Rising Grade 11 Summer 26 Math Packet

1.

Which of the following is equivalent to log5(25)?

a) 2

b) 5

c) 10

d) 1

2.

What is log2(16) equal to?

a) 4

b) 2

c) 8

d) 3

3.

Solve for x: log3(2x + 1) = log3(5x - 2).

3.

A population follows the model P = 300 log2(t + 1). How many years after the initial measurement will it take for the population to reach 1200?

4.

Which of the following represents the inverse of $f(x) = x^3 + 4$?

- A) $f^{-1}(x) = \sqrt[3]{x - 4}$
- B) $f^{-1}(x) = \sqrt{x} - 4$
- C) $f^{-1}(x) = x^3 - 4$
- D) $f^{-1}(x) = \sqrt[3]{x + 4}$

5.

What is the domain of the function $f(x) = \sqrt{x - 3}$?

- A) $x \geq 3$
- B) $x > 3$
- C) $x \leq 3$
- D) $x < 3$

6.

What is the simplified form of $\sqrt{50} - \sqrt{8}$?

- A) $5\sqrt{2} - 2\sqrt{2}$
- B) $3\sqrt{2}$
- C) $\sqrt{42}$
- D) $\sqrt{58}$

7.

The cube root function $h(x) = \sqrt[3]{x + 5}$ has which transformation compared to $g(x) = \sqrt[3]{x}$?

- A) Shifted 5 units left
- B) Shifted 5 units right
- C) Shifted 5 units up
- D) Shifted 5 units down

8.

What is the simplified form of $\frac{\sqrt{75}+\sqrt{27}}{\sqrt{3}}$?

- A) $4\sqrt{3}$
- B) $6\sqrt{3}$
- C) $8\sqrt{3}$
- D) $10\sqrt{3}$

9.

Find the transformation applied to $g(x) = \sqrt{x}$ to get $f(x) = \sqrt{x-4} + 2$.

10.

A function $f(x) = a\sqrt{x-h} + k$ has a vertex at (3,2). Write a possible equation.

11.

Which of the following is a factor of the expression $x^2 - 5x + 6$?

A) $x - 1$

B) $x - 2$

C) $x - 3$

D) $x - 4$

12.

The expression $2(x-3)^2 - 4$ is equivalent to:

A) $2x^2 - 12x + 14$

B) $2x^2 - 12x + 22$

C) $2x^2 - 18x + 14$

D) $2x^2 - 18x + 22$

13.

Which of the following expressions is equivalent to $x^2 - 16$?

A) $(x - 8)(x + 8)$

B) $(x - 4)(x + 4)$

C) $(x - 2)(x + 2)$

D) $(x - 3)(x + 3)$

14.

The expression $x^2 - 10x + 25$ represents the square of a binomial. Write its factored form.

15.

Find the product of $(2 + 3i)(4 - i)$.

16

The axis of symmetry of a parabola is a line through the focus, parallel to the directrix.

a) True b) False

17

An exponential function of the form $y = ab^{x-h} + k$ has an x-intercept.

a) True b) False

18

if two events A and B are dependent, then the probability that A and B will occur is P(A and B) = P(A) . P(B).

a) True b) False

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19

Find the distance between the centers of the circles with equations

$(x-5)^2+(y-1)^2=16$ *and* $(x+1)^2+(y-9)^2=9$

a) 7 b) 3 c) 10 d) 9

20

Solve the following equation: log (3x + 1) = 2

a) X = $\frac{100}{3}$ c) x = $\frac{1}{3}$

b) X = 33 d) x = 1

22

Which equation represents a parabola that opens downward?

a) $x=2y^2$ b) $y=-2x^2$ c) $x=-2y^2$ d) $y=2x^2$

23

What is the length of the major axis of the ellipse: $16x^2 + 25y^2 = 400$?

a) 16 b) 10 c) 25 d) 20

24

Simplify the following expression: $\log_4 16 - \log_4 8$?

a) ½ b) 2 c) 4 d) 8

25

Which of these conic sections have more than one focus ?

a) Ellipse and hyperbola c) Parabola and ellipse

b) Circle and ellipse d) Circle and Parabola

26

What is the value of : $\log_4 \frac{1}{64}$?

a) – 3 b) -1/3 c) 1/3 d) 3

27

What is the y-intercept of the exponential function below ?

