## Honors Math 2 Placement Test Study Guide

1. How many terms are in the expression $160q^6 - 160q^4 + 128q^2 - 128q + 32$?

2. What are the coefficients in the expression $5n^3 - 5n^2 - 11n + 6$?

3. For what values of b will the result of 3^b be greater than 1.

4. What are the factors in the expression $-9d - 29$?

5. The product of 6, g, and f is represented by the expression $6gf$. If the value of g is positive, what must be said about the value of f in order for the product to be positive?

6. The expression $\frac{1}{2}h(b_1 + b_2)$ is used to find the area of a trapezoid. If the height, h, equals 7 and the base, b_1, equals 15, what values of b_2 will result in an area less than 133 square units?

7. Marty's music app costs $12 per month for 300 songs to be played a month. 35 cents is charged for each additional song played over for a month. This month Marty paid $44.20. By how many songs did Marty exceed his plan?

____ 8. A couch that costs C dollars with 9% discount can be described using the expression $C - 0.09C$. Which expression below is NOT the same as this expression?

    a. $0.91C$ c. $0.1C$

    b. $-0.09C + C$ d. $C(1 - 0.09)$

9. The expression $\frac{2}{5}(x - 45)$ is used to determine how many bags of chips should be purchased for the NHS meeting. What values of x will always result in recommending a positive number of bags of chips to be purchased?

10. You have $575 to spend on clothes for the school year. You want to buy 8 pairs of pants that cost $352.45 including tax and hoodies that will have a 8.7% sales tax. What is the inequality that represents the amount of money you have to spend?

11. Geraldine brings undeveloped camera film to her local film shop. She doesn't want to sit and wait for the job to be completed, so she asks when she should come back to pick up her order. The workers develop 525 photos per hour and 35 photos developed while she paid for her order. She has less than 650 photos left to go. How much longer will it take her order to develop?

12. Two friends collectively travel 188 miles to see each other. They drive toward each other to meet for a weekend. The first friend drives her car and it took her 2 hours to meet her friend. The second friend leaves 15 minutes later, so she drives 5 miles per hour faster than her friend. What was the second friend's speed to the nearest whole number?

13. An African rainforest is seeing its population of plants decline at a rate of 3.1% per year. If the current plant count is 2,000,000 plants, what will the plant count be in 6 years?

14. A certain type of bacteria doubles every 3 hours. If you started with 39 bacteria, how many would you have after 18 hours?

15. A carafe at a banquet holds about 11 cups of coffee. When the carafe has 1 cup or less of coffee left, the waiter dumps the coffee out and pours in a fresh pot. Each coffee mug at the banquet holds 7 ounces of coffee. Assuming each person fills his or her mug, what inequality represents the number of people who can fill their mugs before the carafe needs to be refilled? (*Hint*: 1 cup = 8 ounces)

16. A form of a certain isotope has a half-life of 19 days. At the end of an experiment that lasted 171 days, there were 2 grams of the isotope left. How much of the isotope was there at the beginning of the experiment?

17. Marquise is saving for a 2012 Mustange and has saved $1476. He is saving $12 a day and needs at least $4500. How many weeks will it take him to save for the Mustang he wants?

____ 18. A store is giving away 175 gift cards each valued at $35 for every hour that the store is open. Which equation models this scenario?

   a. $y = -x + 175$
   b. $y = -35x + 6125$
   c. either a or b
   d. neither a nor b

