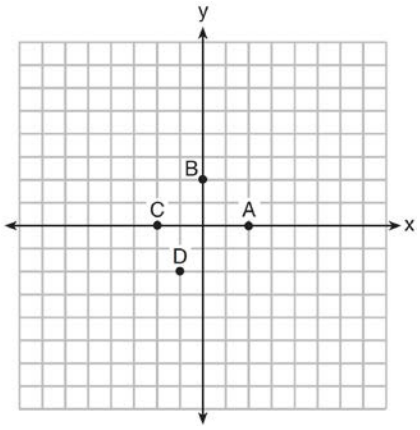
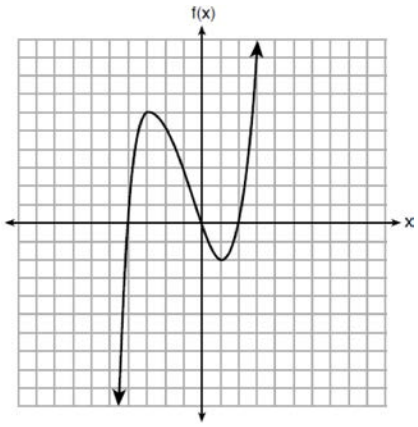
F.IF.A.2: Functional Notation 1

1 The graph of $y = f(x)$ is shown below.



Which point could be used to find $f(2)$?
1) A
2) B
3) C
4) D

2 The graph of $f(x)$ is shown below.



What is the value of $f(-3)$?
1) 6
2) 2
3) –2
4) –4

3 If $f(x) = 4x + 5$, what is the value of $f(-3)$?
1) –2
2) –7
3) 17
4) 4

4 If $f(x) = \frac{3x+4}{2}$, then $f(8)$ is
1) 21
2) 16
3) 14
4) 4

5 Given $f(x) = -3x^2 + 10$, what is the value of $f(-2)$?
1) -26
2) -2
3) 22
4) 46

6 The function $g(x)$ is defined as $g(x) = -2x^2 + 3x$. The value of $g(-3)$ is
1) -27
2) -9
3) 27
4) 45

7 If $g(x) = -x^2 - x + 5$, then $g(-4)$ is equal to
1) -15
2) -7
3) 17
4) 25

8 A function is defined as $K(x) = 2x^2 - 5x + 3$. The value of $K(-3)$ is
1) 54
2) 36
3) 0
4) -18

9 If $f(x) = \frac{1}{2}x^2 - \left(\frac{1}{4}x + 3\right)$, what is the value of $f(8)$?
1) 11
2) 17
3) 27
4) 33

10 If $k(x) = 2x^2 - 3\sqrt{x}$, then $k(9)$ is
1) 315
2) 307
3) 159
4) 153

11 If $f(x) = 2(3^x) + 1$, what is the value of $f(2)$?
1) 13
2) 19
3) 37
4) 54

12 If $f(x) = \frac{\sqrt{2x+3}}{6x-5}$, then $f\left(\frac{1}{2}\right) =$
1) 1
2) -2
3) -1
4) $-\frac{13}{3}$

13 If $f(x) = x^2 + 2x + 1$ and $g(x) = 3x + 5$, then what is the value of $f(1) - g(3)$?
1) 10
2) 8
3) -10
4) -8

14 Given $f(x) = 3x - 5$, which statement is true?
1) $f(0) = 0$
2) $f(3) = 4$
3) $f(4) = 3$
4) $f(5) = 0$

15 If $f(n) = (n-1)^2 + 3n$, which statement is true?
1) $f(3) = -2$
2) $f(-2) = 3$
3) $f(-2) = -15$
4) $f(-15) = -2$

16 If $f(x) = x^2 + 3x$, then which statement is true?
1) $f(1) = f(-1)$
2) $f(2) = f(-2)$
3) $f(1) = f(2)$
4) $f(-1) = f(-2)$

17 Lynn, Jude, and Anne were given the function $f(x) = -2x^2 + 32$, and they were asked to find $f(3)$. Lynn's answer was 14, Jude's answer was 4, and Anne's answer was ±4. Who is correct?
1) Lynn, only
2) Jude, only
3) Anne, only
4) Both Lynn and Jude

