RISING GRADE 12B 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 General Math objectives. Neatly **SHOW YOUR WORK** on a separate sheet of paper.

Week 1:

Q1: Solve $\log_7 343$

Q2:

A teacher randomly shuffled a pile of 45 mathematics flash cards, with one problem per flash card. The table shown shows the number of flash cards of each type and difficulty level.

	Easy	Hard
Algebra	8	19
Geometry	6	12

If the top flash card is easy then the probability it is a geometry question is [a ▾] .

If the top flash card is hard then the probability it is an algebra question is [b ▾] .

a.
- ○ 3/7
- ○ 2/3
- ○ 1/3
- ○ 1/2

b.
- ○ 8/19
- ○ 8/27
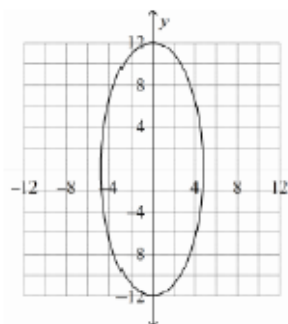- ○ 19/27
- ○ 19/31

Q3: Part A

The equation in standard form for the circle withe center (h, k) and radius r is

- **A** $(x - h)^2 + (y - k)^2 = r^2$
- **B** $(x - k)^2 + (y - h)^2 = r^2$
- **C** $(x + h)^2 + (y + k)^2 = r^2$
- **D** $(x + k)^2 + (y + h)^2 = r^2$

Part B

For the equation of a circle $x^2 + 6x + y^2 + 14y + 49 = 0$, the h coordinate of the center of the circle is

[   ] .

Q4: Generate the general equation for the following graph:


```
[                    ]
```

Q5: Consider the following equations of the circle and calculate its center and radius. Enter the correct value for center and radius in the empty boxes.

Equation 1: $x^2 + y^2 = r^2$
Equation 2: $(x-5)^2 + (y-5)^2 = 100$
Equation 3: $x^2 + y^2 - 2x - 4y - 4 = 0$

Note : The missing values should be in the same format as the correct values already provided.

Equations	Center	Radius
Equation 1	0,0	r
Equation 2		10
Equation 3		

Q6: Part A

A circle passes through the point $(2,2)$ and has its center at $(1,-3)$. The radius of the circle is   units.

A $26 \; units$

B $\sqrt{26} \; units$
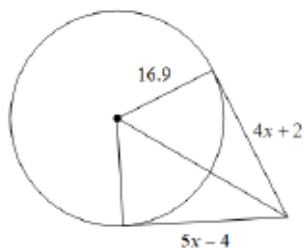
C $5 \; units$

D $1 \; unit$

Part B

Write the equation in standard form for a circle with above properties.
Choose the correct option:

A $(x+1)^2 + (y-3)^2 = \sqrt{26}^2$

B $(x-1)^2 + (y+3)^2 = \sqrt{26}^2$

C $(x-1)^2 + (y-3)^2 = 26$

D   None of the above

Q7: Solve for x. Assume that lines which appear to be tangent are tangent.

16.9

4x + 2

5x − 4

Part A

$x =$ [_____]

Part B

To the nearest whole number, what is the length of the segment bisecting the kite? (Connected from center of the circle to opposite vertex of kite).

[_____] units

Q8: Find an equation in vertex form for the parabola with focus $(1, 4)$ and directrix $x = 5$.

Show your work or explain your reasoning on the scratchpad.

[_____]

Q9: Certain situations are given in the first column, identify the correct equation corresponding to each situation.

The original equation is $(x + 4)^2 + (y + 2)^2 = (5)^2$

Situations	$(x + 4)^2 + (y + 2)^2 = 36$	$(x + 3)^2 + (y + 3)^2 = 25$	$(x - 2)^2 + (y - 1)^2 = 25$
Radius in increased by a unit			
Center is shifted to (-3,-3)			
Center is shifted to (2,1)			

Q10: Use the information provided to write the standard form equation of each ellipse.