19. It costs $75 to buy an air conditioner and about $0.40 per minute to run it. What equation models the total cost of using an air conditioner?
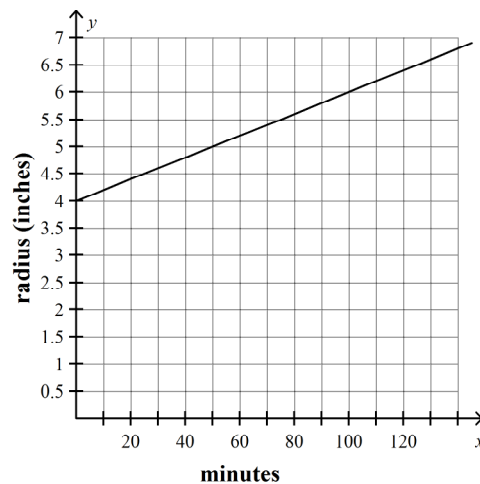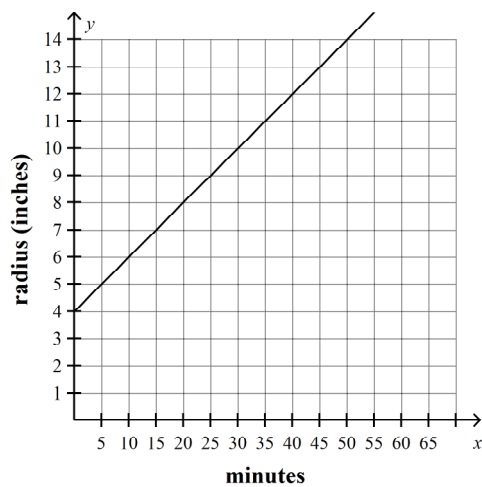
_____ 20. A soccer ball has a radius of 4 inches. Air leaking causes the radius of the soccer ball to change at a rate of 0.2 inches per minute. Which graph models the radius of the soccer ball?
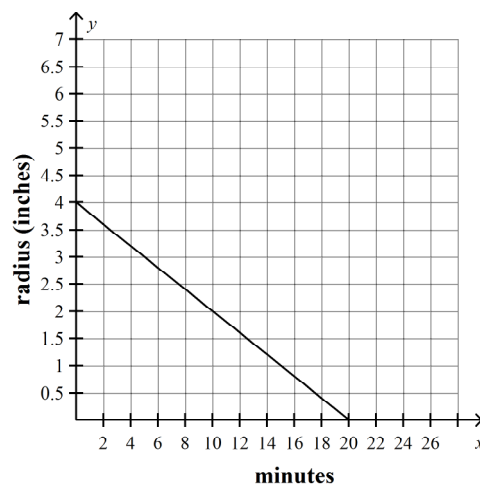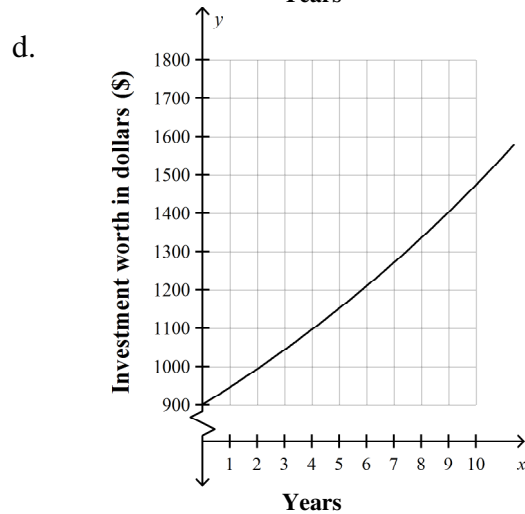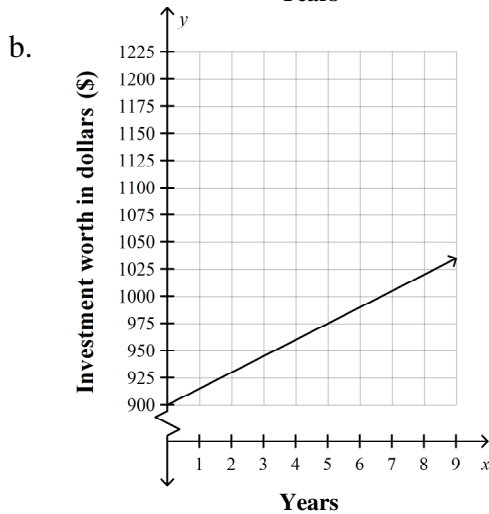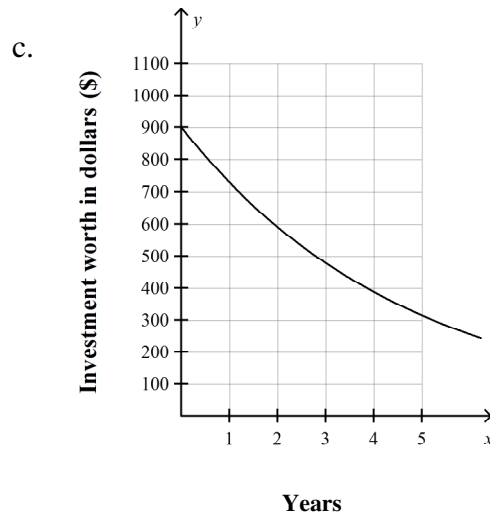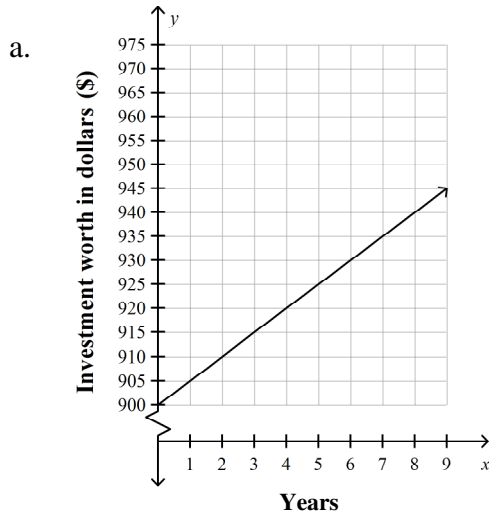
a.

