2016-2017 UCS Accelerated Algebra II Semester 2 Exam Part B Review- Multiple Choice

**1**   Which values of x satisfy: $\sqrt{x-3} + 5 = x$?

    A $x = 4$ only   **C** $x = 4$ and $x = 7$

    B $x = 7$ only   **D** $x = 4$ and $x = -7$

2   Find the x-intercept of the graph of: $f(x) = \log_2(x+5)$.

    A   (5,0)   **C**   (−5,0)

    B   (6,0)   **D**   (−4,0)

3   The y-intercept of the graph of $f(x) = e^x - 4$ is...

    A $(0, -3)$ **C** $(0,5)$

    B $(0, -4)$ **D** $(0,0)$

4   Which of the following functions represents exponential Growth?

    A $y = ab^x, \ a > 1$ **C** $y = ab^x, \ 0 < a < 1$

    B $y = ab^x, \ b > 1$ **D** $y = ab^x, \ 0 < b < 1$

5   A single-celled bacterium doubles every hour. The number N of bacteria after t hours is given by the formula $2^t = N$. What is a reasonable <u>domain</u> for this function?

    A   real numbers   **C**   positive integers

    B   negative integers   **D**   real numbers greater than 0

6 When Pete looks at the ocean, he knows that the distance he can see to the horizon is represented by the function $f(x) = 1.22\sqrt{x}$, where x is his altitude, in feet, above sea level. Which graph shows this function?

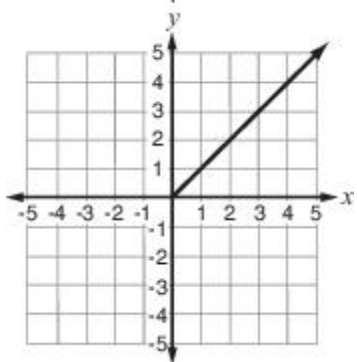**A**
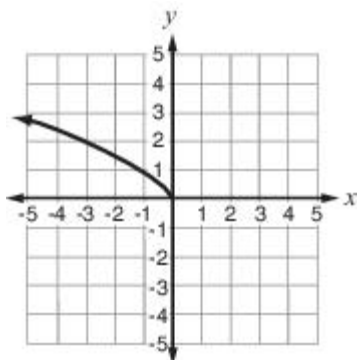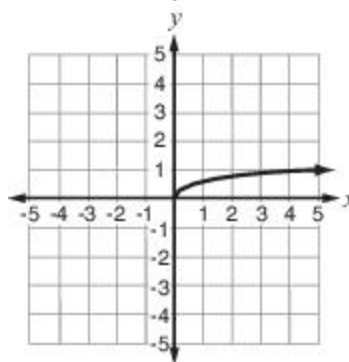

C
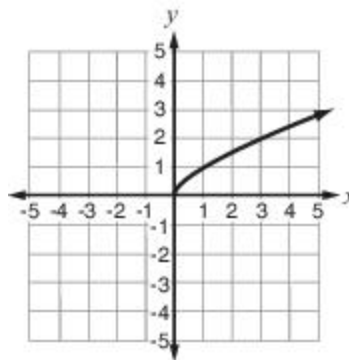
B

D

7 The weight of a human embryo increases at about 28.5% each day. A model for the weight of a human embryo is $W = 0.0125(1.285)^t$ where W is the weight in milligrams and t is the age of the embryo in days. How many days will it take an embryo to weigh 81 milligrams?

