Math 1 Unit 1 EOC Review

Solving Equations (including Literal Equations)

- Get the variable ________________ to show what it equals to satisfy the equation or inequality

- Steps (each step only where necessary):

1. Distribute
2. Same Side Combine (like terms)
3. Opposite Sides Cancel (a variable)
4. Solve two-step equation

Concept Questions:

1. Why do we use "opposite" operations to solve an equation?

2. What does the solution to an equation represent?

3. What key words in a word problem can help determine the operations to set up an equation?

Parts of Expressions

Coefficient - ____________________________ Variable - _________________________________

Constant - ______________________________ Exponent - ________________________________

In the expression $5x^3 - 7x^2 + 4$, name the: Term(s) - _____________________________

Coefficient(s) - __________ Variable(s) - ___________ Constant(s) - __________ Exponent(s) - _______

Concept Question:

1. What is the difference between how terms are separated in expressions and how factors are separated?

Function Intro

A function is a rule in which each ____________ (usually x) yields exactly one ___________ (usually y).

Domain - ___________________________ Range - _______________________________

When we evaluate functions, we substitute the _________ variable and evaluate the expression.

Example: Evaluate h(4) for $h(t) = -4.9t^2 + 20t + 3$.

Concept Question: Write a mathematical relation that is NOT a function (has more than one y for an x) and explain.

Key Features of Graphs

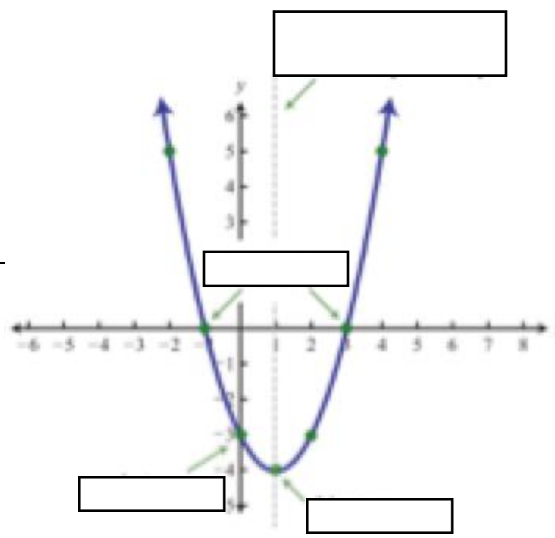
Intercepts: Points where a graph ________________ the x or y axis.

Vertex: ______________________ or _______________________

point on a function

Axis of Symmetry: Line that cuts a function ____________________

A.



Concept Questions:

1. What is the x-value for every y-intercept? What is the y-value for every x-intercept? Why are these the case?

2. Does the graph of a line have a vertex? Why or why not?

Math 1 Unit 1 Sample Problems

6 Two boys, Shawn and Curtis, went for a walk. Shawn began walking 20 seconds earlier than Curtis.

- Shawn walked at a speed of 5 feet per second.
- Curtis walked at a speed of 6 feet per second.

For how many seconds had Shawn been walking at the moment when the two boys had walked exactly the same distance?

14 A school purchases boxes of candy bars.

- Each box contains 50 candy bars.
- Each box costs $30.

How much does the school have to charge for each candy bar to make a profit of $10 per box?

A $0.40

B $0.50

C $0.80

D $1.25

15 Energy and mass are related by the formula $E = mc^2$.

- m is the mass of the object.
- c is the speed of light.

Which equation finds m, given E and c?

A $m = E - c^2$

B $m = Ec^2$

C $m = \frac{c^2}{E}$

D $m = \frac{E}{c^2}$

28 John mixed cashews and almonds.

- John bought 4 pounds of almonds for a total cost of \$22.
- The cost per pound for cashews is 60% more than the cost per pound for almonds.
- John bought enough cashews that, when he mixed them with the almonds, the mixture had a value of \$6.50 per pound.

Approximately what percent of the mixture, by weight, was cashews?

A 20%

B 25%

C 30%

D 35%

30 Collin noticed that various combinations of nickels and dimes could add up to \$0.65.

- Let x equal the number of nickels.
- Let y equal the number of dimes.

What is the domain where y is a function of x and the total value is \$0.65?

A {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13}

B {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13}

C {0, 1, 3, 5, 7, 9, 11, 13}

D {1, 3, 5, 7, 9, 11, 13}

Math 1 Unit 2 EOC Review

Linear Equation

$$y = mx + b$$

(x, y) – Points on the line with x = ________________________ and y = ____________________________

m – Slope (or _________________________) – constant rate by which dependent variable __________ or _________ as the independent variable increases

b – Y-Intercept – value of the equation when ___________________

Concept Questions:

1. In a linear function f(x) = mx + b, what are the terms, coefficients, variables, and constant?

Slope/Rate of Change

Rate of change - $\frac{Change\ in\ \_\_\_}{Change\ in\ \_\_\_}$ for any defined region. Give two points, use the formula _______________

In a line, the rate of change (called __________) is ___________________.