Vertices: (-2, 5), (-10, 5)
Co-vertices: (-6, 8), (-6, 2)

[_____]

Q11: Select all the characteristics below that apply to the ellipse.

$$\frac{(x+2)^2}{25} + \frac{(y+2)^2}{9} = 1$$

A	Center (2,1)

B	Center (-2,-1)

C	Direction of Opening: Horizontally

D	Direction of Opening: Vertically

E	Major Axis Length: 10 units

F	Major Axis Length: 25 units

G	Minor Axis Length: 9 units

H	Minor Axis Length 6 units

Q12: Use the given equation to answer the following.

$$25x^2 + 16y^2 + 100x + 64y - 236 = 0$$

Standard Form: _____

Vertices (list left to right OR down to up): _____ , _____

Co-Vertices (list left to right OR down to up): _____ , _____

Eccentricity (rounded to the hundredths place): _____

Q13: When transforming any function the rule f(x) + 2 tells us to move the function up two units.

(A) True

(B) False

Q14: Use the given equation to answer the following.
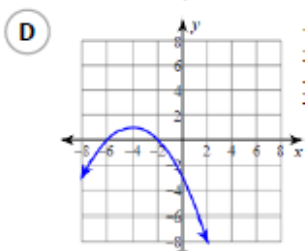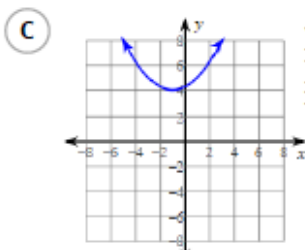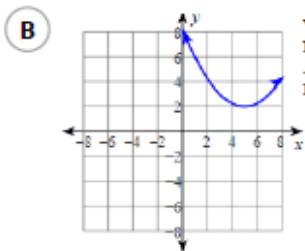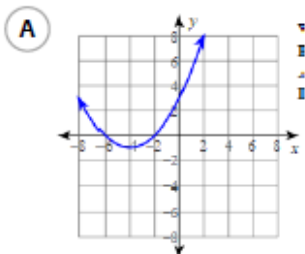
$$-2x^2 + 20x + y - 44 = 0$$

Standard Form: _____

Vertex: _____

Axis of Symmetry: _____

Q15: Part A: Match the graph that matches this equation.

$$4(y - 4) = (x + 1)^2$$

A

B

C

D

Identify the following

Vertex:

Axis of Symmetry:

Focus:

Directrix:

Week 2

Q1: Write the equation of the parabola in standard form with the given characteristics.

Vertex: (0,-4)

Focus: $(\frac{1}{2}, -4)$

```
┌─────────────────────┐
│                     │
└─────────────────────┘
```

Q2: Write the equation of the parabola in standard form with the given characteristics.

Vertex: (3,-5)

Directrix: y = -4

```
┌─────────────────────┐
│                     │
└─────────────────────┘
```

Q3: 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?
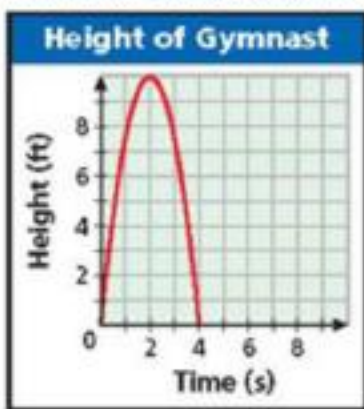
Show your work on the scratchpad.

P (boy or blonde hair) = ┌──────────────────┐
                         │   │
                         └──────────────────┘

Q4: In a class of 5 , there are 3 students who have done their homework. If the teacher chooses 2 students, what is the probability that none of them have done their homework?

Answer: ┌──────────────────┐
              │   │ .
              └──────────────────┘

Note: Write the answer as a decimal.

Q5: The graph shows the height y in feet of a gymnast jumping off a vault after x seconds.

Height of Gymnast

Part A

How long does the gymnast stay in the air?

[_____] seconds

Part B

What is the maximum height that the gymnast reaches?