A 28 days

C 42 days

B 35 days

D 45 days

8 An initial population of 505 quail increases at an annual rate of 23%. Write an exponential function to model the quail population.
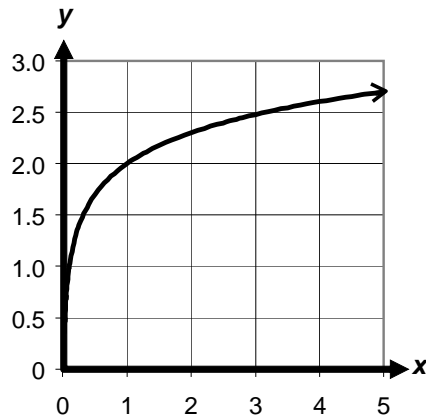
A $f(x) = 505(0.23)^x$

C $f(x) = 505(23)^x$

B $f(x) = (505 \cdot 0.23)^x$

D $f(x) = 505(1.23)^x$

9   Which of the following equations is shown in the graph below?

A $y = \log x + 2$ **C** $y = \log 2x$

B $y = \log (x + 2)$ **D** $y = 2 \log x$

10   The value of an object decreases by 15% each year. The value of the object can be modeled with the equation $A = P(0.85)^t$, where P is the original value and A is the value after t years. What is a reasonable <u>range</u> for this function?

A   real numbers   **C**   positive integers

B   negative integers   **D**   real numbers greater than 0

11   Given the two functions, $f(x) = 6x^2 - 3x + 4$ and $(x) = 4x - 9$, what is $(f + g)(x)$?

A $(f + g)(x) = 6x^2 + x - 5$ **C** $(f + g)(x) = 6x^2 - 7x - 5$

B $(f + g)(x) = 6x^2 + 7x - 5$ **D** $(f + g)(x) = 6x^2 - 7x + 13$

12   For the equation $10 - 3^{2x} = -16$, what is the approximate value of x ?
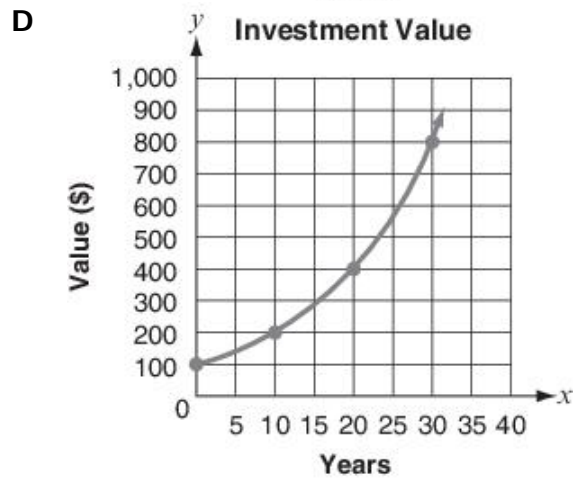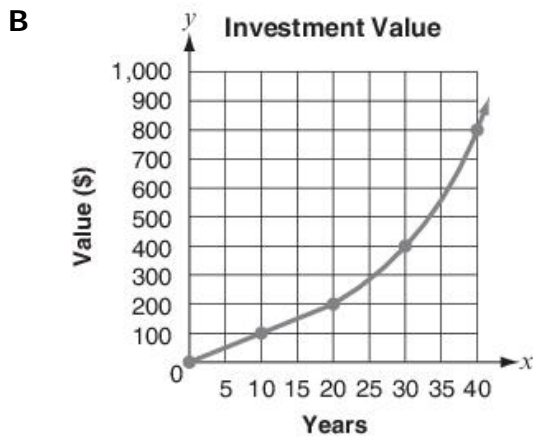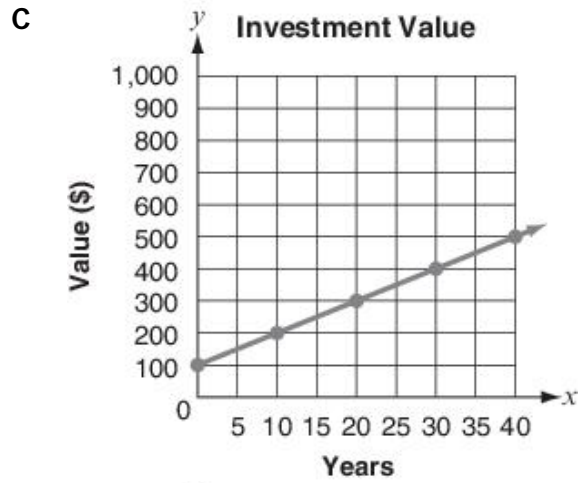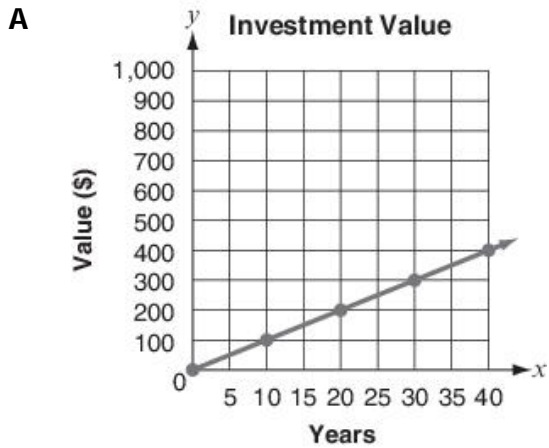
A   -1.48   **C**   0.82

