

RIISING GRADE 12A SUMMER REVIEW PACKET
DUE ON THE FIRST DAY OF SCHOOL

The problems in this packet are designed to help you review topics from previous mathematics courses that are essential to your success in your next math class. **You are expected to bring this completed packet to class on the first day of school.** In addition, this packet will count as part of your first quarter grade. **Upon returning, you will be ASSESSED on the content of this packet.** All contents outlined in the packet are Pre-Calculus Honors objectives. Neatly **SHOW YOUR WORK** on a separate sheet of paper.

Week 1

Q1: Directions - Based on the equation, determine if it represents exponential growth or exponential decay.

Equation	Growth or Decay?
$y = 400 \cdot 99^x$	<input type="text" value="a"/>
$y = 0.5 \cdot 3^x$	<input type="text" value="b"/>
$y = 12 \cdot 4^x$	<input type="text" value="c"/>
$y = 100 \cdot \left(\frac{1}{2}\right)^x$	<input type="text" value="d"/>

a. Exponential Growth
 Exponential Decay

b. Exponential Growth
 Exponential Decay

c. Exponential Growth
 Exponential Decay

d. Exponential Growth
 Exponential Decay

Q2: Rewrite the equation in exponential form.

$$\log_a b = c$$

- A $a^b = c$
- B $b^a = c$
- C $b^c = a$
- D $a^c = b$

Q3: Solve the equation $\log(x - 7) = 2$ Please input the answer 9999 for "No Solution".

Q4: Directions - Identify the key components, create an exponential equation, then answer the questions.

Exponential Form: $y = a \cdot b^x$, a is the starting value, b is the base (rate).

In a small town, the stray dog population is rapidly increasing. there are currently 15 stray dogs, and it is estimated that the population will triple every year. How many dogs will there be after 1 year? 2 years? 3 years?

1) a = <input type="text"/>	4) Dogs after 1 years = <input type="text"/>
2) b = <input type="text"/>	5) Dogs after 2 years = <input type="text"/>
3) Equation: <input type="text"/>	6) Dogs after 3 years = <input type="text"/>

Q5: Solve the equation $3 \log_5 (x - 2) + 1 = 13$ Please input the answer 9999 for "No Solution".

Q6: 1) Solve the following equation using properties of logarithms.

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

$$x =$$

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

$$x =$$

- a. 4
- 2
- 2
- no extraneous solution

Q7: Part A

A function $g(x)$ is obtained by shifting the graph of the function $f(x) = x^2$ three units left, stretching the graph vertically by a factor of two, reflecting that result over the x -axis, and then translating the graph up four units. Determine the equation of the function $g(x)$.

Choose the suitable option:

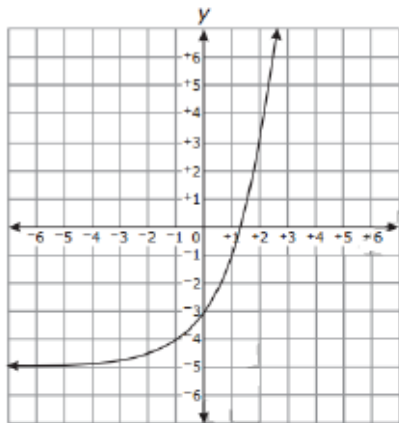
- A $2(x + 3)^2 + 4$
- B $-2(x - 3)^2 + 4$
- C $-2(x + 3)^2 + 4$
- D None of the above

Part B

The function $g(x)$ is now transformed 2 units up to obtain another function $h(x)$.

The equation of the function $h(x)$ is .

Q8: The function $f(x) = 2(2)^x$ was replicated with $f(x) + k$, resulting in the function graphed below.



What is the value of k ?

$k =$

Q9: Solve the equation $\log_8(x - 6) = \log_8(-x - 4)$. Please input the answer 9999 for "No Solution".

Q10: In a class of 25 students, $\frac{3}{5}$ of the class are boys, $\frac{2}{5}$ of the class have blonde hair, and $\frac{1}{5}$ of the class are boys with blonde hair.

If one student is to be chosen at random from the class, what is the probability that the student is a boy or has blonde hair?

Show your work on the scratchpad.

P (boy or blonde hair) =

Q11: Calculate the following probabilities if an individual is chosen at random that had participated in the survey that was used to produce the following chart.

	Use Pinterest	Do Not Use Pinterest	Total
Use Instagram	45	26	71
Do Not Use Instagram	23	6	29
Total	68	32	100

If an individual is chosen that uses Instagram the probability that they use Pinterest is .

If an individual is chosen that uses Pinterest the probability that they use Instagram is .

a. 0.66
 0.63

b. 0.66
 0.63

Q12: Two events, A and B , are independent.

