F.IF.A.2: Domain and Range 3

1 If $f(x) = \sqrt{9 - x^2}$, what are its domain and range?
1) domain: $\{x \mid -3 \le x \le 3\}$; range: $\{y \mid 0 \le y \le 3\}$
2) domain: $\{x \mid x \ne \pm 3\}$; range: $\{y \mid 0 \le y \le 3\}$
3) domain: $\{x \mid x \le -3 \text{ or } x \ge 3\}$; range: $\{y \mid y \ne 0\}$
4) domain: $\{x \mid x \ne 3\}$; range: $\{y \mid y \ge 0\}$

2 What is the domain of $h(x) = \sqrt{x^2 - 4x - 5}$?
1) $\{x \mid x \ge 1 \text{ or } x \le -5\}$
2) $\{x \mid x \ge 5 \text{ or } x \le -1\}$
3) $\{x \mid -1 \le x \le 5\}$
4) $\{x \mid -5 \le x \le 1\}$

3 Which statement about the function $f(x) = \frac{x-3}{x+2}$ is true?
1) Its domain does not include 2.
2) Its domain does not include 3.
3) Its range does not include 1.
4) Its range does not include $-\frac{3}{2}$.

4 What is the domain of the function $f(x) = \frac{2x^2}{x^2 - 9}$?
1) all real numbers except 0
2) all real numbers except 3
3) all real numbers except 3 and –3
4) all real numbers

5 What is the domain of the function $f(x) = \frac{3x^2}{x^2 - 49}$?
1) $\{x \mid x \in \text{real numbers}, x \ne 7\}$
2) $\{x \mid x \in \text{real numbers}, x \ne \pm 7\}$
3) $\{x \mid x \in \text{real numbers}\}$
4) $\{x \mid x \in \text{real numbers}, x \ne 0\}$

6 The domain of the equation $y = \frac{1}{(x-1)^2}$ is all real numbers
1) greater than 1
2) except 1
3) less than 1
4) except 1 and –1

7 Which negative real number is *not* in the domain of $\frac{3}{x^2 - 4}$?

8 What is the domain of the function $f(x) = \frac{4}{\sqrt{x+1}}$ over the set of real numbers?
1) $\{x \mid x = 1\}$
2) $\{x \mid x \ge -1\}$
3) $\{x \mid x < -1\}$
4) $\{x \mid x > -1\}$

9 What is the domain of the function $f(x) = \frac{4}{\sqrt{x+5}}$ over the set of real numbers?

1) $\{x|x > -5\}$
2) $\{x|x < -5\}$
3) $\{x|x \geq -5\}$
4) $\{x|x = -5\}$

10 In the set of real numbers, what is the domain of $f(x) = \frac{4x}{\sqrt{x-4}}$?

1) $x > 0$
2) $x < 4$
3) $x \geq 4$
4) $x > 4$

11 For $y = \frac{3}{\sqrt{x-4}}$, what are the domain and range?

1) $\{x|x > 4\}$ and $\{y|y > 0\}$
2) $\{x|x \geq 4\}$ and $\{y|y > 0\}$
3) $\{x|x > 4\}$ and $\{y|y \geq 0\}$
4) $\{x|x \geq 4\}$ and $\{y|y \geq 0\}$

12 What is the domain of the function $f(x) = \frac{4}{\sqrt{2x-1}}$ over the set of real numbers?

1) $\left\{x|x = \frac{1}{2}\right\}$
2) $\left\{x|x \geq \frac{1}{2}\right\}$
3) $\left\{x|x < \frac{1}{2}\right\}$
4) $\left\{x|x > \frac{1}{2}\right\}$

13 If $f(x) = \frac{1}{\sqrt{2x-4}}$, the domain of $f(x)$ is

1) $x = 2$
2) $x < 2$
3) $x \geq 2$
4) $x > 2$

14 The domain of $f(x) = -\frac{3}{\sqrt{2-x}}$ is the set of all real numbers

1) greater than 2
2) less than 2
3) except 2
4) between –2 and 2

15 What is the domain of $f(x) = \frac{1}{\sqrt{(4-x^2)}}$?

1) $x < 2$
2) $|x| \leq 2$
3) $-2 < x < 2$
4) all real numbers

16 In which function is the range equal to the domain?

1) $y = 2^x$
2) $y = x^2$
3) $y = \log x$
4) $y = x$

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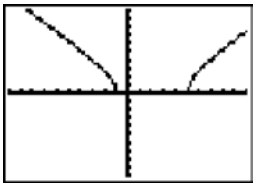
Answer Section

1 ANS: 1 REF: 011313a2

2 ANS: 2

For real solutions, the expression under the radical must be greater than or equal to zero. $x^2 - 4x - 5 \geq 0$
$(x-5)(x+1) \geq 0$. For the product of these two binomials to be positive, both binomials must be either positive or negative. $x-5 \geq 0$ and $x+1 \geq 0$ $\quad$ $x-5 \leq 0$ and $x+1 \leq 0$
$x \geq 5$ and $x \geq -1$ $\quad$ or $\quad$ $x \leq 5$ and $x \leq -1$
$x \geq 5$ $\quad$ $x \leq -1$.



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3 ANS: 3

$$1 = \frac{x-3}{x+2}$$

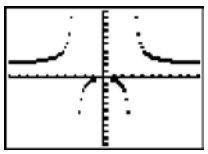
$$x + 2 = x - 3$$

$$0 \neq -5$$

REF: 081623a2

4 ANS: 3

If x = 3 or -3, the denominator of the function is zero, which is undefined.



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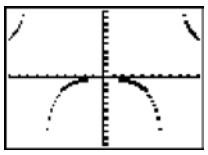
5 ANS: 2

If x = 7 or -7, the denominator of the function is zero, which is undefined.



REF: 010504b

6 ANS: 2 REF: 069725siii

7 ANS:
–2

REF: 010005siii

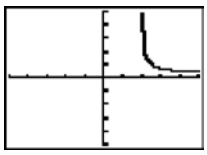
8 ANS: 4 REF: 068728siii

9 ANS: 1 REF: 010228siii

10 ANS: 4 REF: 010424siii

11 ANS: 1 REF: 011416a2
12 ANS: 4 REF: 080227siii
13 ANS: 4

$2x - 4 > 0$
$2x > 4.$
$x > 2$



REF: 010314b
14 ANS: 2 REF: 011521a2
15 ANS: 3 REF: 069829siii
16 ANS: 4 REF: 088716siii