B   -0.82   **D**   1.48

13 An initial investment of $100 is expected to double in value every 10 years. Which graph BEST models the investment's value?

A

Investment Value

C

Investment Value

B

Investment Value

D

Investment Value

14 What is the inverse of $f(x) = \log_4 x$?

A $f^{-1}(x) = 4\log x$

C $f^{-1}(x) = x^4$

B $f^{-1}(x) = 4^x$

D $f^{-1}(x) = \log_x 4$

15 Which shows $1000 = b^3$ as a logarithm?

A $\log_3 1000 = b$

C $\log_b 1000 = 3$

B $\log_3 b = 1000$

D $\log_{1000} 3 = b$

16 Given a bag containing 100 pieces of candy. Use the results in the table to determine which statement BEST describes the colors of the candy in the bag?

Selection	1	2	3	4	5	6	7	8	9	10
Color	Green	Red	Red	Yellow	Red	Green	Red	Yellow	Red	Red

A   The bag holds more pieces of green candy than red candy.

B   The bag holds more pieces of yellow candy than green candy.

C   There are approximately 60 pieces of red candy in the bag.

D   There are approximately 25 pieces of yellow candy in the bag.

17 Javier picks a number from 1 to 10 and then spins a spinner with three evenly distributed colors of red, yellow, and blue. What is the probability that Javier will choose an even number followed by spinning the color blue on the spinner?

A $\dfrac{1}{6}$

B $\dfrac{1}{30}$

C $\dfrac{1}{15}$

D $\dfrac{1}{100}$

18 The size (S) of a bacteria colony doubles every hour. At the start of an experiment, $S=1200$. Which formula can be used to model the size of the colony, where t is the number of hours after the start of the experiment?
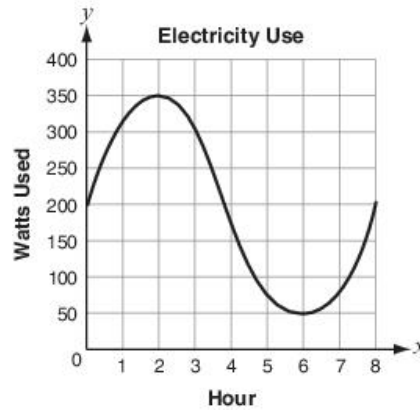
A $S = 1,200\ (t)^2$

B $S = (1,200 \times 2)^t$

C $S = 1,200(2)^t$

D $S = 1,200\ (2)\ (t)$

19 The amount of electricity used during an 8-hour period is shown in the graph. What is the range of this function?

A	$0 \le w \le 400$
B	$2 \le h \le 6$
C	$50 \le w \le 350$
D	$0 \le h \le 8$

Electricity Use

20 Two functions used to predict the population of two cities t years from now are shown below. $A(t)$ represents the population of Albene, and $B(t)$ represents the population of Brookside.

$A(t) = 212{,}000(1.015)^t$
$B(t) = 174{,}500(0.992)^t$

Which statement correctly compares the two functions?

A The current population of Brookside is 2.3% less than the current population of Albene.

B The growth rate of Brookside's population is 2.3% greater than the growth rate of Albene's population.