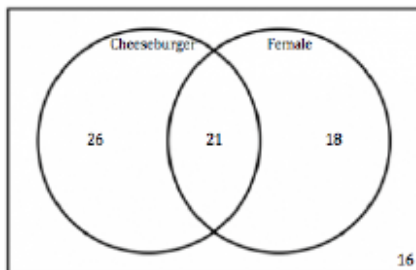
- $P(A) = 0.3$
- $P(A \text{ and } B) = 0.24$

What is $P(B)$?

$P(B) =$

Week 2

Q1: A survey was conducted between males and females to see if they prefer cheeseburgers or hamburgers. The results of the survey are posted in the Venn diagram below.



Find the following probabilities as a percent. If necessary, round to the nearest whole

$$P(\text{cheeseburger} \mid \text{female}) = \boxed{} \%$$

$$P(\text{hamburger} \mid \text{male}) = \boxed{} \%$$

$$P(\text{cheeseburger}) = \boxed{} \%$$

Q2: The probability that the event A occurs is $\frac{3}{4}$, the probability that event B occurs is $\frac{5}{8}$, and the probability that events A and B both occur is $\frac{5}{9}$. What is the probability that A occurs given that B occurs?

Answer:

Note: Use slash (/) to separate numerator from denominator.

Q3: One household is to be selected at random from a town.

The probability that the household has a cat is 0. 2.

The probability that the household has a dog is 0. 4.

The probability that the household has a cat or a dog is 0. 5.

What is the probability that the household has a dog AND a cat?

Q4:

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

Students were ask how many MP3 players they own

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

Q5: *Bonus!!!!*

Solve the system using Cramer's Rule and enter the appropriate values.

$$x - 3y + z = -7$$

$$-4x + 0y - 6z = 4$$

$$2x + 3y + 2z = 4$$

$$D = \text{[input box]}$$

$$D_x = \text{[input box]}$$

$$D_y = \text{[input box]}$$

$$D_z = \text{[input box]}$$

$$x = \text{[input box]}$$

$$y = \text{[input box]}$$

$$z = \text{[input box]}$$

Q6: State the order (dimensions) of the matrix below

$$\begin{bmatrix} 4 & 5 & 6 & 7 \\ 1 & 2 & 3 & 4 \end{bmatrix}$$

Q7: Given the matrix below find a_{31}

$$\begin{bmatrix} 2 & 5 & -7 \\ 9 & 11 & 40 \\ 25 & 0 & 6 \end{bmatrix}$$

Q8: Multiply if possible. If not possible, write "no solution". MAKE SURE YOUR ANSWER IS A MATRIX!!

$$A = \begin{bmatrix} 4 & 3 \\ 7 & -2 \end{bmatrix}$$

$$B = \begin{bmatrix} -4 & 2 & 10 \\ 8 & -7 & 9 \end{bmatrix}$$

Find AB

Q9: Find the determinant for...

$$\begin{bmatrix} 6 & 4 \\ 2 & -1 \end{bmatrix}$$

Q10: Find the determinant

$$\begin{bmatrix} 0 & 2 & 3 \\ 1 & -1 & 4 \\ 3 & 0 & 2 \end{bmatrix}$$

Q11: Find the inverse

$$\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$$

Q12: Find the inverse

$$\begin{bmatrix} 1 & 3 & -1 \\ 0 & 2 & 1 \\ -1 & 1 & -2 \end{bmatrix}$$

Q13: Find the unit vector, u , in the direction of the given vector w .

$$w = 3i + 3j$$

$u =$

Week 3

Q1: Find the component form of each vector. USE PROPER NOTATION, round to 1 decimal place when necessary.

$$\|u\| = 20, \text{ angle} = 150^\circ$$

Q2: Determine the unit vector, u , in the direction of the given vector w .

$$w = \langle -6, -8 \rangle$$

$u =$

Q3: Find the direction angle of each vector. Round all answers to ONE decimal point as needed.

$$s = \langle 6, -2 \rangle$$

Q4: Find the direction angle of each vector. Round all answers to ONE decimal point as needed.

$$v = -3i - 7j$$

Q5: Find the component form of each vector. USE PROPER NOTATION, round to 1 decimal place when necessary.

$$\|s\| = 10, \text{ angle} = 315^\circ$$

Q6: Determine the component form and the magnitude

Part A

A vector begins at (1, 3) and ends at (5, 6). Determine the component form! Your answer will be an ordered pair with $\langle \rangle$ instead of $()$, example $\langle 2, 5 \rangle$

Part B

Find the magnitude, simplify as much as possible!

Q7: In the matrix below, find c_{32}

$$C = \begin{bmatrix} -1 & 2 \\ -5 & 4 \\ 3 & 0 \\ 7 & -8 \end{bmatrix}$$

Q8: Solve the system of equations. Write your answer as a list of numbers separate by parentheses. (Hint: what number do we use as a placeholder when something is missing?)

$$x - 3z = -2$$

$$3x + y - 2z = 5$$

$$2x + 2y + z = 4$$

Q9: A boat is traveling at 45 knots bearing 210° against a current moving 7 mph at $N75^\circ E$.