$y = 4^x - 3$

a) - 3 b) 1 c) - 2 d) 4

28

In a recent poll, 48% of Americans said that they shopped online for at least one holiday gift. If a random sample of 10 Americans is selected, what is the probability that at least 7 shopped online for gift ?

a) 3,4% b) 4.8% c) 10.0% d) 14.1%

29

Andres has a bag that contains 4 red, 6 yellow, 2 blue, and 4 green marbles. If he reaches into the bag and removes a marble without looking, what is the probability that it will not be yellow ?

a) $\frac{1}{8}$ b) $\frac{1}{4}$ c) $\frac{3}{8}$ d) $\frac{5}{8}$

30

Mr. and Mrs. Davis are planning to have 3 children. The probability of each child being a boy is 50%. What is the probability that they will have 2 boys ?

a) Solve the following equation using properties of logarithms.

$\log_4 x + \log_4 (x - 6) = 2$

b) Find the extraneous solution of the above equation, if any.

31

Two events, A and B , are independent.

- P(A) = 0. 3
- P(A and B) = 0. 24

What is P(B) ?

32

Write the following exponential equation in logarithm form. $\mathbf{4^{-3} = \frac{1}{64}}$

33

Write an equation for the circle that satisfies the following conditions.

Center (9, - 8), passes through (1, -2)

34

Write an equation for the ellipse that satisfies the following conditions.

Vertices at (-6, 4) and (12, 4), co-vertices at (3, 12) and (3, -4)

35

Write an exponential function for the graph that passes through the given points.

(0, 256) and (4, 81)

36

suppose a certain bacteria duplicates to reproduce itself every 20 minutes. If you begin with one cell of the bacteria, how many will there be after 2 hours

37 a) Write the equation : $x^2 + 8x = 4y - 8$ in standard form.

b) Identify the vertex and the axis of symmetry

c) Find the focus and the directrix

d) Graph the conic section

38

a) Write the following equation in standard form : $x^2 + 4y^2 - 2x + 24y + 21 = 0$

b) Find the coordinates of the center and foci

c) Find the lengths of the major and minor axis of the ellipse

d) Find the coordinates of the vertices and co-vertices

e) graph the ellipse then find the eccentricity of the ellipse.

39

Students were asking how many MP3 players they own

Players X	Frequency
0	9
1	17
2	9
3	5
4	2

a) Construct and graph a probability distribution for each random variable X.
b) Find the expected value of the distribution.
c) Find the variance and standard deviation of the probability distribution.

40

For the function: $y = 2^{x-1} - 3$

Fill in the blank:

a) The graph is translated 1 unit……. (left or right) and 3 units…… (up or down)
b) The domain is …….and the range is……
c) The y-intercept is …….and the x-intercept is…….
d) Make a table of values, then plot the points and sketch the graph.

49

Solve. Simplify your answer.

$\log x + \log 2 = 2$

50

A restaurant server claims that 88% of the time she leaves candy with the bill, the customer "tips well"

If the server's claim is true, and one day she leaves candy with 2 customers' bill, what is the probability that 0 of those customers will tip well?

Write your answer as a decimal rounded to the nearest thousandth.

51

The founders of an online dating website believe there is a 47% chance that a user believes in love at first sight.

If 5 of the website's users are randomly selected to participate in a speed dating event, what is the mean of the number of users who believe in love at first sight?

Write your answer as a decimal.

52

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53

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54

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55

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56

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- D) 8

59

Find the transformation applied to $g(x) = \sqrt{x}$ to get $f(x) = \sqrt{x-4} + 2$.

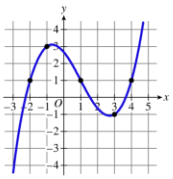
60

Find the exact values of $\sin\frac{\pi}{6}$, $\cos\frac{\pi}{4}$, and $\tan\frac{\pi}{3}$.

61

The function $h(t) = 10\sin(4t) + 5$ models the height of a buoy bobbing up and down in the water over time t in seconds. Find the amplitude, period, and midline of the function.