Concept Questions:

1. Why does a line have a constant slope but a parabola does not?

2. What are some clues in word problems that would help indicate the slope?

Graphs of Linear Equations

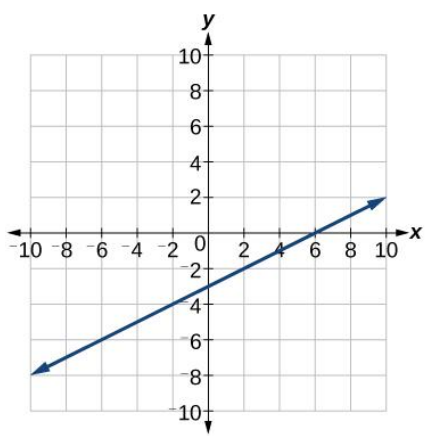
For the graph to the right:

x-intercept = __________ y-intercept = ____________

Slope = _____________ Equation = _____________

Table of values:

x	-2	-1	0	3	6	9
y			-3		0	



Concept Questions:

1. How can the x-intercept help determine the equation of the line?

2. Write a word problem that could be solved using the graph above.

Arithmetic Sequences

Arithmetic Sequence – sequence of numbers that ________________ or __________________ by a constant rate, called the __________________________________.

Explicit Sequence: $a_n = a_1 + (n-1)d$ Recursive Sequence: $a_n = a_{n-1} + d$

n = ______________ a_1 = _______________ a_n = _________________ d = _________________________

a_{n-1} = ____________________________

Conceptual Questions:

1. Could the function f(x) = 3x + 2 be an arithmetic sequence? What would be a_1 and d?

2. Why are arithmetic sequences and linear functions taught in the same unit?

Scatter Plots/Correlation

Calculator Steps for Linear Regression/Plotting Scatter Plots/Getting Line of Best Fit:

1. Push STAT-EDIT-enter all (x, y) values into table (X in L_1, Y in L_2)
2. To get equation of best-fit line, STAT-CALC-LinReg (#4) ______ is the correlation coefficient
3. To graph scatterplot, 2^{nd} – STAT PLOT – Plot1…On, then choose options

Concept Questions:

1. How can a linear regression (line of best fit) help solve problems?

2. If most of the points on a scatterplot are far from the line of best fit, what will the r value be close to? How do you know?

Math 1 Unit 2 Practice Problems

11 Suppose that the function $f(x) = 2x + 12$ represents the cost to rent x movies a month from an internet movie club. Makayla now has \$10. How many more dollars does Makayla need to rent 7 movies next month?

18 Dennis compared the y-intercept of the graph of the function $f(x) = 3x + 5$ to the y-intercept of the graph of the linear function that includes the points in the table below.

x	$g(x)$
$^{-}7$	2
$^{-}5$	3
$^{-}3$	4
$^{-}1$	5

What is the difference when the y-intercept of $f(x)$ is subtracted from the y-intercept of $g(x)$?

A $^{-}11.0$

B $^{-}9.3$

C 0.5

D 5.5

19 Cell phone Company *Y* charges a \$10 start-up fee plus \$0.10 per minute, x. Cell phone Company *Z* charges \$0.20 per minute, x, with no start-up fee. Which function represents the difference in cost between Company *Y* and Company *Z*?

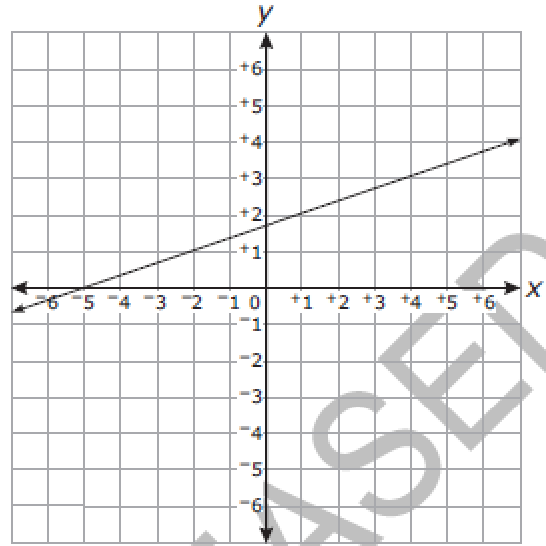
A $f(x) = {}^{-}0.10x - 10$

B $f(x) = {}^{-}0.10x + 10$

C $f(x) = 10x - 0.10$

D $f(x) = 10x + 0.10$

21 Mario compared the slope of the function graphed below to the slope of the linear function that has an x-intercept of $\frac{4}{3}$ and a y-intercept of $^{-}2$.