[a ▾]

a.
- ○ 2 feet
- ○ 10 feet
- ○ 4 feet
- ○ 0 feet

Q6: An art gallery has a collection of works. 59% of the works are paintings. 83% of the works are for sale.

Let A = a work is a painting, and B = a work is for sale

What is P(A)?

P(A) = [_____]

If P(A and B) = 0.51, find P(A or B).

P(A or B) = [_____]

Using all of the information above, calculate P(A|B). Round to the nearest percent.

P(A|B) = [_____]

Q7: Use the table below to answer the questions.

Biking to School			
	Can Bike	Can't Bike	Total
Boys	7	4	11
Girls	9	10	19
Total	16	14	30

If a student is randomly selected, what is the probability they are a girl?

| a ▾ |

If a student is randomly selected, what is the probability they are a boy that can bike to school?

| b ▾ |

If a student is randomly selected, what is the probability they are a girl or can bike to school?

| c ▾ |

Given that a randomly selected student is a boy, what is the probability they can bike to school?

| d ▾ |

a.
- ○ 19/30
- ○ 19/11
- ○ 9/16

b.
- ○ 7/16
- ○ 7/11
- ○ 7/30

c.
- ○ 9/30
- ○ 26/30
- ○ 9/16

d.
- ○ 7/11
- ○ 7/16
- ○ 7/30

Q8: A soccer coach determines that there is a 50% chance that a star player, Ralph, will play in a tournament.

- The probability that another star player, Dan, will play is 0.48.
- The probability that both Ralph and Dan will play in the tournament is 0.25.

Select phrases to complete the statement.

To find the probability that either Ralph or Dan will play in the tournament, first add | a ▾ | and
then | b ▾ |

a.
- ○ 0.50 and 0.48
- ○ 0.50 and 0.25
- ○ 0.48 and 0.25

b.
- ○ subtract 0.25 from the sum.
- ○ multiply the sum by 0.48.
- ○ divide 0.50 by the sum.
- ○ subtract 0.50 from the sum.
- ○ multiply the sum by 0.25.
- ○ divide 0.48 by the sum.

Q9: Two events, A and B, are independent.

P(A) = 0.15   P(A ∩ B) = .045   What is P(B)?

(A) .105

(B) 0.3

(C) .145

(D) .00001367

Q10:

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

Students were ask how many MP3 players they own
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.

Q11: Shayla and Carlos each have a bag that contains 5 green marbles, 5 red marbles, and 10 yellow marbles. The marbles are all the same size and shape.

Part A
Shayla will select two marbles from her bag at random. She will not return the first marble to the bag before selecting the second marble.

Which expression represents the probability that Shayla will select two red marbles?

(A) $\frac{5}{20} \cdot \frac{4}{19}$

(B) $\frac{5}{20} \cdot \frac{4}{20}$

(C) $\frac{5}{20} \cdot \frac{5}{19}$

(D) $\frac{5}{20} \cdot \frac{5}{20}$

Part B
Carlos will select two marbles from his bag at random. He will not return the first marble to the bag before selecting the second marble.

The first marble Carlos selects will **not** be yellow. What is the probability that the second marble he selects will be yellow?

(A) $\frac{9}{20}$

(B) $\frac{9}{19}$

(C) $\frac{10}{20}$

(D) $\frac{10}{19}$

Q12: A total of 50 students play either soccer or lacrosse.

- 20 girls play lacrosse.
- 20 boys play either soccer or lacrosse.
- 20 students play soccer.

What is the probability that a student plays soccer or is a girl?

[   ]

Q13: Solve the equation $\log(x - 7) = 2$ Please input the answer 9999 for "No Solution".

[   ]

Q14:

Part A

If the area of a circle is 36π square units, its circumference will be [   ] π units.