C The population of Albene is increasing by 1.5% each year, whereas the population of Brookside is decreasing by 0.8% each year.

D The population of Albene will change by 30% over the next 20 years, whereas the population of Brookside will change by 16% over the same period of time.

21 Michelle and Jesse are graphing exponential equations on a coordinate grid. Michelle first graphs the equation, $y = 2^x$. Jesse will graph, $y = 2^{x+4} + 1$. Which statement describes how Jesse can use Michelle's graph to create her graph?

A Jesse can shift Michelle's graph left 4 units and up 1 unit.

B Jesse can shift Michelle's graph right 4 units and up 1 unit.

C Jesse can shift Michelle's graph left 4 units and down 1 unit.

D Jesse can shift Michelle's graph right 4 units and down 1 unit.

22 Which graph represents the function $f(x) = -\log(x + 4)$.

A

C

B

D
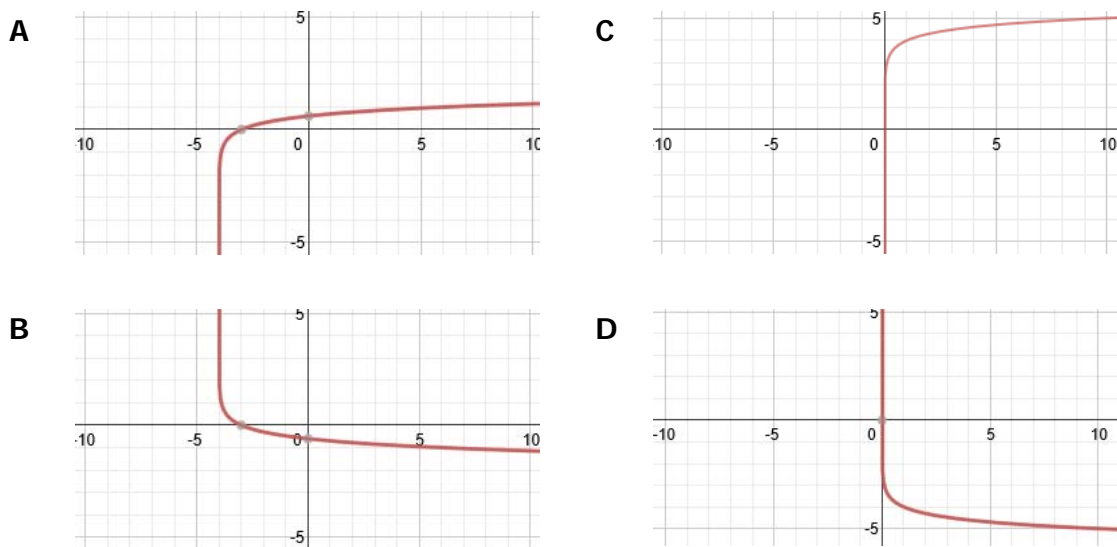
23 The functions $f(x) = 2^x$ and $g(x) = x + 1$ are graphed on the set of axes below, and they are tangent at (0, 1) .
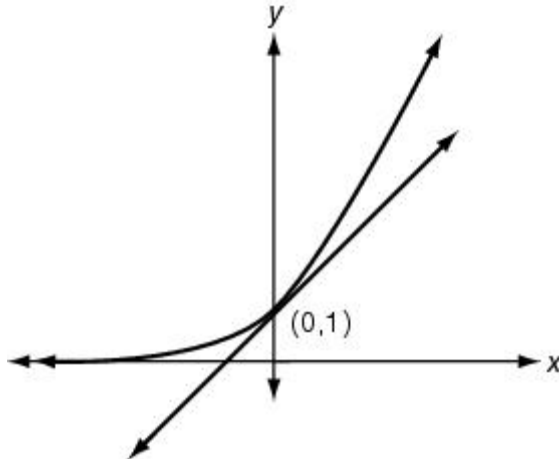
Which set of statements are true about these two functions?