b.

c.
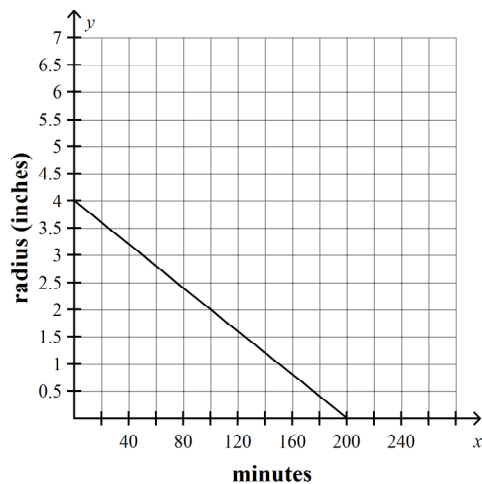
d.

21. A savings account of $850 earns 2.7% interest compounded semi-annually. What is the equation?

_____ 22. An investment of $900 earns 5% interest and is compounded semi-annually. Which graph models the worth of the investment over time?

a.

c.

b.

d.

23. A satellite TV company charges $65 a month for service and $2 for each on-demand movie watched. What is the graph of the equation for this scenario?

_____ 24. Which point is a solution of the equation $y = 9x + 10$?

a. $(3, -15)$ c. $(2, 8)$
b. $(5, 35)$ d. $(6, 64)$

25. A pizzeria is advertising a weeknight special for large pizzas. One large pizza is $12.99, plus $5.99 for each additional large pizza. You can afford to spend no more than $22.00 each week on pizzas. What is the maximum number of pizzas you can purchase?

26. A science test worth 100 points has 15 questions. The test consists of fill-in-the-blank questions worth 4 points each and short-answer questions worth 12 points each. How many fill-in-the-blank questions are on the test?

_____ 27. Your doctor recommends that you eat at least 18 milligrams of iron each day. One ounce of cashews contains 2 milligrams of iron, while one half cup of spinach contains 3 milligrams of iron. Determine which system of inequalities represents the number of servings of cashews and spinach you must eat in order to reach the minimum recommendation.

a. $\begin{cases} 2x + 3y \le 18 \\ x \ge 0 \\ y \ge 0 \end{cases}$
c. $\begin{cases} 2x + 3y \ge 18 \\ x \le 0 \\ y \le 0 \end{cases}$

b. $\begin{cases} 2x + 3y \ge 18 \\ x \ge 0 \\ y \ge 0 \end{cases}$
d. $\begin{cases} 2x + 3y \le 18 \\ x \le 0 \\ y \le 0 \end{cases}$

28. Miguel has a monthly budget of $275.00 for clothing. He spent $59.21 the first week, $50.52 the second week, and $71.02 the third week. Using c for clothing, how much can Miguel spend on clothing during the final week of the month and still stay within budget?

29. Solve the equation $14x + 2y = -6$ for y.

30. Solve the equation $4x + \dfrac{2}{9}y = 2$ for y.

31. The formula for calculating simple interest is $I = prt$. Solve this formula for r.

32. The formula for calculating the volume of a cone is $V = \dfrac{1}{3}\pi r^2 h$. Solve this formula for h.

33. $f(x) = 4x - 9$ and the domain of f is $\{-2, 1, 7, 10\}$. What is the range of f?

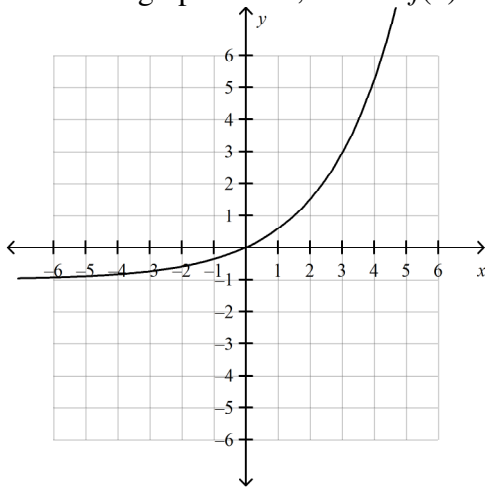_____ 34. Which of the following is true at the intersection of $y = f(x)$ and $y = g(x)$?

a. $f(x) = 1$
c. $f(x) = g(x)$
b. $y = 0$
d. $g(x) < f(x)$

35. Given the graph below, what is $f(2)$?

____ 36. Which of the following does a sign change in the $f(x) - g(x)$ column of a table of values imply?

   a. $y = f(x)$ has infinitely many solutions with $y = g(x)$.
   b. $y = f(x)$ equals $y = g(x)$.
   c. $y = f(x)$ has crossed $y = g(x)$.
   d. $y = f(x)$ has the same range as $y = g(x)$.