62



The graph of a function is shown in the xy-plane. What is the average rate of change of the function over the interval $[-1, 4]$?

A -2

B $-\frac{4}{3}$

C $-\frac{3}{4}$

D $-\frac{2}{3}$

63

Duration of Flight (minutes)	Cost
45	$120
60	$165
85	$175
180	$284
210	$346

The table shows the duration of some flights, in minutes, and the corresponding costs of those flights. Using a graphing utility, a linear regression is created to model the cost of a flight in terms of the duration. Based on the linear regression, the predicted cost of a 150-minute flight, rounded to the nearest dollar, is closest to which of the following?

A $230

B $240

C $250

D $260

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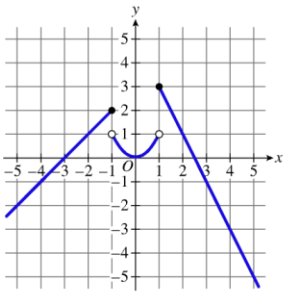
64



unction f is a piecewise function, and the graph of $y = f(x)$ is shown in the xy-plane. Which of the following equations could be the function f?

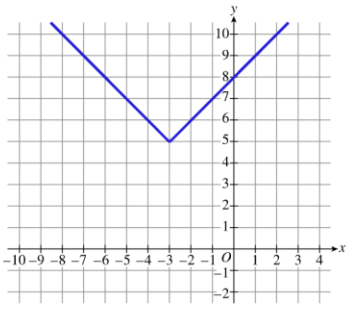
A $f(x) = \begin{cases} -x+3 & x \le -1 \\ x^2 & -1 < x < 1 \\ 2x+5 & x \ge 1 \end{cases}$

B $f(x) = \begin{cases} -x+3 & x < -1 \\ x^2 & -1 \le x \le 1 \\ 2x+5 & x > 1 \end{cases}$

C $f(x) = \begin{cases} x+3 & x \le -1 \\ x^2 & -1 < x < 1 \\ -2x+5 & x \ge 1 \end{cases}$

D $f(x) = \begin{cases} x+3 & x < -1 \\ x^2 & -1 \le x \le 1 \\ -2x+5 & x > 1 \end{cases}$

65



he graph of an absolute value function, $y = f(x)$, is shown in the xy-plane. Which of the following could define the function f ?

A $f(x) = |x-3| - 5$

B $f(x) = |x-3| + 5$

C $f(x) = |x+3| - 5$

D $f(x) = |x+3| + 5$

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66

unction h is defined by $h(x) = \frac{4}{x^2-1}$. If h can be formed by the composition of the functions f and g such that $h(x) = f(g(x))$, which of the following could define functions f and g ?

A $f(x) = \frac{4}{x^2}$ and $g(x) = x - 1$

B $f(x) = \frac{4}{x}$ and $g(x) = x^2 - 1$

C $f(x) = 4x$ and $g(x) = x^2 - 1$

D $f(x) = 4x^2$ and $g(x) = \frac{1}{x} - 1$

67

unction g is defined by $g(x) = \sqrt{x}$, and function f is defined by $f(x) = \sqrt{x+4}$. In the xy-plane, how does the graph of $y = g(x)$ compare to the graph of $y = f(x)$?

A The graph of $y = f(x)$ is a translation of the graph of $y = g(x)$ four units up.

B The graph of $y = f(x)$ is a translation of the graph of $y = g(x)$ four units down.

C The graph of $y = f(x)$ is a translation of the graph of $y = g(x)$ four units to the right.

D The graph of $y = f(x)$ is a translation of the graph of $y = g(x)$ four units to the left.

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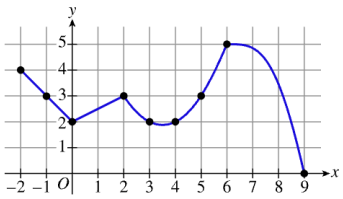
68



unction f is defined on the interval $[-2, 9]$, and the graph of $y = f(x)$ is shown in the xy-plane. Function g is defined by $g(x) = (x+1)^2$.

/hat is the value of $g(f(2))$?