Part A

Determine the actual speed of the boat in the current, round all answers to nearest whole number.

Part B

Determine the actual bearing (direction) of the boat.

Q10: A vector parallel to $1i + 2j + 3k$ with the magnitude $\sqrt{56}$ is

- A** $-i - 2j - 3k$
 - B** $2i + 4j + 6k$
 - C** $4i + 2j + 6k$
 - D** $4i + 8j + 12k$
-

Q11: Which of the following is the correct pair of vector and parametric equations for the line containing the point P $(4, 0, 2)$ and parallel to $v = (1, -4, 2)$?

- A** *Parametric* : $x = 4 + t, y = -4t, z = 2 + 2t$
Vector : $(x, y, z) = (4, 0, 2) + t(1, -4, 2)$
 - B** *Parametric* : $x = 1 + 4t, y = -4, z = 2 + 2t$
Vector : $(x, y, z) = t(1, -4, 2)$
 - C** *Parametric* : $x = t, y = -4t, z = 2t$
Vector : $(x, y, z) = t(1, -4, 2)$
 - D** *Parametric* : $x = 1, y = -4, z = 2$
Vector : $(x, y, z) = (4, 0, 2) + t(1, -4, 2)$
-

Q12: Which of the following is not a point on the plane with Cartesian equation $3x + 2y - 2z - 4 = 0$

- A** P(2, 0, 1)
- B** Q(2, 3, 4)
- C** R(1, 1, 1)
- D** S(0, 3, 1)

Week 4

Q1: u and v are vectors with components $i + 2j + k$ and $-j$ respectively.

If t is the angle between these vectors then the value of $\cos t$ is

- A 0
 - B $-\sqrt{3}$
 - C $\frac{1}{2}$
 - D $\frac{2}{\sqrt{6}}$
-

Q2: Find a vector orthogonal (perpendicular) to both v and w .

$$v = 2i - 5j + k, \quad w = 3i + 3j - k.$$

- A $-10i+8j-6k$
- B $2i+5j+21k$
- C $-2i-5j+5k$
- D $22i+12j+24k$

Q3: Estimates for the population of Las Vegas, Nevada, are shown in the table.

Las Vegas Population over Time	
Year	Population (in thousands)
1990	261
2000	484
2010	584

a. A linear model for the data is $f(t) = 281.5 + 16.15t$, where $f(t)$ represents the population of Las Vegas in thousands of residents t years after 1990. Use the model to predict the population of Las Vegas in 2013.

Round your answer to the nearest thousand.

b. An exponential model for the data is $g(t) = 280.4(1.04)^t$, where $g(t)$ represents the population of Las Vegas in thousands of residents t years after 1990. Use the model to predict the population of Las Vegas in 2013. Round your answer to the nearest thousand.

c. The actual population of Las Vegas was approximately 603,000 in 2013. Did either model provide an accurate prediction? Explain your answer.

d. Calculate the average rate of change for each interval shown in the table. Do the values confirm or refute your answer in part (c)?

Q4: Robert is collecting books to donate to the library.

The number of books he collects, n , is defined by $n = 14d + 21$ where d is the number of days he spends collecting books.

What does 14 represent in the context of Robert's book collecting?

- A represents the number of books per day that are collected.
 - B represents the number of books per week that are collected.
 - C represents the number of books per month that are collected.
 - D represents the number of books per year that are collected.
-

Q5: Which of the following is the solution to the equation $12e^{2x} = 200$?

- A $\ln\left(\frac{100}{3}\right)$
 - B $\ln\left(\frac{50}{3}\right)$
 - C $\frac{1}{2}\ln\left(\frac{50}{3}\right)$
 - D $\ln\left(\frac{25}{3}\right)$
-

Q6: Part A

A function $g(x)$ is obtained by shifting the graph of the function $f(x) = x^2$ three units left, stretching the graph vertically by a factor of two, reflecting that result over the x -axis, and then translating the graph up four units. Determine the equation of the function $g(x)$.

Choose the suitable option:

- A $2(x + 3)^2 + 4$
- B $-2(x - 3)^2 + 4$
- C $-2(x + 3)^2 + 4$
- D None of the above

Part B

The function $g(x)$ is now transformed 2 units up to obtain another function $h(x)$.

The equation of the function $h(x)$ is .

Q7: Part A

For the function $f(x) = x^2 + 10$, the average rate of change of f over the interval $[-3, -2]$ is

Part B

Over which interval does f have a positive average rate of change?