A Domain of $f(x)$ = domain of $g(x)$. Range of $f(x)$ = range of $g(x)$. The equation $f(x) = g(x)$ has one solution.

B Domain of $f(x)$ = range of $g(x)$. Range of $f(x)$ = domain of $g(x)$. The equation $f(x) = g(x)$ has one solution.

C Domain of $f(x)$ = domain of $g(x)$. Range of $f(x) \neq$ range of $g(x)$. The equation $f(x) = g(x)$ has one solution.

D Domain of $f(x) \neq$ range of $g(x)$. Range of $f(x)$ = domain of $g(x)$. The equation $f(x) = g(x)$ has one solution.

24 What is the sine of the angle $\dfrac{5\pi}{6}$?

A $\dfrac{1}{2}$

B $\dfrac{\sqrt{3}}{2}$

C $-\dfrac{1}{2}$

D $-\dfrac{\sqrt{3}}{2}$

25 Given that $cos\theta = \dfrac{4}{5}$ and $sin\theta < 0$. Find $sin\theta$, using the Pythagorean Identity: $sin^2\theta + cos^2\theta = 1$.

A $-\dfrac{3}{5}$

B $\dfrac{3}{5}$

C $-\dfrac{9}{25}$

D $\dfrac{9}{25}$

26 Sue's school has a calling tree to notify students when the school is closed due to bad weather. Sue is one of 25 original callers. Each of these callers contacts 3 others, and each of them calls 3 more, and so on. The number of people doing the calling is listed in the sequence:

25, 75, 225, ...

The formula for the *n*th term in this geometric sequence is

$$a_n = a_1 r^{n-1}$$

where a_n represents the nth term, a_1 represents the first term, r represents the common ratio, and n represents the number of the term in question. Which equation shows the substitution that will allow us to determine the 5th term?
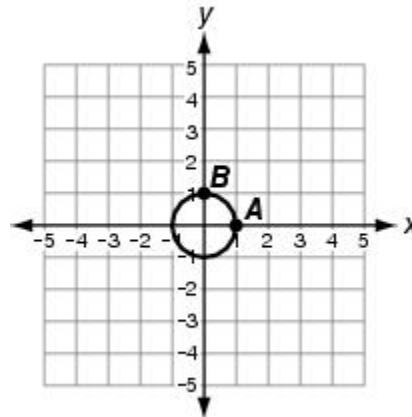
A $a_5 = 25(3)^4$ **C** $a_5 = 75(3)^4$

B $a_5 = 25(4)^3$ **D** $a_5 = 75(4)^3$

27 Joe is riding on a Ferris wheel. The lowest point on the Ferris wheel is 6 feet above the ground; the highest point is 42 feet above the ground. The Ferris wheel completes a cycle every 10 minutes. If Joe starts at the bottom of the Ferris wheel, which equation models Joe's distance from the ground, in y feet, x minutes after he starts riding the Ferris wheel?

A $y = -18\cos\left(\dfrac{\pi x}{5}\right) + 6$ **C** $y = -36\cos\left(\dfrac{\pi x}{10}\right) + 6$

B $y = -18\cos\left(\dfrac{\pi x}{5}\right) + 24$ **D** $y = -36\cos\left(\dfrac{\pi x}{10}\right) + 24$

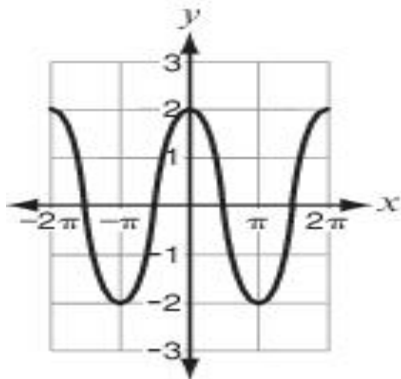**28** Look at the graph below. What is the measure of the central angle, in radians, from A to B?