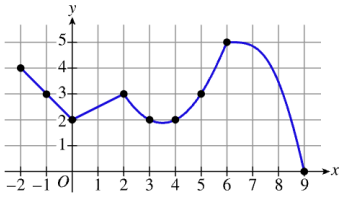
A 0

B 9

C 16

D $g(f(2))$ is not defined.

69



unction f is defined on the interval $[-2, 9]$, and the graph of $y = f(x)$ is shown in the xy-plane. Function g is defined by $g(x) = (x+1)^2$.

/hich of the following expressions has a value of 2 ?

A $(f \circ g)(-3)$

B $(g \circ f)(-3)$

C $(f \circ g)(0)$

D $(g \circ f)(0)$

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70

x	$f(x)$
3	6
6	12
7	15
12	9

unction f is defined by the table shown. Function g is the inverse of function f. What is the value of $(f \circ g)(6)$?

A 3

B 6

C 9

D 12

71

$b > 1$, which of the following expressions must equal 2 ?

A $\log_b(2b)$

B $\log_b(b^2)$

C $\log_{2b}(b)$

D $\log_{2b}(2b^2)$

72

The function f is defined by $f(x) = 2x$, and the function g is defined by $g(x) = \frac{1}{2}x$. Which of the following statements is true about the two functions?

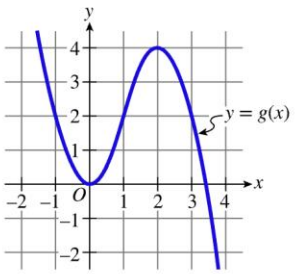
A The functions f and g are inverses of each other, because $f(g(x)) = g(f(x)) = x$.

B The functions f and g are inverses of each other, because $f(x) \cdot g(x) = 1$.

C The functions f and g are not inverses of each other, because $f(g(x)) \neq x$ and $g(f(x)) \neq x$.

D The functions f and g are not inverses of each other, because $f(x) \cdot g(x) \neq 1$.

73



The graph of the function $y = g(x)$ is shown in the xy-plane. If $g(n) = 2$ for a constant n, which THREE of the following could be a value of n ?

A -1

B 0

C 1

D 2

E 3

F 4

74

Function f is defined by $f(x) = \frac{1}{3}(8^x)$. For what value of x is $f(x) = 10$?

A $\frac{1}{3}\log_8(10)$

B $\log_8(30)$

C $\log_{10}(\frac{8}{3})$

D $3\log_8(10)$

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75

x	1	3	9	27
$f(x)$	0	1	2	3

Some input values, x, and the corresponding output values, $f(x)$, are shown in the given table. Which of the following equations best defines f ?

A $f(x) = 3^x$

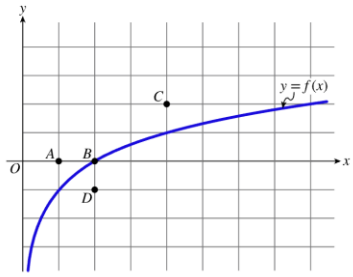
B $f(x) = x^3$

C $f(x) = \log_3(x)$

D $f(x) = \log_x(3)$

76

In the xy-plane, the graph of $y = f(x)$ is shown, where $f(x) = \log_m(x)$ and $m > 1$. Select ONE labeled point in the xy-plane that the graph of $y = g(x)$ could pass through, where $g(x) = \log_m(0.5x)$ and $m > 1$



77

n the xy-plane, angle θ is in standard position and has a measure of $\frac{5\pi}{6}$ radians. An angle in standard position is coterminal with angle θ. Which TWO of the following could be the measure of the angle?

A $-\frac{7\pi}{6}$ radians

B $-\frac{5\pi}{6}$ radians

C $\frac{7\pi}{6}$ radians

D $\frac{11\pi}{6}$ radians

E $\frac{17\pi}{6}$ radians

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78

Function f is defined by $f(x) = \sin(x)$. The graph of function g is a transformation of the graph of function f that consists of a translation of 6 units to the right. Which of the following could define function g ?