37. DeAndre modeled the growth of his beetle population using the function $a(x) = 3(3)^{\frac{x}{2}}$, where x is in days. He started with 3 beetles, and the population triples every 2 days. He evaluated the function at $f(12)$ and calculated $f(12) = 2{,}187$. What does his calculation say about the beetle population?

____ 38. The contents of the fuel tank of a car can be modeled by the function $g(x) = -0.04x + 15$, where x is in miles driven and $g(x)$ represents the amount of fuel remaining in the tank in gallons. Courtney has traveled 200 miles. Which statement represents the amount of gas in gallons that she has left in her car?

   a. $g(200) = 8$ c. $g(200) = 7$
   b. $g(x) = 8$ d. $g(x) = 7$

39. What is the apparent range of the function graphed below?
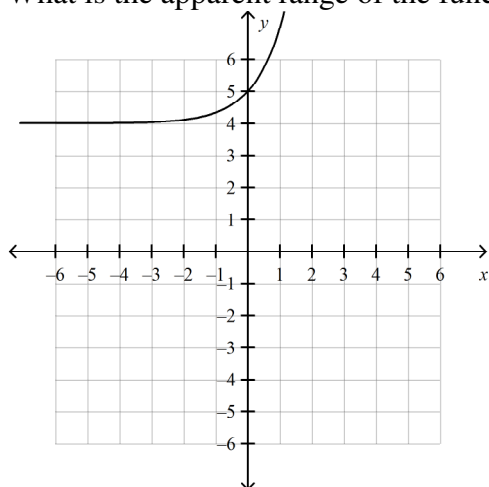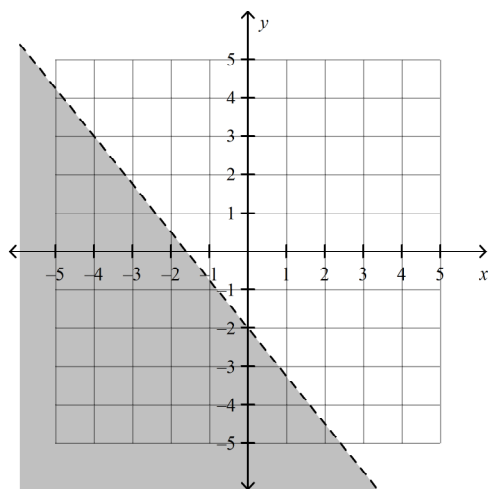

____ 40. Which inequality represents the graph?
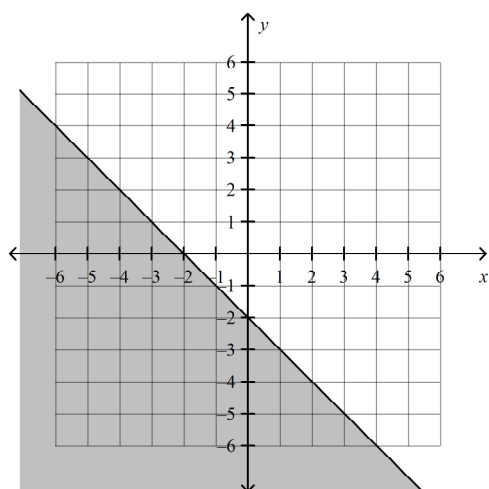
a. $y \le -x - 2$

b. $y \le x - 1$

c. $y < -x - 2$

d. $y \le x - 2$

_____ 41. Which inequality represents the graph?

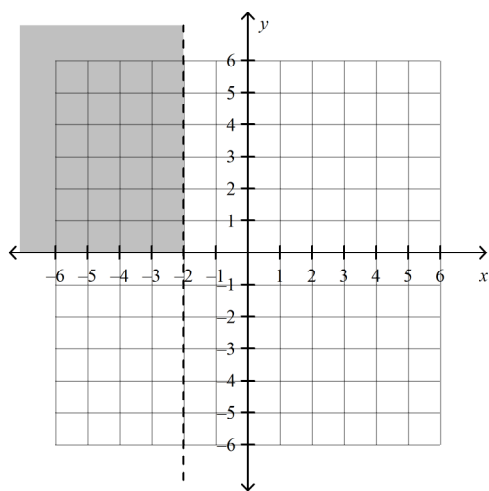a. $5x + 4y \geq -8$ c. $4x + 4y \geq 8$
b. $5x + 4y < -8$ d. $-5x - 4y < 8$

_____ 42. Which system of inequalities represents the solution to the graph below?

a. $\begin{cases} x < -2 \\ y \geq 0 \end{cases}$ c. $\begin{cases} x \leq -2 \\ y > 0 \end{cases}$