A $\dfrac{\pi}{6}$
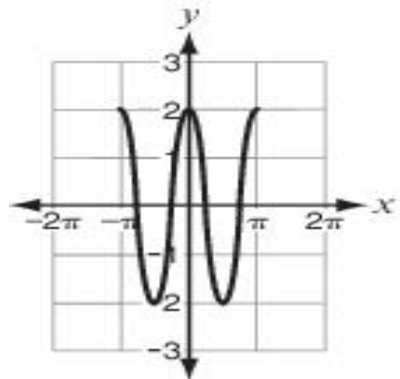
B $\dfrac{\pi}{4}$

C $\dfrac{\pi}{3}$

D $\dfrac{\pi}{2}$

29 The XYZ Chip Company manufactures computer chips. It predicts that the rate of defective chips is 3 out of 10,000. Four companies ordered computer chips from the XYZ Chip Company. Each company recorded the number of chips it ordered as well as the number of defective chips that were found in each order. Their results are shown in the table below.

Computer Chip Orders

Company Placing Orders	Number of Chips Ordered	Number of Defective Chips
Company A	500	2
Company B	29,000	9
Company C	112,400	12
Company D	222,600	20

Which company's order was MOST consistent with the manufacturer's prediction?

A company A

B company B

C company C

D company D

30 Given a standard deck of 52 cards, what is the probability of drawing a Queen **or** a heart?

A $\dfrac{17}{52}$

B $\dfrac{16}{52}$

C $\dfrac{4}{52}$

D $\dfrac{13}{52}$

31 Which graph BEST represents the equation $(x) = 2\cos(x)$?

A

C

B
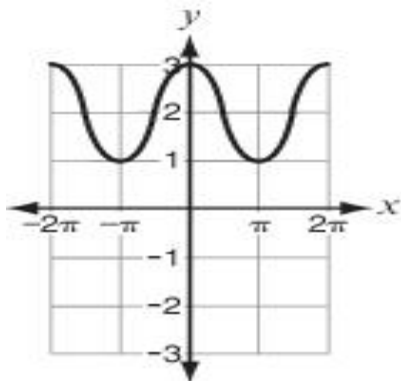
D
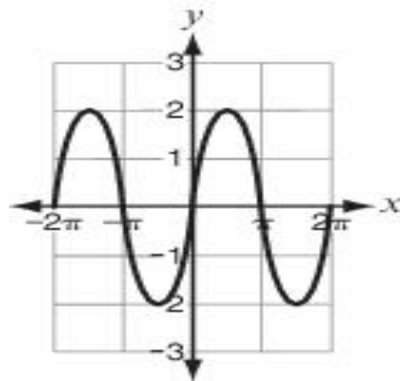
32 What is the $\cos\frac{5\pi}{3}$?

A $\quad \dfrac{\sqrt{3}}{2}$

C $\quad \dfrac{1}{2}$

B $\quad -\dfrac{3}{2}$

D $\quad -\dfrac{1}{2}$

33 How does the graph of the equation $y = \cos(2x)$ differ from the equation of $= \cos(x)$?

A   The amplitude is multiplied by 2.

C   The cycle length is multiplied by 2.

B   The centerline is shifted up 2.

D   The cycle length is divided by 2.

34 Given the following functions:

- $f(x) = 6 + 5x - 3x^2 - 5x^3$
- $g(x) = 4x + 5x^2 + 2x^3 - 3$

Evaluate $f(x) - g(x)$.

A $-7x^3 - 8x^2 + x + 3$ **C** $-7x^3 - 8x^2 + x + 9$

B $-3x^3 + 2x^2 + 9x + 3$ **D** $3x^3 - 2x^2 + 9x - 9$

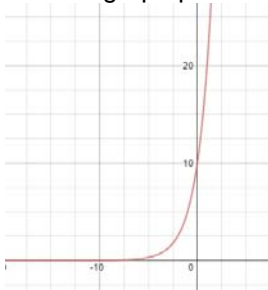**35** Find the point of intersection for the following functions.

- $y = x + \sqrt{32 - 4x}$
- $y = 8$

A $x = 4 \; only$ **C** $x = -4 \; or \; x = 8$

B $x = -8 \; only$ **D** $x = 4 \; or \; x = 8$

36 Given the continuously compounded interest formula $A = 1{,}000e^{(.04 \cdot 7)}$. What is the initial value and rate?