What is the slope of the function with the smaller slope?

A $\frac{1}{5}$

B $\frac{1}{3}$

C 3

D 5

22 The boiling point of water, T (measured in degrees), at altitude a (measured in feet) is modeled by the function $T(a) = {}^{-}0.0018a + 212$. In terms of altitude and temperature, which statement describes the meaning of the slope?

A The boiling point increases by 18 degrees as the altitude increases by 1,000 feet.

B The boiling point increases by 1.8 degrees as the altitude increases by 1,000 feet.

C The boiling point decreases by 18 degrees as the altitude increases by 1,000 feet.

D The boiling point decreases by 1.8 degrees as the altitude increases by 1,000 feet.

26 The table below shows the distance a car has traveled.

Minutes	25	50	75	100	125
Distance Traveled (in miles)	20	40	60	80	100

What is the meaning of the slope of the linear model for the data?

A The car travels 5 miles every minute.

B The car travels 4 miles every minute.

C The car travels 4 miles every 5 minutes.

D The car travels 5 miles every 4 minutes.

29 Lucy and Barbara began saving money the same week. The table below shows the models for the amount of money Lucy and Barbara had saved after x weeks.

Lucy's Savings	$f(x) = 10x + 5$
Barbara's Savings	$g(x) = 7.5x + 25$

After how many weeks will Lucy and Barbara have the same amount of money saved?

A 1.1 weeks

B 1.7 weeks

C 8 weeks

D 12 weeks

31 The table below shows the cost of a pizza based on the number of toppings.

Number of Toppings (n)	**Cost** (C)
1	\$12
2	\$13.50
3	\$15
4	\$16.50

Which function represents the cost of a pizza with n toppings?

A $C(n) = 12 + 1.5(n - 1)$

B $C(n) = 1.5n + 12$

C $C(n) = 12 + n$

D $C(n) = 12n$

32 There were originally 4 trees in an orchard. Each year the owner planted the same number of trees. In the 29th year, there were 178 trees in the orchard. Which function, $t(n)$, can be used to determine the number of trees in the orchard in any year, n?

A $t(n) = \frac{178}{29}n + 4$

B $t(n) = \frac{178}{29}n - 4$

C $t(n) = 6n + 4$

D $t(n) = 29n - 4$

35 The sequence below shows the total number of days Francisco had used his gym membership at the end of weeks 1, 2, 3, and 4.

$$4, 9, 14, 19, \ldots$$

Assuming the pattern continued, which function could be used to find the total number of days Francisco had used his gym membership at the end of week n?

A $f(n) = n + 5$

B $f(n) = 5n - 1$

C $f(n) = 5n + 4$

D $f(n) = n^2$

37 The table below shows the shoe size and age of 7 boys.

Name	**Shoe Size** (x)	**Age** (y)
Tyrone	6	9
Marcel	6	11
Patrick	7	15
Bobby	8	11
Dylan	9	15
Mike	10	16
Jonathan	12	17

Approximately what percent of the boys' ages is more than 1 year different from the age predicted by the line of best fit for the data?