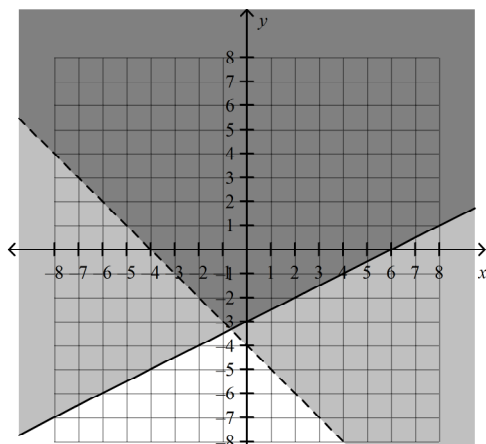b. $\begin{cases} x < 0 \\ y \geq -2 \end{cases}$ d. $\begin{cases} x > -2 \\ y \leq 0 \end{cases}$

____ 43. Which graph represents the solution to the system of inequalities below?

$$\begin{cases} 5x + 5y > 20 \\ \dfrac{1}{2}x - y \le -3 \end{cases}$$

a.

c.
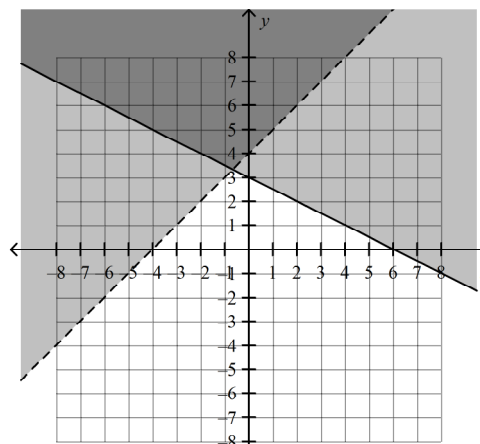
b.
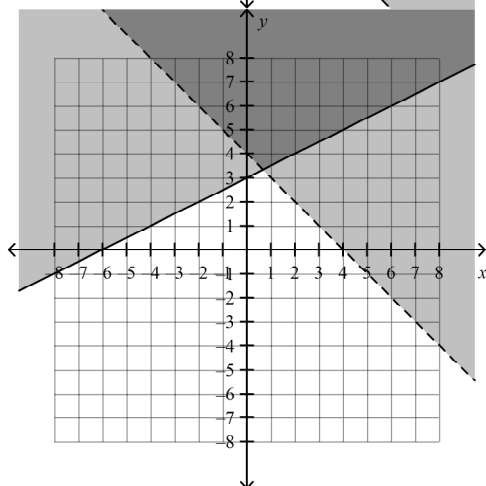
d.
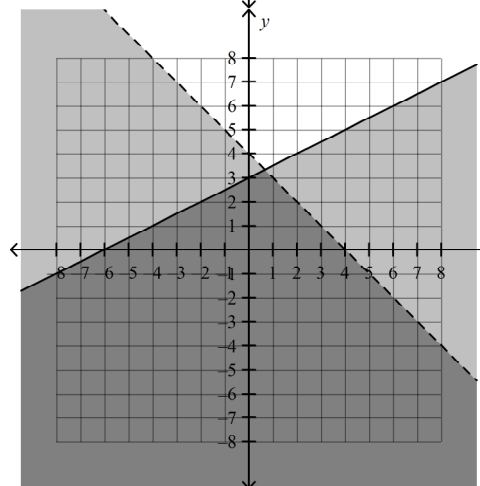
____ 44. Which graph represents the solution to the system of inequalities below?

$$\begin{cases} y < x - 6 \\ y > -2x + 5 \end{cases}$$

a.

c.

b.