- A $[-3, 3]$
 - B $[-4, -1]$
 - C $[-1, 2]$
 - D $[-3, 1]$
-

Q8: Part A

What kind of transformation converts the graph of $f(x) = 5(x - 4)^2$ into the graph of $g(x) = 5(x - 4)^2 + 6$?

- A right translation
- B left translation
- C up translation
- D down translation

Part B

Here, the function $f(x)$ is translated units.

Q9: The expression $500(1.03)^t$ models the population of a city in thousands of people t years since 2010. Based on this model, answer each of the following questions.

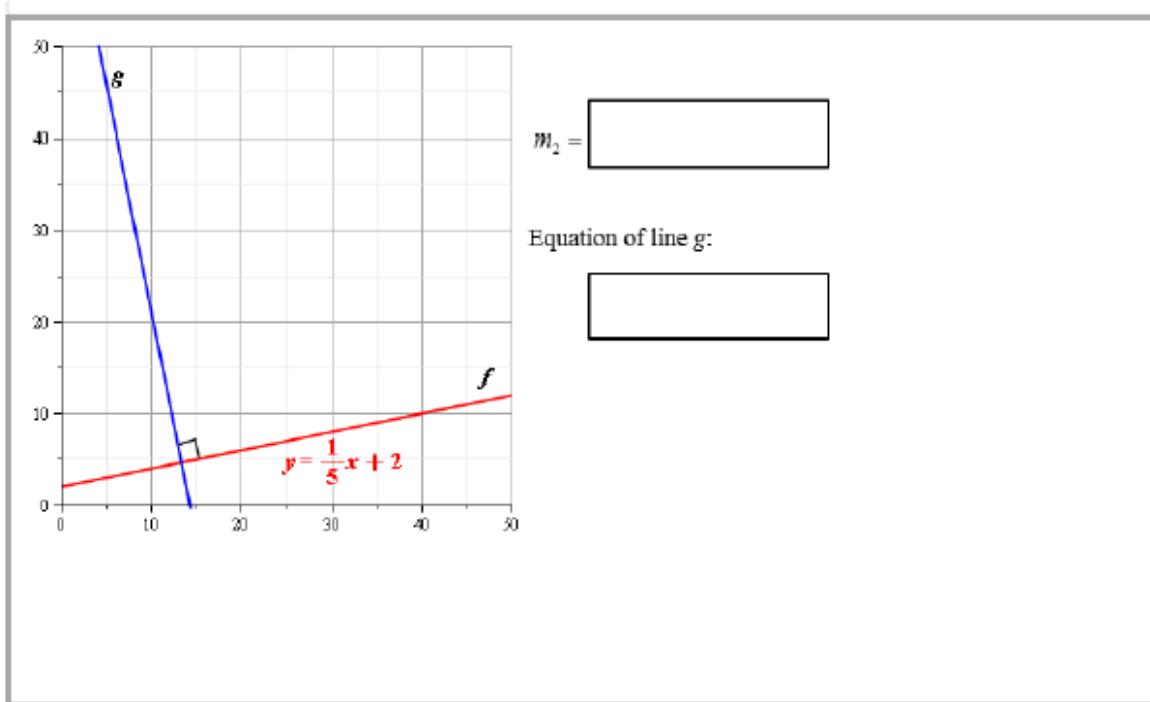
a. What was the population of the city in the year 2010?

b. What has the annual growth rate been since 2010?

 % per year

c. What is the predicted population in 2025?

Q10: Line f is represented by the equation $y = \frac{1}{5}x + 2$. Line g , which is perpendicular to line f , passes through the point $(15, -4)$. Find the slope, m_2 of line g and the equation of line g .



Q11: A bank account starts with \$3.00. The amount in the account doubles every year.

Part A

Write a function to express the total amount of money, $A(t)$, in the account after t years.

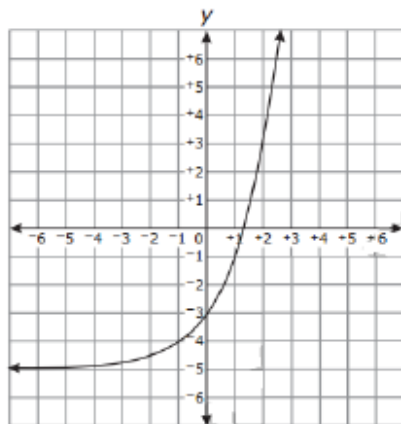
$A(t) =$

Part B

After how many years will the account have \$1536.00?

years

Q12: The function $f(x) = 2(2)^x$ was replicated with $f(x) + k$, resulting in the function graphed below.



What is the value of k ?

$k =$

Q13: Consider the following table of data.

x	$f(x)$
0	2
1	5

a. Write a formula for a linear function in the form $f(x) = ax + b$ that models the data.

$f(x) =$

b. Write a formula for an exponential function in the form $f(x) = a(b)^x$ that models the data.

$f(x) =$