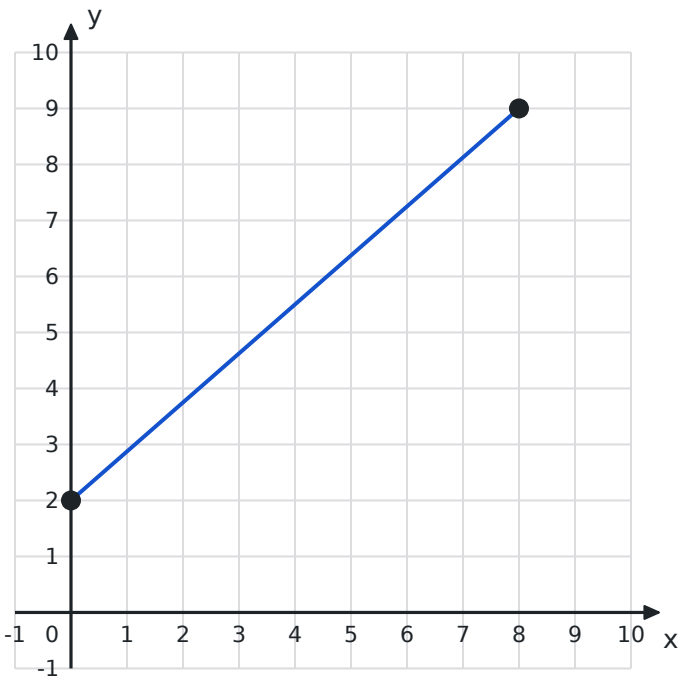
   A. decimals

   B. whole numbers

   C. negative integers

   D. all real numbers

9. The graph shows the function f. What is the largest x-value in its domain?



10. A(s) gives the area of a square with side length s. What is a sensible domain?

A. $s > 0$

B. all real numbers

C. $s \leq 0$

D. $s = 1$ only

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On Level

Grade-level practice.

1. A ball's height is $h(t) = -16t^2 + 64t$. The domain runs from launch until it lands. At what value of t does the domain end?

2. A phone battery starts at 100% and drops 8% per hour until it is empty. What is the largest value in the domain of the battery function?

3. Shirts cost 15 dollars each and you have 100 dollars. N(s) is the money left after buying s shirts. What is the domain?

   A. $0 \le s \le 100$

   B. all whole numbers

   C. $s \ge 0$

   D. 0, 1, 2, 3, 4, 5, 6

4. Shirts cost 15 dollars each and you have 100 dollars. What is the most shirts you can buy?

5. Which domain does NOT fit "the number of students in a class"?

   A. the counting numbers up to 40

   B. all real numbers between 0 and 40

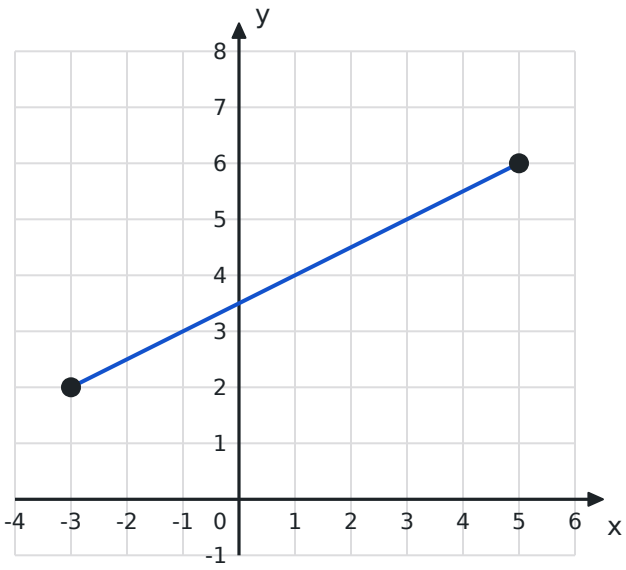
   C. the integers from 1 to 40

   D. the whole numbers from 0 to 40

6. Explain why the positive integers make sense as the domain of h(n), the person-hours needed to assemble n engines.

7. A pen uses 40 feet of fence. Its area is $A(x) = x(20 - x)$, where x is one side. x must be greater than 0 and less than what number?

8. The graph shows the function f. What is the smallest x-value in its domain?



9. T(n) is the cost of n concert tickets. Is the domain discrete or continuous?

   A. discrete

   B. continuous

   C. both

   D. neither

10. A rental company rents cars for 1 to 7 whole days. How many values are in the domain of the cost function?

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Challenge

Multi-step and word problems that stretch it.

1. A box is made from a 12-by-12 sheet by cutting x-by-x squares from the corners: $V(x) = x(12 - 2x)^2$. x must be greater than 0 and less than what number?

2. What does the graph of a function with a discrete domain look like?

   A. a closed curve

   B. a shaded region

   C. a solid line

   D. separate points

3. An elevator holds up to 1,000 kg. Each person weighs about 80 kg. P(n) is the total weight of n people. What is the largest n in the domain?

4. Savings $S(w) = 200 + 15w$ dollars after w weeks, until the total reaches 500 dollars. What is the largest w in the domain?

5. $f(x) = \sqrt{(x - 4)}$. What is the smallest x in its domain?

6. d(t) is the distance traveled t hours into a 3-hour trip. What is the domain?

   A. all real numbers

   B. $t \geq 0$

   C. $0 \leq t \leq 3$

   D. $0 \leq t \leq 180$

7. A rock's height is $h(t) = -5t^2 + 20t + 25$ meters. The domain runs until it lands. At what value of t does the domain end?

8. A pen's area is $A(x) = x(20 - x)$. Explain why the domain is $0 < x < 20$.

9. A bakery packs 96 cookies into boxes of 12. B(n) is the cookies used for n full boxes. What is the largest n in the domain?

10. A function is defined only for $x = 0, 1, 2, 3, 4, 5$. What is its domain?

    A. all integers

    B. the integers from 0 to 5

    C. $x \geq 0$

    D. $0 \leq x \leq 5$ (all real numbers)