A $P = 1{,}000$ **C** $P = 1.025$
       $r = 4\%$ $r = 4\%$

B $P = 1{,}000$ **D** $P = 1.025$
       $r = 7\%$ $r = 7\%$

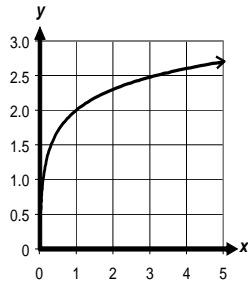**37** Write an exponential function for the graph pictured.

A $y = 10(5)^x$ **C** $y = 10(.5)^x$

B $y = 10(2)^x$ **D** $y = 5(2)^x$

38 Jean opens a savings account with an initial deposit of $2,000 and her interest is compounded continuously at a rate of 4%. What would be the balance of her account after 3 years?

A $2250   **C** $2000.13

B $6240   **D** $2255

39

The graph above represents a logarithmic function.

What is the minimum y-value within the domain of $1 \le x \le 4$?

A   4   C   3

B   2   D   0

40   Solve for x: $\log_5 x = 4$

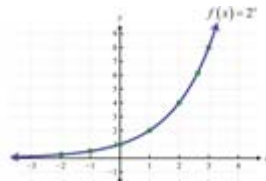A $x = 625$ C $x = 1024$

B $x = 20$ D $x = 1$

41   Compare the following two functions:

- $h(x) = 5x + 1$
- $g(x) = 3^x - 2$

A   They are both exponential functions.   C $g(x)$ is an exponential function and $h(x)$ is linear.

B   Both functions have a y-intercept of 1.   D   Both functions are linear.

42   The graph $f(x) = 2^x$ is shown below. What function would result if this graph was translated up 2 units and reflected over the x-axis?

A $f(x) = 2^x - 2$ C $f(x) = 2^{-x} + 2$

B $f(x) = -2^x + 2$ D $f(x) = -2^x - 2$

43 Which statement is true about the graph pictured below?
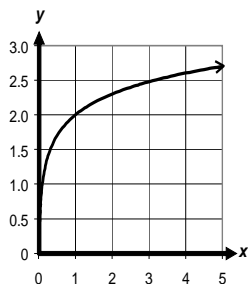
A The domain is greater than 1.

B The domain is all real numbers.

C The domain is greater than or equal to zero.
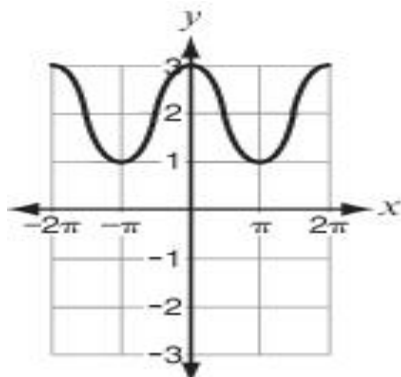
D The domain is greater than zero.

44 The expression $y = \ln 6$ can be re-written as which of the following expressions?

A $y = \log_6 e$

B $y = \log_{10} e$

C $y = \log_e 6$

D $y = \log e$

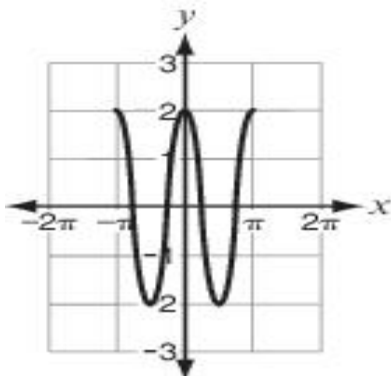**45** Evaluate: $3 \log_2 64 + \log_2 8$

A 72

B 3

C 24

D 21

46 State the domain and range of the sine function graphed below.

A Domain: all real numbers
Range: all real numbers

B Domain: all real numbers
Range: $1 \le y \le 3$

C Domain: $1 \le x \le 3$
Range: all real numbers

D Domain: all real numbers
Range: $1 \ge y \ge 3$

47 Which of the following is FALSE for the cosine function graphed below?

A   Amplitude= 2   **C**   Translated right $\frac{\pi}{2}$ units

B   Period=π **D**   None of the above.