Part B

Determine the equation of the same circle, if its center is at $(4, 7)$.
Choose the correct equation(s):

A $(x - 4)^2 + (y - 7)^2 = 6^2$

B $x^2 + y^2 - 8x - 14y + 29 = 0$

C $(x + 4)^2 + (y + 7)^2 = 6^2$

D None of the above

Q15: Write the following exponential equation in log form. $4^{-3} = \frac{1}{64}$

A $\log_{64} 4 = -3$

B $\log_{-3} 4 = \frac{1}{64}$

C $\log_4 \frac{1}{64} = -3$

D $\log_4 -3 = \frac{1}{64}$

Week 3

Q1: 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 = [ ]	4) Dogs after 1 years = [ ]
2) b = [ ]	5) Dogs after 2 years = [ ]
3) Equation: [ ]	6) Dogs after 3 years = [ ]

Q2: Solve the following logarithmic equation for x .
$$3\log(x+4) = 6$$
$$x = [\quad\quad\quad]$$

Q3: Solve the equation $\log_4(2x+6) = 2$ Please input the answer 9999 for "No Solution".

[ ]

Q4: Directions - Based on the equation, determine if it represents exponential growth or exponential decay.

Equation	Growth or Decay?
$y = 200 \times 1.5^x$	a ▾
$y = \frac{1}{2}\left(\frac{5}{2}\right)^x$	b ▾
$y = 40 \times \left(\frac{1}{4}\right)^x$	c ▾
$y = 150 \times .54^x$	d ▾

a. ○ Exponential Growth ○ Exponential Decay

b. ○ Exponential Growth ○ Exponential Decay

c. ○ Exponential Growth ○ Exponential Decay

d. ○ Exponential Growth ○ Exponential Decay

Q5: In the year 2005 the cost of a painting from a well-known artist was $30000 . Each year the value of the painting increases by 5% . The cost of the painting in the year 2007 was $ [ ] .
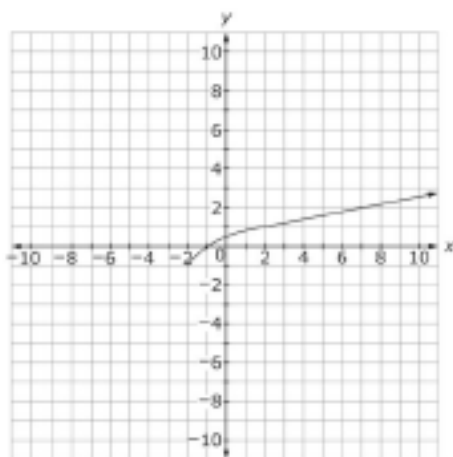Note: Do not use comma (,) to separate the numbers.

Q6: The natural logarithm $f(x) = \ln(x)$ is the same as which of the following?

(A) $\ln_{10}(x)$

(B) $\ln_e(x)$

(C) $\log_e(x)$

(D) $\log_{10}(x)$

Q7: For what value of x is the equation $2^{2x+7} = 2^{15}$ true?

(A) 2

(B) 4

(C) 11

(D) 16

(E) 44

Q8: A function is graphed on the coordinate plane.

Select the function that is graphed on the coordinate plane.

(A) $f(x) = \sqrt{x+1} - 2$

(B) $f(x) = \sqrt{x-1} + 2$

(C) $f(x) = \sqrt{x+2} - 1$

(D) $f(x) = \sqrt{x-2} + 1$

Q9: The parabola $f(x) = (x-2)^2 + 1$ is graphed in the xy-coordinate plane.

Part A

Select from the drop-down menus to correctly complete the sentence.
The vertex of the parabola is 2 units [a ▾] the origin and 1 unit [b ▾] the origin.

