F.IF.B.4: Relating Graphs to Events
Answer Section

1 ANS: 4 REF: 061502ai

2 ANS: 2

Between points B and C, John's distance from home remains constant. (2) represents an interpretation in which John's distance remains constant, waiting before crossing a busy street. (1) also represents an interpretation in which John's distance remains constant, but at points B and C, John had not yet arrived at school. In both (3) and (4), John's distance from school is changing.

REF: 010412a

3 ANS: 2

When Rover is drinking, the amount of water in his dish decreases over time. The first decrease ends at 30 seconds and the second decrease begins at 60 seconds. The difference between these points is 30 seconds.

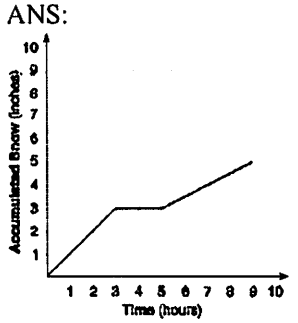
REF: 080410a

4 ANS: 3

In this sketch, the bug's speed is decreasing during the first third of time, equals 0 during the second third of time and is increasing the last third of time. In (4), the bug is traveling down the tree. In (1) and (2), the bug's speed remains constant.

REF: 060114b

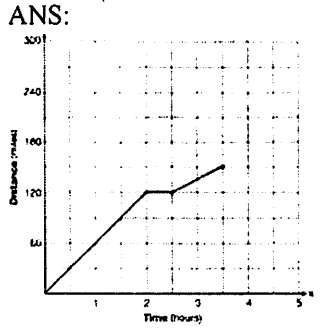
5 ANS:



At 6 hours, $3\frac{1}{2}$ inches of snow have fallen.

REF: spr1307ai

6 ANS:



REF: 081528ai

7 ANS:
B, 5 minutes. At point B, Mary's distance from home begins to decrease, representing the point where she turned back around to go home. The interval between points D and E is the only portion of the graph where Mary's distance from home remains constant. It lasts for 5 mins.

REF: 010121a

F.IF.A.1: Defining Functions 1
Answer Section

1 ANS: 3
An element of the domain, 1, is paired with two different elements of the range, 3 and 7.

REF: 080919ia

2 ANS: 4
In (4), each element in the domain corresponds to a unique element in the range.

REF: 011018ia

3 ANS: 2
In (2), each element in the domain corresponds to a unique element in the range.

REF: 061116ia

4 ANS: 4
An element of the domain, 1, is paired with two different elements of the range, 1 and −1.

REF: 011405ia

5 ANS: 1 REF: 061413ia

6 ANS: 2 REF: 011514ia

7 ANS: 1 REF: 080403b

8 ANS: 2 REF: 060715b

9 ANS: 3 REF: 061612ia

10 ANS: 4
In (4), each element in the domain corresponds to a unique element in the range.

REF: 011105ia

11 ANS: 4 REF: 068634siii

12 ANS: 3 REF: 011305a2

13 ANS: 4 REF: 018530siii

14 ANS:
Yes, because every element of the domain is assigned one unique element in the range.

REF: 061430ai

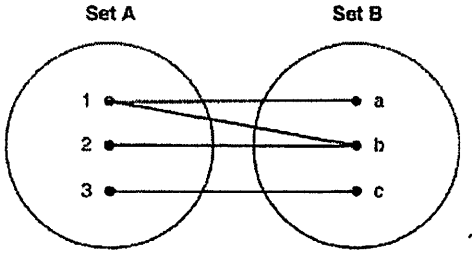
15 ANS: 3 REF: 061504ai

16 ANS:
(−4, 1), because then every element of the domain is not assigned one unique element in the range.

REF: 011527ai

17 ANS: 3 REF: 011604a2

18 ANS:



The relationship is not a function because an element in Set A maps to two different elements in Set B.

REF: 010622b

F.IF.A.2: Functional Notation 1a
Answer Section

1 ANS: 1 REF: 061420ai
2 ANS: 4 REF: 019020siii
3 ANS: 2

$$f(10) = \frac{-10}{(-10)^2 - 16} = \frac{-10}{84} = -\frac{5}{42}$$

REF: 061102a2
4 ANS: 3

$$\frac{\sqrt{2\left(\frac{1}{2}\right)+3}}{6\left(\frac{1}{2}\right)-5} = \frac{\sqrt{4}}{-2} = \frac{2}{-2} = -1$$