d.
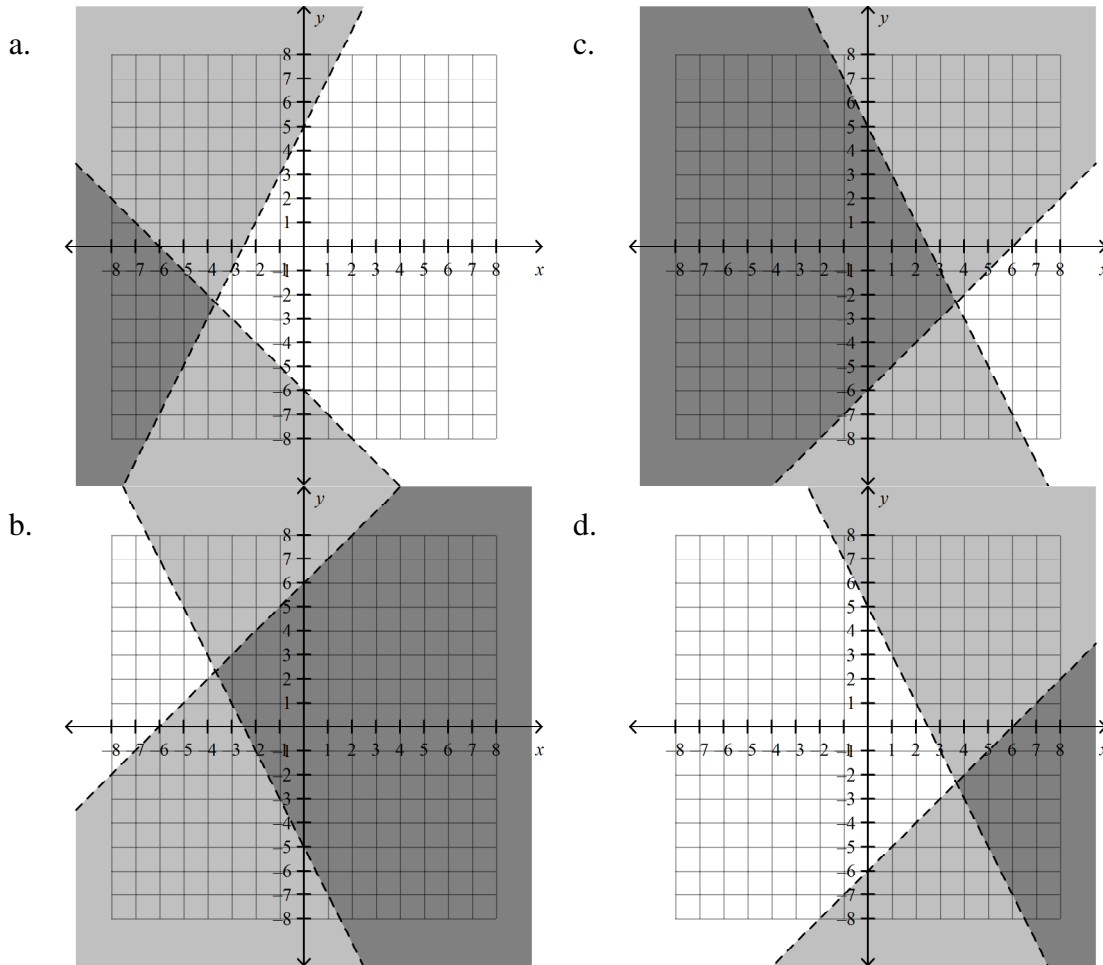
45. A sequence is generated by $a_n = -n - 16$. What is the value of the seventh term?

46. If $a_n = a_{n-1} - 3$ and $a_4 = -7$, what is a_6?

47. A sequence is generated by $a_n = 5(2^n) - 3$. What is the value of the seventh term?

48. If $a_n = a_{n-1} \cdot 2$ and $a_3 = 8$, what is a_5?

49. If $a_n = a_{n-1} - 5$ and $a_3 = 9$, what is a_5?

_____ 50. Which of the following graphs best represents the number of miles ran during a period of time?

a.

c.

b.