Part B

Select from the drop-down menus to correctly compare the sentence.
How does the function $f(x+3)$ compare to $f(x)$?
$f(x+3)$ has a [c ▾] shift 3 units [d ▾] $f(x)$.

a.
○ up from
○ down from
○ right of
○ left of

b.
○ up from
○ down from
○ right of
○ left of

c.
○ vertical
○ horizontal

d.
○ up from
○ down from
○ right of
○ left of

Q10: Check all that apply. Which of the following are equivalent to the following log expression $\log_4 4 + \log_4 16$

A 4

B 3

C $\log_4 64$

D $\log_3 27$

Q11: Directions - For the scenario, identify the key components, create an exponential function, then answer the questions.
The number of psychiatry papers published each year increases by 7%. If 26,000 papers were published in the current year, how many papers would be expected to be published in 5 years? 7 years? (round to the nearest whole number).

a) a = [_____]	d) Exponential Equation = [_____]
b) b = [_____]	e) Papers published after 5 years = [_____]
c) (two answers) x = [_____] and x = [_____]	f) Papers published after 7 years = [_____]

Q12: Solve the following equation. Round your answer to three decimal places.
$-e^{x+10} = -82$
[_____]

Q13: Find the radius of the following circle and write your result in the empty box provided below.
$x^2 + y^2 - 6x + 4y + 9 = 0$
$r =$ [_____]

Q14: The parabola $f(x) = (x-2)^2 + 1$ is graphed in the $xy-$ coordinate plane.

Part A

Select from the drop-down menus to correctly complete the sentence.

The vertex of the parabola is 2 units [a ▾] the origin and 1 unit [b ▾] the origin.

Part B

Select from the drop - down menus to correctly complete the sentence

How does the function $f(x+3)$ compare to $f(x)$?

$f(x+3)$ has a [c ▾] shift 3 units [d ▾] $f(x)$.

a.
- ○ up from
- ○ down from
- ○ right of
- ○ left of

b.
- ○ up from
- ○ down from
- ○ right of
- ○ left of

c.
- ○ horizontal
- ○ vertical

d.
- ○ up from
- ○ down from
- ○ right of
- ○ left of

Q15: Solve for x in the expression, $8^{x-3} = 64$?

$x =$ [   ]

Week 4

Q1: The population of snails in a tank at the aquarium is found to triple every year. Mark visits the aquarium and counts 80 snails in the tank.

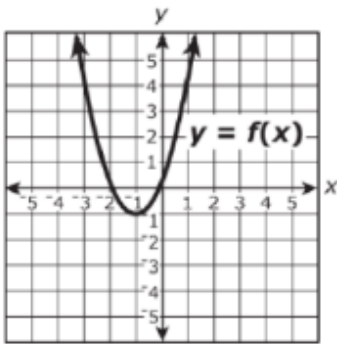Write a function $f(n)$ to model the number of snails in the tank n years after Mark's visit.

$f(n) =$ [   ]

Q2: Write the following exponential equation in logarithmic form.

$e^{1.609} \approx 5$

$\ln$ [   ] ≈ 1.609

Q3: A quadratic function $f(x)$ is graphed in the $xy-$ coordinate plane.

In which quadrant would the vertex of $f(x+3)+2$ be located?

A Quadrant 1

B Quadrant 2

C Quadrant 3

D Quadrant 3

Q4: A high school wants to buy a heat press machine that will allow them to make their own logos on T-shirts. The cost of the machine will be $470, and the T-shirts will cost the high school $3. 50 each. The school plans to sell the T-shirts for $12. 00 each.

a. Write a function that models the cost of buying the machine and x T-shirts.

$C(x) =$ [   ]

b. Write a function that models the revenue produced when x T-shirts are sold.

$R(x) =$ [   ]

c. How many T-shirts would the school need to sell for the revenue to exceed the cost?

[   ] T-shirts

Q5: Which equivalent form of $g(x) = 2x^2 - 12x - 54$ is the **best** form to find the zeros of the function?

(A) $g(x) = 2(x-3)^2 - 72$

(B) $g(x) = 2(x^2 - 6x - 27)$

(C) $g(x) = 2(x-9)(x+3)$

(D) $g(x) = 2x^2 - 18x + 6x - 54$

Q6: A quadratic function is shown.

$y = x^2 - 14x + 33$

The function has two x-intercepts. What is the equation of the function's axis of symmetry?

(A) $x = -3$

(B) $x = 3$

(C) $x = 7$

(D) $x = 11$

Q7: What is the expression, in terms of n, for the sequence a_n as defined in the input-output table?