18 The value in dollars, $v(x)$, of a certain car after x years is represented by the equation $v(x) = 25{,}000(0.86)^x$. To the *nearest dollar*, how much more is the car worth after 2 years than after 3 years?
1) 2589
2) 6510
3) 15,901
4) 18,490

19 If $f(x) = \frac{-3x-5}{2}$, algebraically determine the value of x when $f(x) = -22$.

20 If $g(x) = -4x^2 - 3x + 2$, determine $g(-2)$.

21 Given $g(x) = x^3 + 2x^2 - x$, evaluate $g(-3)$.

22 If $f(x) = \frac{30x^2}{x+2}$, determine the value of $f\left(\frac{1}{2}\right)$.

23 The piecewise function $f(x)$ is given below.

$$f(x) = \begin{cases} 2x-3, & x > 3 \\ -x^2 + 15, & x \le 3 \end{cases}$$

State the value of $f(3)$. Justify your answer.

24 The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by $w(x)$, where x is the number of hours worked.

$$w(x) = \begin{cases} 10x, & 0 \le x \le 40 \\ 15(x-40) + 400, & x > 40 \end{cases}$$

Determine the difference in salary, *in dollars*, for an employee who works 52 hours versus one who works 38 hours. Determine the number of hours an employee must work in order to earn $445. Explain how you arrived at this answer.

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Answer Section

1 ANS: 1 REF: 061420ai
2 ANS: 1 REF: 081805ai
3 ANS: 2
$f(-3) = -12 + 5 = -7$

REF: 061902ai
4 ANS: 3
$f(8) = \frac{3(8)+4}{2} = \frac{28}{2} = 14$

REF: 082201ai
5 ANS: 2
$f(-2) = -3(-2)^2 + 10 = -12 + 10 = -2$

REF: 012304ai
6 ANS: 1
$g(-3) = -2(-3)^2 + 3(-3) = -18 - 9 = -27$

REF: 011902ai
7 ANS: 2
$g(-4) = -(-4)^2 - (-4) + 5 = -7$

REF: 062311ai
8 ANS: 2
$K(-3) = 2(-3)^2 - 5(-3) + 3 = 18 + 15 + 3 = 36$

REF: 062103ai
9 ANS: 3
$f(8) = \frac{1}{2}(8)^2 - \left(\frac{1}{4}(8) + 3\right) = 32 - 5 = 27$

REF: 081704ai
10 ANS: 4
$k(9) = 2(9)^2 - 3\sqrt{9} = 162 - 9 = 153$

REF: 061802ai
11 ANS: 2
$f(2) = 2(3^2) + 1 = 19$

REF: 012001ai

12 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

13 ANS: 3

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

$$g(3)=3(3)+5=14$$

$$f(1)-g(3)=-10$$

REF: 012410ai

14 ANS: 2

$$f(3)=3(3)-5=4$$

REF: 062202ai

15 ANS: 2

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

REF: 081605ai

16 ANS: 4

$$f(-1)=f(-2)=-2$$

REF: 082318ai

17 ANS: 1

$$f(3)=-2(3)^2+32=-18+32=14$$

REF: 061705ai

18 ANS: 1

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

REF: 011508ai

19 ANS:

$$-22=\frac{-3x-5}{2}$$

$$-44=-3x-5$$

$$-39=-3x$$

$$13=x$$

REF: 012529ai

20 ANS:

$g(-2) = -4(-2)^2 - 3(-2) + 2 = -16 + 6 + 2 = -8$

REF: 081925ai

21 ANS:

$g(-3) = (-3)^3 + 2(-3)^2 - (-3) = -27 + 18 + 3 = -6$

REF: 062426ai

22 ANS:

$$f\left(\frac{1}{2}\right) = \frac{30\left(\frac{1}{2}\right)^2}{\frac{1}{2} + 2} = \frac{\frac{30}{4}}{\frac{5}{2}} = \frac{15}{2} \times \frac{2}{5} = 3$$

REF: 082426ai

23 ANS:

$f(3) = -(3)^2 + 15 = 6$

REF: 012430ai

24 ANS:

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

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

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

200 $x = 43$

REF: 061534ai