d.
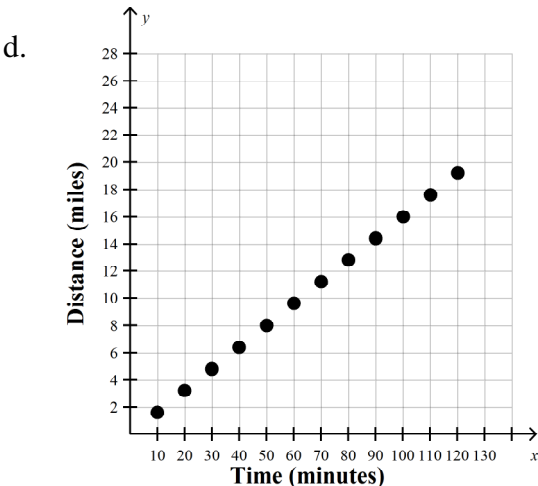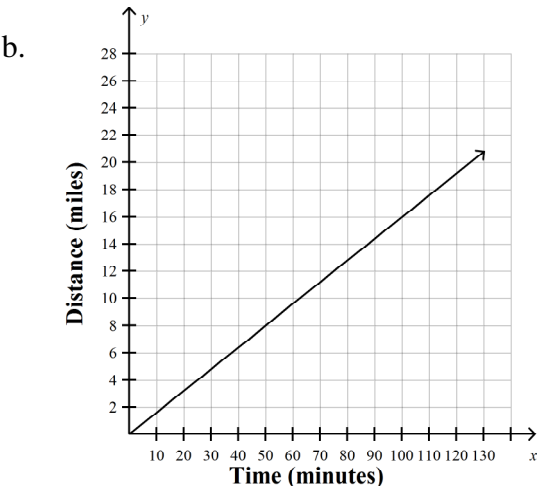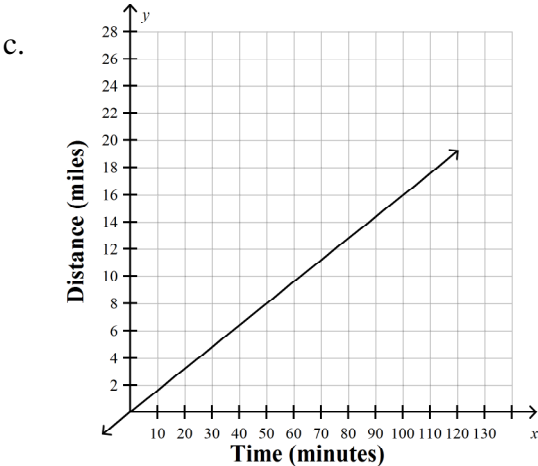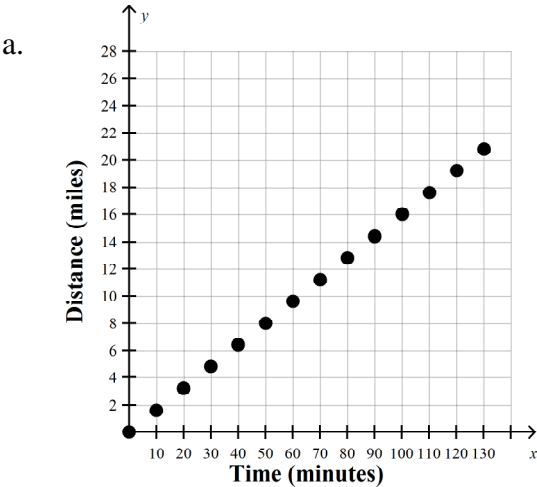
_____ 51. The graph below can be described as:
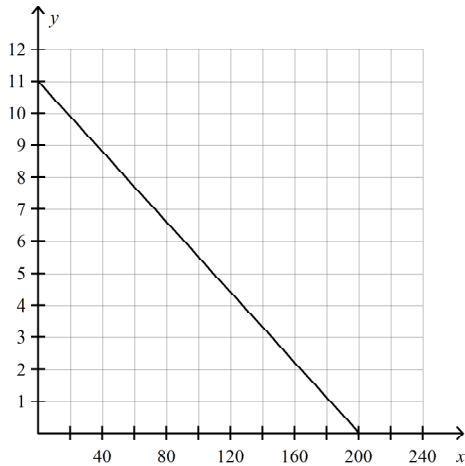
a. having no maximum
b. having a maximum of 200 and a minimum of 0
c. having a maximum of 11 and a minimum of 0
d. having no minimum

52. Use the table below to determine the rate of change for the interval [1, 3].

Weeks (x)	Value of stock in dollars ($f(x)$)
0	530
1	500.85
2	472.30
3	448.69
4	425.80

53. Use the table below to determine the rate of change for the interval [5, 10].

Weeks (x)	Amount owed in dollars ($f(x)$)
0	1950
5	1925
10	1900
15	1875
20	1850

54. What is the rate of change for the function $f(x) = 2.7x - 3$ over the interval [15, 21]?

55. What is the rate of change for the function $f(x) = 5(2)^{\frac{x}{2}}$ over the interval [6, 10]?

56. What are the intercepts of the graph of $f(x) = \dfrac{1}{5}x - 3$?

_____ 57. Which graph shows a line with an *x*-intercept of –8?

a.

c.

b.