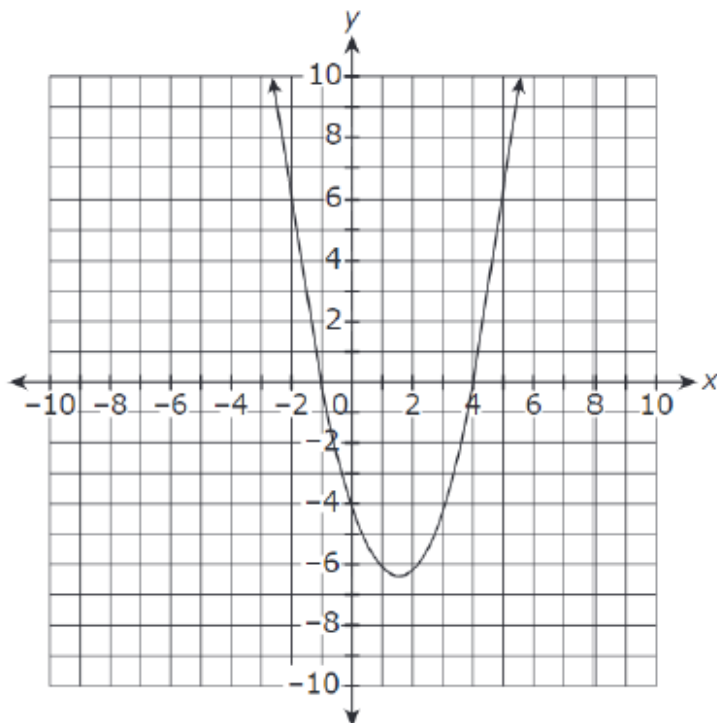| n	a_n
1	21
2	26
3	31
4	36

(A) $a_n = 1 + 10n$

(B) $a_n = 4 + n$

(C) $a_n = 5 + n$

(D) $a_n = 16 + 5n$

Q8: The cost of renting a car from Big Cars includes an administration fee and a fee for each mile driven. This is modeled by $f(x) = 0.23x + 30$.

What is the cost per mile?

(A) $0.23

(B) $0.53

(C) $30.00

(D) $30.23

Q9: The function $f(x) = x^2 - 3x - 4$ is graphed on the coordinate plane.

Consider $f(x - 3)$. Which option correctly describes the transformation to the graph?

A up 3 units

B down 3 units

C left 3 units

D right 3 units

Q10: Given $f(x) = \frac{x^2 - a^2}{x - a}$ and $g(x) = \frac{x^2 + a^2}{x - a}$, where a is a real number,

Using the choices on the right to fill in the blanks

1. What is the domain of f?

The domain of f is [____]

2. What value does $f(x)$ approach as $x \to a$ from the right?

As $x \to a$ from the right, $f(x) \to$ [____]

3. What value does $f(x)$ approach as $x \to a$ from the left?

As $x \to a$ from the left, $f(x) \to$ [____]

4. What is the domain of g?

The domain of g is [____]

5. What value does $g(x)$ approach as $x \to a$ from the right?

As $x \to a$ from the right, $g(x) \to$ [____]

6. What value does $g(x)$ approach as $x \to a$ from the left?

As $x \to a$ from the left, $g(x) \to$ [____]