REF: 081512ai
5 ANS: 3 REF: 018915siii
6 ANS: 2

$$-16x^2 + 32x = 0$$
$$-16x(x-2) = 0$$
$$x = 0,2$$

REF: 011524ia
7 ANS: 1

$$80(0.5)^1 = 40$$
$$80(0.5)^4 = 5$$

REF: 060607b
8 ANS: 1

$$25{,}000(0.86)^2 - 25{,}000(0.86)^3 = 18490 - 15901.40 = 2588.60$$

REF: 011508ai
9 ANS: 3

$$p(5) - p(0) = 17(1.15)^{2(5)} - 17(1.15)^{2(0)} \approx 68.8 - 17 \approx 51$$

REF: 061527a2
10 ANS: 1 REF: 019517siii
11 ANS: 3 REF: 018616siii

12 ANS: 3

$f(x+3) = 2(x+3)^2 - 3(x+3) + 4 = 2x^2 + 12x + 18 - 3x - 9 + 4 = 2x^2 + 9x + 13$

REF: 011619a2

13 ANS: 4

$f(a+1) = 4(a+1)^2 - (a+1) + 1$

$= 4(a^2 + 2a + 1) - a$

$= 4a^2 + 8a + 4 - a$

$= 4a^2 + 7a + 4$

REF: 011527a2

14 ANS: 3 REF: 089525siii

15 ANS: 3

$f(-2) = 4(-2)^3 + 6(-2)^2 - (-2) = -32 + 24 + 2 = -6$

REF: 061608a2

16 ANS: 2 REF: 089422siii

17 ANS: 2

$f(-2) = (-2-1)^2 + 3(-2) = 9 - 6 = 3$

REF: 081605ai

F.IF.A.2: Functional Notation 2
Answer Section

1 ANS:
64

REF: 069801siii
2 ANS:
8.64

REF: 019904siii
3 ANS:
−12

REF: 088603siii
4 ANS:
−1

REF: 068602siii
5 ANS:
11

REF: 088501siii
6 ANS:
13

REF: 018701siii
7 ANS:
−4

REF: 068702siii
8 ANS:
−18

REF: 010303siii
9 ANS:
4

REF: 069601siii
10 ANS:
5

REF: 060102siii
11 ANS:
1

REF: 080001siii

12 ANS:

$g(x) = 2(2x+1)^2 - 1 = 2(4x^2+4x+1) - 1 = 8x^2+8x+2-1 = 8x^2+8x+1$

REF: 061625ai

13 ANS:

65. $P(10) = 80(0.98)^{10} \approx 65$

REF: 060721b

14 ANS:

$w(52) - w(38)$ $\quad 15(x-40)+400 = 445$ Since $w(x) > 400$, $x > 40$. I substituted 445 for $w(x)$ and solved for x.

$15(52-40)+400-10(38)$ $\quad 15(x-40) = 45$

$180+400-380$ $\quad x-40 = 3$

200 $\quad x = 43$

REF: 061534ai

15 ANS:

$g(10) = \left(a(10)\sqrt{1-10}\right)^2 = 100a^2(-9) = -900a^2$

REF: 061333a2

F.LE.A.1: Families of Functions
Answer Section

1 ANS: 3 REF: 081412ai
2 ANS: 1 REF: 011623ai
3 ANS: 2 REF: 061624ai
4 ANS: 4 REF: fall0717ia
5 ANS: 4 REF: 061111ia
6 ANS: 3 REF: 061318ia
7 ANS: 1 REF: 060801ia
8 ANS: 3 REF: 081410ai
9 ANS: 3 REF: 011119a2
10 ANS: 1 REF: 010905ia
11 ANS: 4 REF: 081025ia
12 ANS: 2 REF: 061423ia
13 ANS: 1 REF: 061606ai
14 ANS: 3 REF: 011505ai
15 ANS: 4

1) $y = 3x + 2$; 2) $\frac{-5-2}{3-2} = -7$; 3) $y = -2x + 3$; 4) $y = -3x + 5$

REF: 081615ai
16 ANS: 4 REF: 061406ai
17 ANS:
Linear, because the function has a constant rate of change.

REF: 011625ai
18 ANS:
Exponential, because the function does not have a constant rate of change.

REF: 081627ai
19 ANS:
Exponential, because the function does not grow at a constant rate.