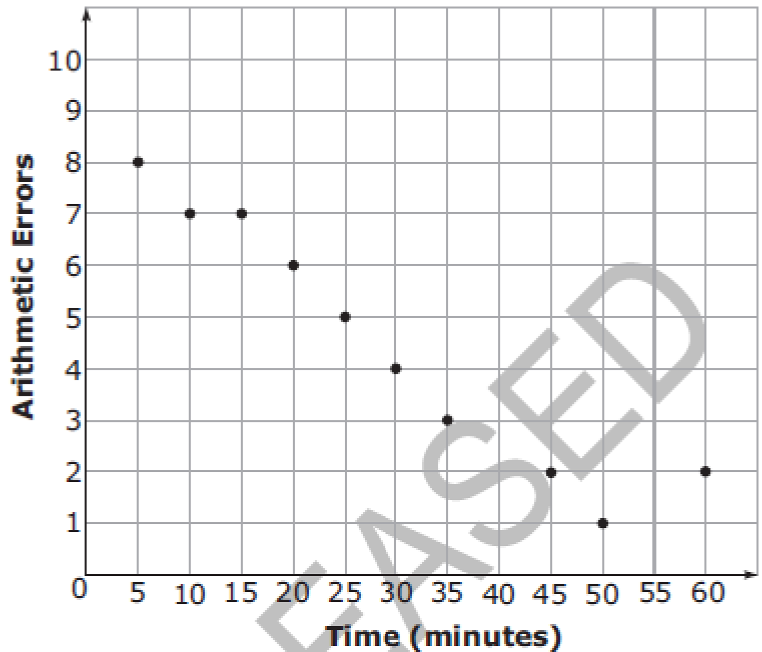
A 14%

B 29%

C 43%

D 57%

38 The scatterplot below shows the number of arithmetic errors 10 students made on a quiz and the amount of time the students took to complete the quiz.



Which describes the relationship between the number of arithmetic errors the students made and the amount of time the students took to complete the quiz?

A There is a strong positive relationship between the variables.

B There is a strong negative relationship between the variables.

C There is a weak positive relationship between the variables.

D There is a weak negative relationship between the variables.

Math 1 Unit 3 EOC Review

Midpoint and Distance Formulas

______________ = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ ______________ = $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$

Concept Questions:

1. How is the distance formula the same as the Pythagorean Theorem?

2. Why do we divide by 2 to compute the midpoint?

Parallel and Perpendicular Slopes

Parallel lines - _______________ intersect, have ________________ slope

Perpendicular lines – Intersect at _______________________, have _________________________________ slopes

(For a perpendicular line, flip the _________________, flip the _______________)

Concept Question:

1. If a triangle has two sides with opposite reciprocal slopes, what kind of triangle is it? How do you know?

Graphing Inequalities

To graph inequalities, first graph the ______________ that represents the bound for the inequality.

If the inequality is < or >, use a ___________ line. If the inequality is ≤ or ≥, use a ______________ line.

Then, shade ________________ if y > or ≥ the expression, shade _________________ if y < or ≤ the expression.

Concept Question:

1. How many solutions are there for an inequality? Why?

2. To solve a system of two inequalities by graphing, how can you tell which region represents the solution?

Solving Systems of Equations

System of Equations - _______________ equations with the same ________________

Methods to solve:

Graphing	Substitution	Elimination
- Graph both equations - The solution to the system is the _________________ of the two graphs.	- Solve one equation for a variable - _______________ the expression for the variable in the other equation - Solve the equation for the first variable, then ________________ again to solve for the second variable	- Multiply one or both equations if necessary to get ________ or ____________ terms - Add or subtract the two equations (Same terms ________, Opposite terms ___________) - Solve the "answer" equation for the first variable, then __________ to solve for the second variable

Systems that are parallel lines have _______ solutions, while systems with the same line have _____________ solutions.

Examples: $y = -2x + 8$ $\qquad$ $7x + 6y = -9$ $\qquad$ $2x + 4y = 36$

$y = x - 1$ $\qquad$ $y = -2x + 1$ $\qquad$ $3x - 4y = -6$

Concept Question:

1. When is it easiest to solve a system by graphing, substitution, or elimination? Why?

Geometric Shapes Review

Quadrilateral: Polygon with _____________ sides

Parallelogram: Quadrilateral with opposite sides __________________ AND _______________

Rectangle: Quadrilateral with four _____________________ opposite sides _____________ and ___________

Square: Quadrilateral with all sides ___________, opposite sides _____________, and all __________ angles

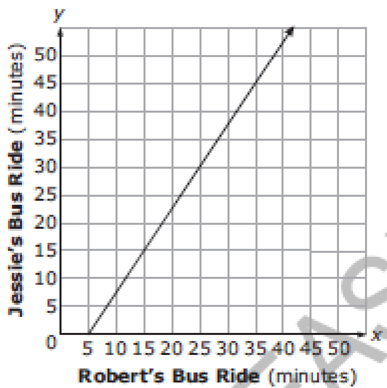
Rhombus: Quadrilateral with all sides _____________ and opposite sides __________________

Trapezoid: Quadrilateral with one pair of _________________ sides

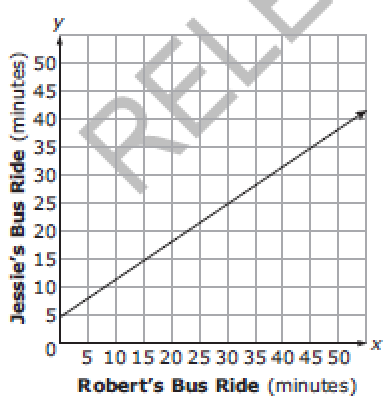
Math 1 Unit 3 Practice Problems

1 Jessie's bus ride to school is 5 minutes more than $\frac{2}{3}$ the time of Robert's bus ride.
Which graph shows the possible times of Jessie's and Robert's bus rides?

