

**A2.A.52: Properties of Graphs of Functions and Relations: Identify relations and functions, using graphs**

- 1 Theresa is comparing the graphs of  $y = 2^x$  and  $y = 5^x$ . Which statement is true?
  - 1) The  $y$ -intercept of  $y = 2^x$  is  $(0, 2)$ , and the  $y$ -intercept of  $y = 5^x$  is  $(0, 5)$ .
  - 2) Both graphs have a  $y$ -intercept of  $(0, 1)$ , and  $y = 2^x$  is steeper for  $x > 0$ .
  - 3) Both graphs have a  $y$ -intercept of  $(0, 1)$ , and  $y = 5^x$  is steeper for  $x > 0$ .
  - 4) Neither graph has a  $y$ -intercept.
- 2 Which statement about the graph of the equation  $y = e^x$  is *not* true?
  - 1) It is asymptotic to the  $x$ -axis.
  - 2) The domain is the set of all real numbers.
  - 3) It lies in Quadrants I and II.
  - 4) It passes through the point  $(e, 1)$ .
- 3 The graph of the equation  $x^2 + y^2 = 4$  can be described as a
  - 1) line passing through points  $(0, 2)$  and  $(2, 0)$
  - 2) parabola with its vertex at  $(0, 2)$
  - 3) circle with its center at the origin and a radius of 2
  - 4) circle with its center at the origin and a radius of 4
- 4 Which statement describes the graph of  $x = 4$ ?
  - 1) It passes through the point  $(0, 4)$ .
  - 2) It has a slope of 4.
  - 3) It is parallel to the  $y$ -axis.
  - 4) It is parallel to the  $x$ -axis.
- 5 The graph of the equation  $x^2 + y^2 = r^2$  forms
  - 1) a circle
  - 2) a parabola
  - 3) a straight line
  - 4) two intersecting lines
- 6 When graphed on the coordinate plane, the equations  $y = 2x^2 + 4x + 5$  and  $x^2 + y^2 = 36$  form
  - 1) a parabola and a straight line
  - 2) a parabola and a circle
  - 3) two parabolas
  - 4) two circles
- 7 Camisha is paying a band \$330 to play at her graduation party. The amount each member earns,  $d$ , varies inversely as the number of members who play,  $n$ . The graph of the equation that represents the relationship between  $d$  and  $n$  is an example of
  - 1) a hyperbola
  - 2) a line
  - 3) a parabola
  - 4) an ellipse
- 8 A commercial artist plans to include an ellipse in a design and wants the length of the horizontal axis to equal 10 and the length of the vertical axis to equal 6. Which equation could represent this ellipse?
  - 1)  $9x^2 + 25y^2 = 225$
  - 2)  $9x^2 - 25y^2 = 225$
  - 3)  $x^2 + y^2 = 100$
  - 4)  $3y = 20x^2$

- 9 What is the axis of symmetry of the graph of the equation  $x = y^2$ ?
- $x$ -axis
  - $y$ -axis
  - line  $y = x$
  - line  $y = -x$
- 10 Which function is symmetrical with respect to the origin?
- $y = \sqrt{x + 5}$
  - $y = |5 - x|$
  - $y = -\frac{5}{x}$
  - $y = 5^x$
- 11 Which equation, when graphed on a Cartesian coordinate plane, would best represent an elliptical racetrack?
- $3x^2 + 10y^2 = 288,000$
  - $3x^2 - 10y^2 = 288,000$
  - $3x + 10y = 288,000$
  - $30xy = 288,000$
- 12 An object orbiting a planet travels in a path represented by the equation  $3(y + 1)^2 + 5(x + 4)^2 = 15$ . In which type of pattern does the object travel?
- hyperbola
  - ellipse
  - circle
  - parabola
- 13 Which equation represents a hyperbola?
- $y^2 = 16 - x^2$
  - $y = 16 - x^2$
  - $y = 16x^2$
  - $y = \frac{16}{x}$
- 14 A designer who is planning to install an elliptical mirror is laying out the design on a coordinate grid. Which equation could represent the elliptical mirror?
- $x^2 = 144 + 36y^2$
  - $x^2 + y^2 = 144$
  - $x^2 + 4y^2 = 144$
  - $y = 4y^2 + 144$
- 15 The graph of which function is symmetric with respect to the graph of the line  $y = x$ ?
- $y = \frac{1}{x}$
  - $y = x^2$
  - $y = x^3$
  - $y = \log x$
- 16 What is the graph of the function  $y = \sqrt{4 - x^2}$ ?
- a circle whose radius is 2 and whose center is at the origin
  - a circle whose radius is 4 and whose center is at the origin
  - the upper half of a circle whose radius is 2 and whose center is at the origin
  - the upper half of a circle whose radius is 4 and whose center is at the origin