REF: 081527ai

F.LE.A.2: Families of Functions 1a
Answer Section

1 ANS: 4
$y = -2x - 5$

REF: 061221ia

2 ANS:
$y = 2x - 3$. The y-intercept is -3, and the line has a slope of 2. The equation for the line is $y = 2x - 3$.

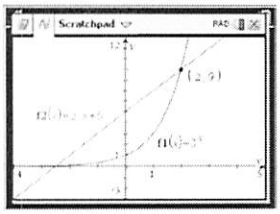
REF: 060225a

3 ANS: 2 REF: 061108a2
4 ANS: 4 REF: fall9902b
5 ANS: 2 REF: 011301a2
6 ANS: 3 REF: 010701b
7 ANS: 2 REF: 080901b
8 ANS: 4 REF: 081604ai
9 ANS: 4 REF: 010211a
10 ANS: 3 REF: 010813a
11 ANS: 2 REF: 080420a
12 ANS: 3 REF: 061415ai
13 ANS: 2 REF: 010113a
14 ANS: 4 REF: 011616ai
15 ANS: 4 REF: 060411b
16 ANS: 4 REF: 060909b
17 ANS: 2 REF: 061513ai
18 ANS: 3 REF: 081118ia

F.LE.A.3: Families of Functions
Answer Section

1 ANS: 1 REF: 081618ai

2 ANS: 1



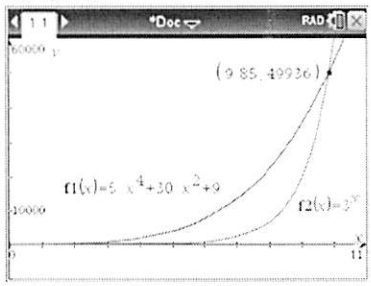
$f(-1) < g(-1)$

$3^{-1} < 2(-1) + 5$

$\frac{1}{3} < 3$

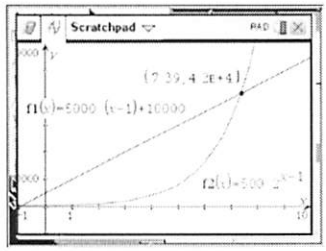
REF: 061515ai

3 ANS: 3



REF: 061621ai

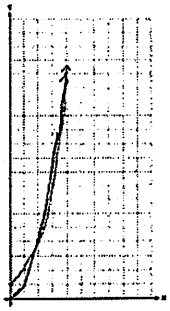
4 ANS: 3



x	$A = 5000(x-1) + 10000$	$B = 500(2)^{x-1}$
6	35,000	16,000
7	40,000	32,000
8	45,000	64,000
9	50,000	128,000

REF: 081518ai

5 ANS:



$g(x)$ has a greater value: $2^{20} > 20^2$

REF: 081533ai

F.IF.B.5: Domain and Range
Answer Section

1 ANS: 2 REF: 011506ai
2 ANS: 1 REF: 011615ai
3 ANS: 4 REF: 061623ai
4 ANS: 2 REF: 081620ai
5 ANS: 4
There are no negative or fractional cars.

REF: 061402ai
6 ANS: 2

$$0 = -16t^2 + 144$$

$$16t^2 = 144$$

$$t^2 = 9$$

$$t = 3$$

REF: 081423ai

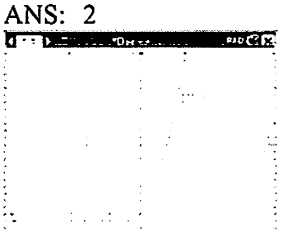
F.IF.A.2: Domain and Range 1a
Answer Section

1 ANS: 1 REF: 061202a2
2 ANS: 3 REF: 061606a2
3 ANS: 1 REF: 010602b
4 ANS: 3 REF: 060804b
5 ANS: 4 REF: 061509ai
6 ANS: 3 REF: 019518siii
7 ANS: 3 REF: 061308a2
8 ANS: 3 REF: 061418a2
9 ANS: 4 REF: 060501b
10 ANS: 3 REF: 010712b
11 ANS: 3 REF: 080708b
12 ANS: 4 REF: 010918b
13 ANS: 4 REF: 061013b
14 ANS: 2 REF: 081003a2
15 ANS: 4 REF: 061518a2
16 ANS:
D: $-5 \le x \le 8$. R: $-3 \le y \le 2$

REF: 011132a2

F.IF.A.2: Domain and Range 3a
Answer Section

1 ANS: 2



$f(x) = x^2 + 2x - 8 = x^2 + 2x + 1 - 9 = (x+1)^2 - 9$

REF: 061611ai

2 ANS: 2 REF: 080204b

3 ANS: 3 REF: 081517a2

4 ANS: 2 REF: 011619ai

5 ANS: 4 REF: 061417ai