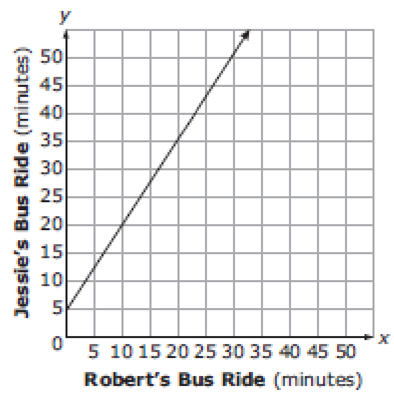
A



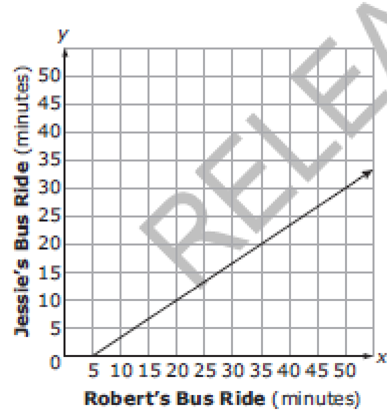
B



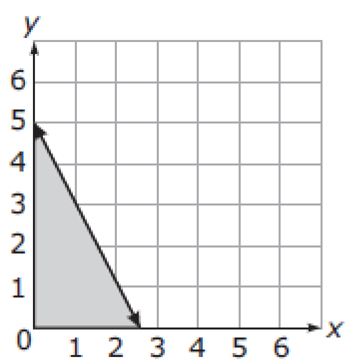
C



D



2 What scenario could be modeled by the graph below?



A The number of pounds of apples, y, minus two times the number of pounds of oranges, x, is at most 5.

B The number of pounds of apples, y, minus half the number of pounds of oranges, x, is at most 5.

C The number of pounds of apples, y, plus two times the number of pounds of oranges, x, is at most 5.

D The number of pounds of apples, y, plus half the number of pounds of oranges, x, is at most 5.

7 The math club sells candy bars and drinks during football games.

- 60 candy bars and 110 drinks will sell for $265.
- 120 candy bars and 90 drinks will sell for $270.

How much does each candy bar sell for?

(Note: Express the answer in dollars.cents.)

10 Two times Antonio’s age plus three times Sarah’s age equals 34. Sarah’s age is also five times Antonio’s age. How old is Sarah?

23 A line segment has endpoints $J(2, 4)$ and $L(6, 8)$. The point K is the midpoint of $\overline{JL}$. What is an equation of a line perpendicular to $\overline{JL}$ and passing through K?

A $y = {}^{-}x + 10$

B $y = {}^{-}x - 10$

C $y = x + 2$

D $y = x - 2$

24 A triangle has vertices at (1, 3), (2, ⁻3), and (⁻1, ⁻1). What is the ***approximate*** perimeter of the triangle?

A 10

B 14

C 15

D 16

33 The vertices of quadrilateral *EFGH* are $E({}^{-}7, 3)$, $F({}^{-}4, 6)$, $G(5, {}^{-}3)$, and $H(2, {}^{-}6)$. What kind of quadrilateral is *EFGH*?

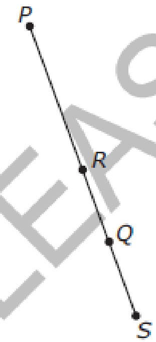
A trapezoid

B square

C rectangle that is not a square

D rhombus that is not a square

34 R is the midpoint of segment PS. Q is the midpoint of segment RS.



P is located at $(8, 10)$, and S is located at $(12, {}^-6)$. What are the coordinates of Q?

A $(4, 2)$

B $(2, {}^-8)$

C $(11, {}^-2)$

D $(10, 2)$

Math 1 Unit 4 EOC Review

Exponential Function Form

$y = ab^x$ (Growth or Decay)

y = ______________________ a = _______________________

b = ___________________________ x = ___________

When the rate is given as a percent, convert it to a decimal and write as ___________ for growth and __________ for decay.

Concept questions:

1. Why do we use $1 \pm r$ for the b value when r is given as a percent?

2. Why is the rate of change for an exponential function NOT constant as it is for a linear function?

3. Which increases faster – exponential functions or linear functions? Why?

Rewriting Exponents

Exponent Rules: $x^a \cdot x^b =$ _____________ $\frac{x^a}{x^b} =$ ___________ $(x^a)^b =$ ____________

$x^{-a} =$ ___________ $\sqrt{x^a} =$ ___________

Concept Questions:

1. Why does the power rule $(x^a)^b = x^{ab}$ apply for exponents with common bases?

2. Why does taking the square root of an exponent divide the exponent by 2?

Geometric Sequences

Geometric Sequence – sequence of numbers that ________________ by the same number to compute the next term. The number multiplied is called the __________________________________.