48 Write the equation for $y = \sin x$ that satisfies the following conditions:
- Amplitude= 4
- Period= 2π

A $y = 4\sin(x)$ **C** $y = 4\sin(2x)$

B $y = 2\sin(4x)$ **D** $y = \sin(2x)+4$

49 Which if the following pairs of angles are coterminal to one another?

A $\frac{2\pi}{3}$ and $\frac{4\pi}{3}$ **C** $\frac{2\pi}{3}$ and $\frac{8\pi}{3}$

B $\frac{2\pi}{3}$ and $\frac{\pi}{3}$ **D** $\frac{2\pi}{3}$ and $\frac{9\pi}{3}$

50 Given the following triangle, find $\sin \theta$ and $\cos \theta$.

A $\sin \theta = \frac{3}{5}, \cos \theta = \frac{3}{4}$ **C** $\sin \theta = \frac{4}{5}, \cos \theta = \frac{3}{5}$
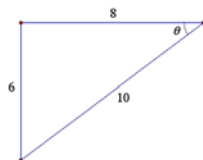
B $\sin \theta = \frac{3}{5}, \cos \theta = \frac{4}{5}$ **D** $\sin \theta = \frac{3}{4}, \cos \theta = \frac{4}{3}$

51 Which equation represents the data in the table below?

x	y
-3	8
-2	4
-1	2
0	1
1	$\frac{1}{2}$
2	$\frac{1}{4}$
3	$\frac{1}{8}$

A $y = (0.5)^x$ **C** $y = (0.5)^{x-1}$

B $y = 0.5(1)^{x-1}$ **D** $y = 0.5(1)^x$

52 Jessie was conducting an experiment with bacteria. She started with 12 cells, on the second day she had 48 cells, and 192 cells by the third day. Assuming that this pattern continues, what is the recursive rule that could be used to determine the number of bacteria cells that Jessie observed?

A $a_1 = 12,\quad a_n = 12a_{n-1}$ **C** $a_1 = 1,\quad a_n = 12a_{n-1}$

B $a_1 = 1,\quad a_n = 4a_{n-1}$ **D** $a_1 = 12,\quad a_n = 4a_{n-1}$

53 Assuming that the following students all conducted the same experiment, which of them would you expect to be closest to the theoretical probability?
- Joey conducted 22 trials.
- James conducted 68 trials.
- Michelle conducted 50 trials.

A Joey **C** Michelle

B James **D** There is not enough information given.

54 If Kate rolls a 6-sided number cube **and** spins a spinner with 4 options, what is the total number of outcomes that Kate could expect?

A 24 **C** 12

B 10 **D** 2

55 Justin has a bag full of Jolly Ranchers, there are 26 grape and 20 watermelon in the bag. If he eats 4 watermelon and then 2 grape jolly ranchers, what is the probability that the 7th jolly rancher he grabs out of the bag will be grape?

A 24/46 **C** 24/26

B 26/40 **D** 24/40

56 Al works for his Grandparents. They are paying him $0.20 on day one, $0.40 on day two and $0.80 on day three. If his pay rate continues in this pattern how much will he make on the 18th day?

A $36.00   **C** $52,428.00

B $131,072.00   **D** $26,214.40

57 Al works for his Grandparents. They are paying him $0.20 on day one, $0.40 on day two and $0.80 on day three. If his pay rate continues in this pattern what is the total amount of money he will make by the end of the 10th day?

A $204.80   **C** $513.00

B $204.60   **D** $102.40

58 Jack shoots 75 free throws in the first half of the season and makes 60 of them. If Jack shoots 90 free throws in the second half of the season. How many free throws do you expect Jack to make in the second half of the season?

A   60   **C**   90

B   72   **D**   67