- 17 If the equation of the axis of symmetry of a parabola is  $x = 2$ , at which pair of points could the parabola intersect the  $x$ -axis?
- 1)  $(3,0)$  and  $(5,0)$
  - 2)  $(3,0)$  and  $(2,0)$
  - 3)  $(3,0)$  and  $(1,0)$
  - 4)  $(-3,0)$  and  $(-1,0)$
- 18 The graph of the equation  $2x^2 - 3y^2 = 4$  forms
- 1) a circle
  - 2) an ellipse
  - 3) a hyperbola
  - 4) a parabola
- 19 The graph of the equation  $xy = 12$  is best described as
- 1) a circle
  - 2) two lines
  - 3) an ellipse
  - 4) a hyperbola
- 20 Which equation represents an ellipse?
- 1)  $3x^2 = 4 - 5y^2$
  - 2)  $4x^2 = 9 - 4y$
  - 3)  $6x^2 = 9 + 8y^2$
  - 4)  $xy = 12$
- 21 Which graph has line symmetry with respect to the  $y$ -axis?
- 1)  $y = x$
  - 2)  $y = x^2$
  - 3)  $y = \sin x$
  - 4)  $y = \tan x$
- 22 The graph of the equation  $y = 2^x$  intersects
- 1) the  $x$ -axis, only
  - 2) the  $y$ -axis, only
  - 3) the  $x$ -axis and the  $y$ -axis
  - 4) neither the  $x$ -axis nor the  $y$ -axis
- 23 The graph of the function  $f(x) = 3^x$  lies in which quadrant(s)?
- 1) I, only
  - 2) I and II
  - 3) I and III
  - 4) I and IV
- 24 The graph of  $y = \log x$  lies in Quadrant(s)
- 1) I and II
  - 2) II and III
  - 3) III and IV
  - 4) I and IV

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### Answer Section

1 ANS: 3

As originally written, alternatives (2) and (3) had no domain restriction, so that both were correct.

REF: 061405a2

2 ANS: 4	REF: 011219a2
3 ANS: 3	REF: 080528a
4 ANS: 3	REF: 060613a
5 ANS: 1	REF: 010714a
6 ANS: 2	REF: 080723a
7 ANS: 1	REF: 060104b
8 ANS: 1	REF: 080318b
9 ANS: 1	REF: 010419b
10 ANS: 3	REF: 060414b
11 ANS: 1	REF: 060512b
12 ANS: 2	REF: 080517b
13 ANS: 4	REF: 060616b
14 ANS: 3	REF: 080609b
15 ANS: 1	REF: 080714b
16 ANS: 3	REF: 080804b
17 ANS: 3	REF: 080912b
18 ANS: 3	REF: 080920b
19 ANS: 4	REF: 011009b
20 ANS: 1	REF: 061020b
21 ANS: 2	REF: 068120siii
22 ANS: 2	REF: 068430siii
23 ANS: 2	REF: 088434siii
24 ANS: 4	REF: 018535siii