Explicit Sequence: $a_n = a_1(r)^{n-1}$ Recursive Sequence: $a_n = ra_{n-1}$

n = ______________ a_1 = _______________ a_n = _________________ r = _________________________

a_{n-1} = ____________________________

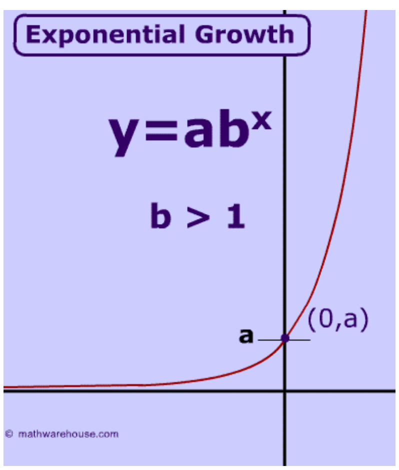
Conceptual Questions:

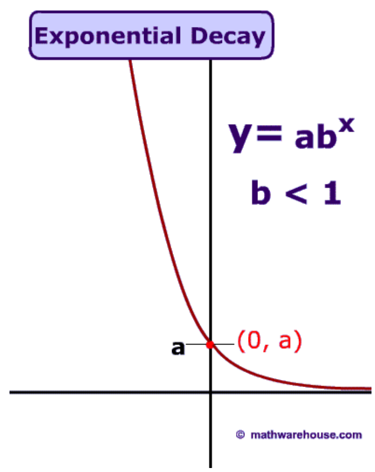
1. Could the function $f(x) = 3(2)^x$ be an arithmetic sequence? What would be a_1 and r?

2. Why are geometric sequences and exponential functions taught in the same unit?

Exponential Graphs

Exponential functions are __________________, with the parent function either increasing _______________ or decreasing to the _________________.





Concept Questions:

1. Why is the *a* value the y-intercept of the parent function for exponential functions?

2. Why does a *b* value between 0 and 1 decrease?

3. Why does an exponential parent function not have negative values?

Math 1 Unit 4 Practice Problems

13 Katie and Jennifer are playing a game.

- Katie and Jennifer each started with 100 points.
- At the end of each turn, Katie's points doubled.
- At the end of each turn, Jennifer's points increased by 200.

At the start of which turn will Katie first have more points than Jennifer?

17 The table below shows the average weight of a type of plankton after several weeks.

Time (weeks)	**Weight** (ounces)
8	0.04
9	0.07
10	0.14
11	0.25
12	0.49

What is the average rate of change in weight of the plankton from week 8 to week 12?

A 0.0265 ounce per week

B 0.0375 ounce per week

C 0.055 ounce per week

D 0.1125 ounce per week

20 Monica did an experiment to compare two methods of warming an object. The results are shown in the table below.

Time (Hours)	**Method 1 Temperature** (°F)	**Method 2 Temperature** (°F)
0	0	1.5
1	5	3
2	11	6
3	15	12
4	19	24
5	25	48

Which statement ***best*** describes her results?

A The temperature using both methods changed at a constant rate.

B The temperature using both methods changed exponentially.

C The temperature using Method 2 changed at a constant rate.

D The temperature using Method 2 changed exponentially.

Math 1 Unit 5 EOC Review

Polynomial Operations

Multiplying: ________________ terms times EVERY other term

To distribute __________________, write the polynomial in parentheses and _____________.

Adding or subtracting: _____________________________________.

Remember, you can NOT operate with ________________ in the calculator!

Example 1: $(2x - 3)^2$

Concept Questions:

1. What is the difference between $2x + 2x$ and $2x(2x)$?

2. Write two polynomials that you can NOT multiply using the "FOIL" trick, and explain why not.

Factoring

GCF	$x^2 + bx + c$	$ax^2 + bx + c$	Perfect Squares	
$10x^2 - 5x$	$x^2 - 9x - 22$	$3x^2 - 13x - 10$	$x^2 - 49$	$5x^3 + 500x$