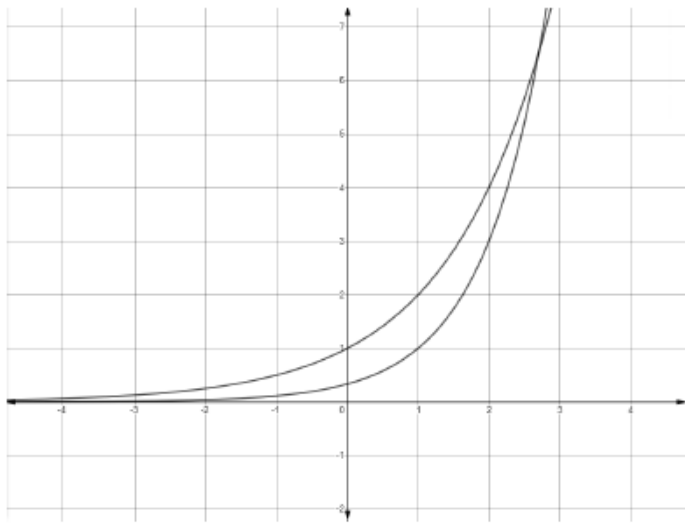| Choices |
| --- |
| the set of all real numbers except $x = a$ |
| $2a$ |
| $2a^2$ |
| the set of all real numbers |
| $-2a^2$ |
| ∞ |
| $-2a$ |
| 0 |
| $-\infty$ |
| a |
| the set of all real numbers except $x = -a$ |
| the set of all real numbers except $x = -a, a$ |

Q11: The graphs of $f(x) = 2^x$ and $g(x) = 3^{x-1}$ are shown.

a. The solution to the equation $f(x) = g(x)$ is the [a ▾] coordinate of the point where the two lines [b ▾]. The solution is approximately [c ▾] .

b. Solve the equation $2^x = 3^{x-1}$. Round your answer to 4 decimal places.

[   ]

a.
- ◯ x
- ◯ y

b.
- ◯ intersect
- ◯ have equal slopes
- ◯ cross the x-axis
- ◯ cross the y-axis

c.
- ◯ 0
- ◯ 0.35
- ◯ 1
- ◯ 2.75
- ◯ 6.5

Q12: Express $f(x) = \log\left(\frac{100}{x^3}\right)$ in the general form of a logarithmic function, $g(x) = k + a\log_b(x - h)$.

Part A

Fill in the missing values of a, b, k, and h in the equation.

$a =$ [   ]

$b =$ [   ]

$k =$ [   ]

$h =$ [   ]

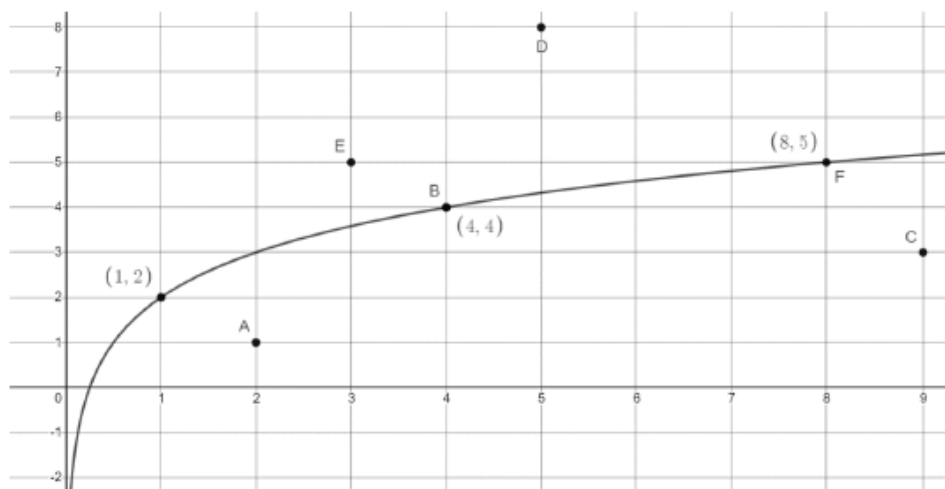**Part B**

Use the structure of g when written in general form to describe the graph of g as a transformation of the graph of $m(x) = \log(x)$.

[   ]

Q13: The given graph shows the function $s(x) = 2 + \log_2(x)$.

Part A

Find the formula for the corresponding inverse function $g(x)$.

$g(x) = \boxed{}$

Part B

Select all of the points that would appear on the graph of $y = g(x)$.

A A

B B

C C

D D

E E

F F

Q14: Find the value of $\log_5(0.04)$.

$x = \boxed{}$

Q15: 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