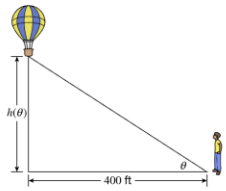
A $g(x) = \sin(x - 6)$

B $g(x) = \sin(x + 6)$

C $g(x) = \sin(x) - 6$

D $g(x) = \sin(x) + 6$

79



Note: Figure not drawn to scale.

A student is standing on the ground watching a hot-air balloon rising straight up. The horizontal distance between the student and the hot-air balloon is 400 feet. Which of the following functions models the height $h(\theta)$, in feet, of the balloon in terms of the angle of elevation, θ ?

A $h(\theta) = \frac{400}{\tan(\theta)}$

B $h(\theta) = 400 \cdot \tan(\theta)$

C $h(\theta) = 400 + \tan(\theta)$

D $h(\theta) = \sqrt{400^2 + (400\tan(\theta))^2}$

80

f $0 \leq x \leq 2\pi$, how many solutions does the equation $\sin(2x) = \frac{\sqrt{3}}{2}$ have?

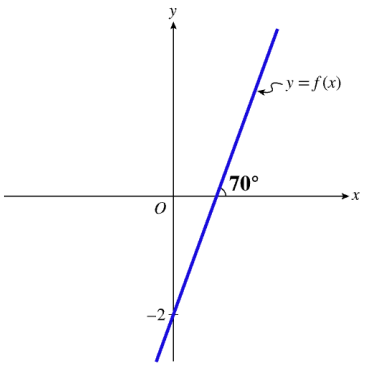
A One

B Two

C Four

D Infinitely many

81



Function f is a linear function. The graph of $y = f(x)$ is shown in the xy-plane. If $f(x) = kx - 2$, where k is a constant, which of the following expressions represents the value of k ?

A $\tan(20^\circ)$

B $\tan(70^\circ)$

C $\tan(110^\circ)$

D $\tan(160^\circ)$

82

Is the secant function even or odd?

a) Even b) odd

Which of the following functions is equal to cos(θ−180°)?

a) $-cos\theta$ b) $cos\theta$ c) $-sin\theta$ d) $sin\theta$

Which of the following functions is equal to cos(90°−θ)?

a) $-sin\theta$ b) $cos\theta$ c) $-cos\theta$ d) $sin\theta$

83

If sin(θ)=35 and 0°<θ<90°,what is cos(θ)?

Write your answer in simplified, rationalized form

84

Gina keeps all her spare keys in a box under her bed. Recently, Gina decided the box was becoming unmanageable, as none of the keys were labeled. She set about labeling them with colored stickers that indicated what each key opened.
The probability that a key opens the front door of the house is 0.9, the probability that it is labeled with a blue sticker is 0.7, and the probability that it opens the front door of the house and is labeled with a blue sticker is 0.6. What is the probability that a randomly chosen key opens the front door of the house or is labeled with a blue sticker?
Write your answer as a whole number, decimal, or simplified fraction.

85

A gate agent looked over a list of passengers on recent flights. The list contained the passengers' Frequent Flyer status as well as the number of bags they checked.
The probability that a passenger has 0 checked bags is 0.17, the probability that a passenger has bronze status is 0.78, and the probability that a passenger has 0 checked bags or bronze status is 0.93.
What is the probability that a randomly chosen passenger has 0 checked bags and bronze status?
Write your answer as a whole number, decimal, or simplified fraction.

86

In an experiment, the probability that event *A* occurs is $\frac{5}{7}$, the probability that event *B* occurs is $\frac{3}{7}$, and the probability that events *A* and *B* both occur is $\frac{3}{8}$. What is the probability that *A* occurs given that *B* occurs?
Simplify any fractions.

87

In an experiment, the probability that event *B* occurs is $\frac{5}{6}$,
and the probability that event *A* occurs given that event *B* occurs is $\frac{1}{9}$
What is the probability that events *A* and *B* both occur?
Simplify any fractions.

88

Write the equation in standard form for the ellipse with vertices (- 7, 0) and (7, 0), and co-vertices (0, 3) and (0, -3).

.

89

Write the equation in standard form for the ellipse with vertices (-3, 11) and (3, 11) and co-vertices (0, 13) and (0, 9)