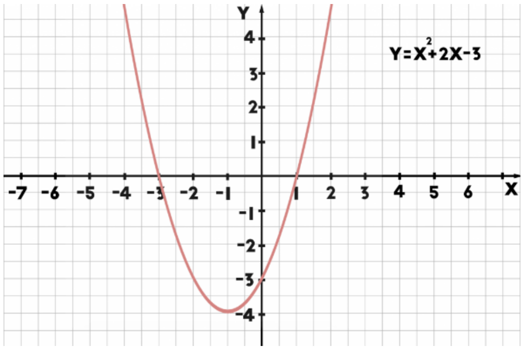
Concept Questions:

1. Why is $a^2 - b^2$ NOT the same as $(a - b)^2$?

2. Why can we NOT just find two numbers that add to *b* and multiply to *c* to factor a trinomial with $a > 1$?

Quadratic Graphs

The shape of the graph of a quadratic function (with degree, or ___________________, of 2) is a ___________.



$f(x) = ax^2 + bx + c$

$f(x) = x^2 + 2x - 3$

X-Intercepts	Y-Intercept	Open Up or Down	Vertex	Axis of Symmetry
__________	__________	a > 0 - _________	________________	________________
		a < 0 - _________		

Concept Questions:

1. Why is the y-intercept equal to the *c* value?

2. Why are the x-intercepts the same as the solutions equal to 0?

Solving by Factoring

To solve a quadratic by factoring, set the expression equal to 0, factor, and ____________________________.

You will get ______ solutions when solving a quadratic equation.

If both solutions are the same, the solution is a ___________________, and the ___________ is on the x-axis.

Example: $x^2 - 5x = 14$

Concept Questions:

1. Why is it necessary to set the quadratic equal to 0 before solving?

Math 1 Unit 5 Practice Problems

3 Which expression is equivalent to $t^2 - 36$?

A $(t - 6)(t - 6)$

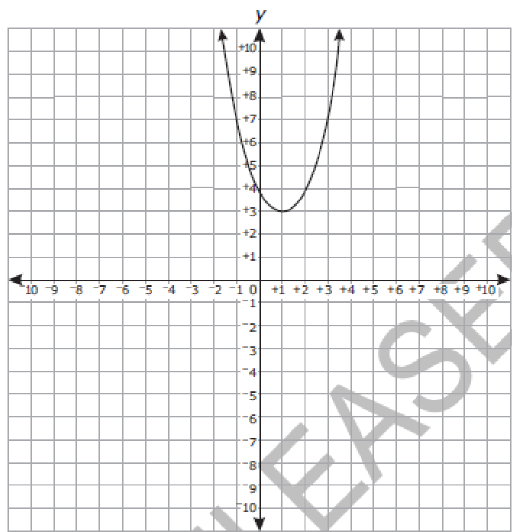
B $(t + 6)(t - 6)$

C $(t - 12)(t - 3)$

D $(t - 12)(t + 3)$

4 Which is the graph of the function $f(x) = 4x^2 - 8x + 7$?

A



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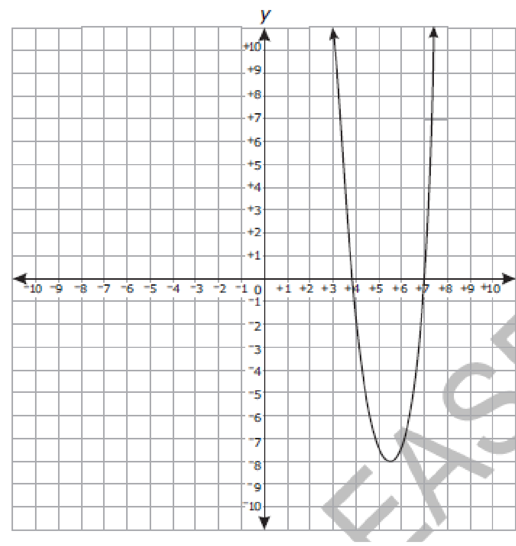

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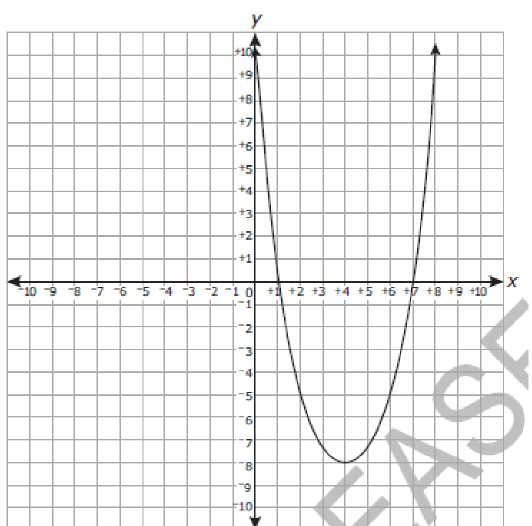
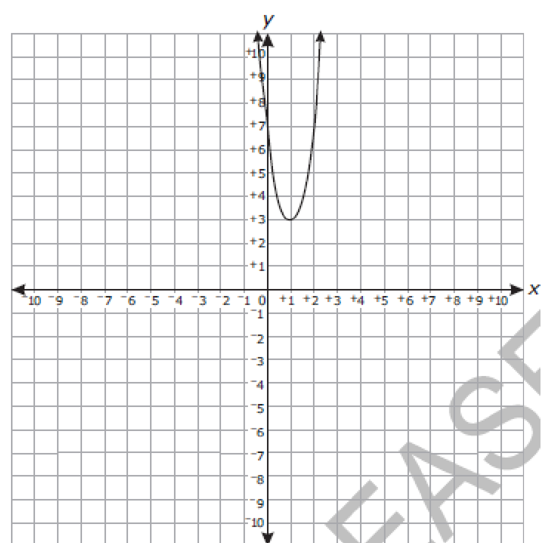


D



5 The floor of a rectangular cage has a length 4 feet greater than its width, w. James will increase both dimensions of the floor by 2 feet. Which equation represents the new area, N, of the floor of the cage?

A $N = w^2 + 4w$

B $N = w^2 + 6w$

C $N = w^2 + 6w + 8$

D $N = w^2 + 8w + 12$

8 What is the smallest of 3 consecutive positive integers if the product of the smaller two integers is 5 less than 5 times the largest integer?

9 The function $f(t) = {}^{-}5t^2 + 20t + 60$ models the approximate height of an object t seconds after it is launched. How many seconds does it take the object to hit the ground?

12 The larger leg of a right triangle is 3 cm longer than its smaller leg. The hypotenuse is 6 cm longer than the smaller leg. How many centimeters long is the smaller leg?

16 Suppose that the equation $V = 20.8x^2 - 458.3x + 3{,}500$ represents the value of a car from 1964 to 2002. What year did the car have the least value? ($x = 0$ in 1964)

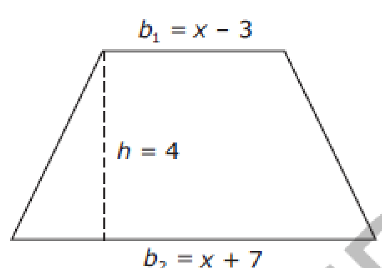
A 1965

B 1970

C 1975

D 1980

27 The area of a trapezoid is found using the formula $A = \frac{1}{2}h(b_1 + b_2)$, where A is the area, h is the height, and b_1 and b_2 are the lengths of the bases.



What is the area of the above trapezoid?

A $A = 4x + 2$

B $A = 4x + 8$

C $A = 2x^2 + 4x - 21$

D $A = 2x^2 + 8x - 42$

Math 1 Unit 6 EOC Review

Representations of Data

Very large quantities of data can be seen much easier using a ______________ or ______________ than a ___________________.

We can create these using our calculators to easily interpret the data.

___________________ are preferable for showing actual values within the data.

___________________ are preferable for showing the spread of the data.

Concept question:

1. Why are dot plots not preferable for a survey of an entire high school with 2000 students?

Measures of Central Tendency (Mean, Median, IQ Range, SD)

Mean - ____

Median - ____

Interquartile Range - ____

Standard Deviation - ____

Concept Question:

1. Explain the potential relationship between the IQR and standard deviation for a box plot with very short whiskers and long boxes.

Outlier Effects

Outlier - ____

An outlier generally has a larger effect on the ____________ and _________________ of a data set than the ____________________ and __________________________.

Concept Question:

1. Why does an outlier not greatly affect a median, but it can have a great effect on a mean?

Math 1 Unit 6 Practice Problems

25 The table below shows the area of several states.

State	**Area** (thousands of square miles)
Connecticut	6
Georgia	59
Maryland	12
Massachusetts	11
New Hampshire	9
New York	54
North Carolina	54
Pennsylvania	46

Delaware has an area of 2,000 square miles. Which is true if Delaware is included in the data set?

A The mean increases.

B The range decreases.

C The interquartile range decreases.

D The standard deviation increases.

36 The number of points scored by a basketball player in the first eight games of a season are shown below.

15, 35, 18, 30, 25, 21, 32, 16

What would happen to the data distribution if she scored 24, 22, 27, and 28 points in her next four games?

A The data distribution would become less peaked and more widely spread.

B The data distribution would become less peaked and less widely spread.

C The data distribution would become more peaked and less widely spread.

D The data distribution would become more peaked and more widely spread.