d.
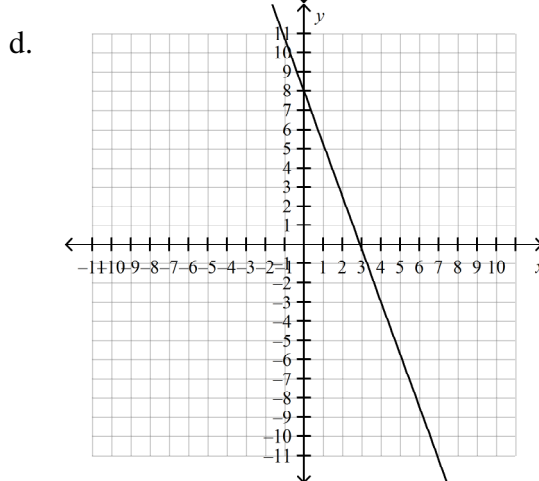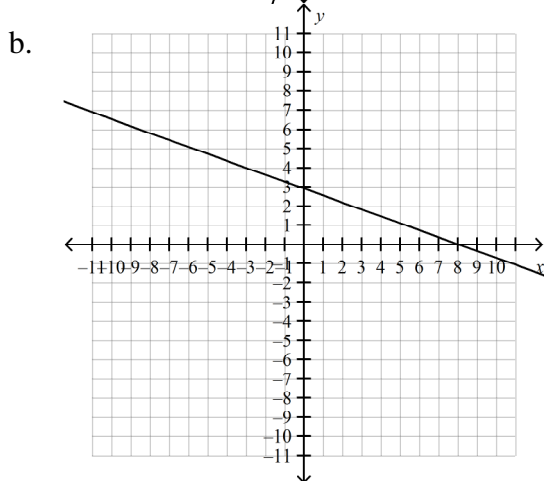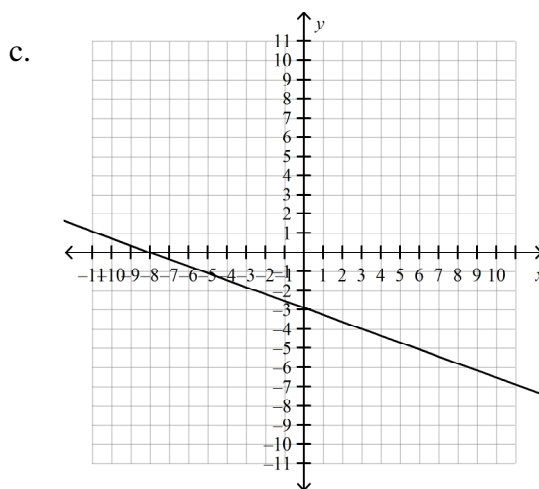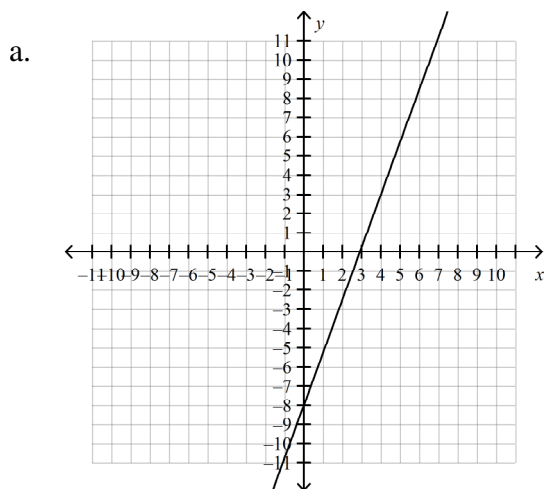
58. What is the *y*-intercept of the curve below?
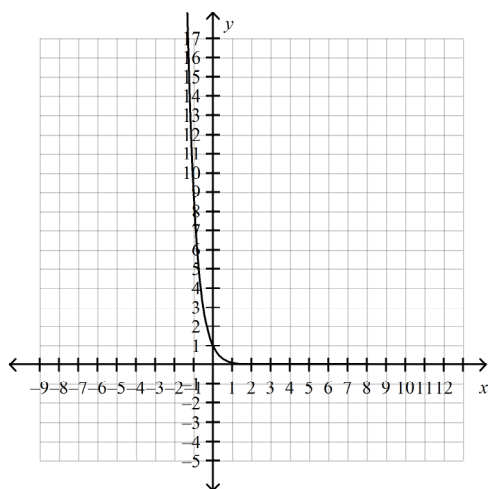
59. What is the best description of the end behavior of the graph below?
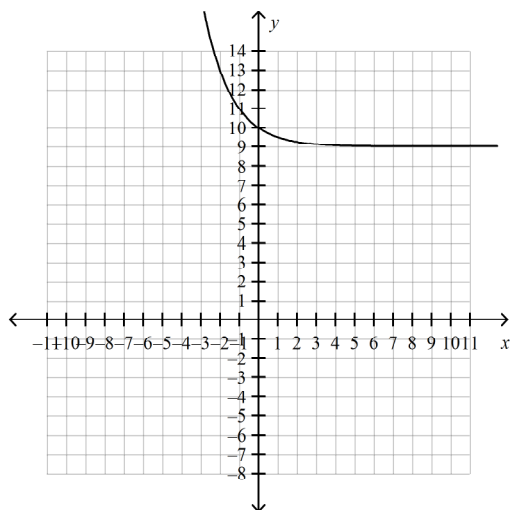
60. What is the *y*-intercept of the graph of $y = 5\left(\dfrac{1}{5}\right)^x - 8$?

61. What is the best description of the end behavior of the graph of $f(x) = \dfrac{1}{6}(4^x) - 6$?

62. What is the *y*-intercept of the graph of $f(x) = \dfrac{1}{10}(4)^x - 2$?

_____   63. Which of the following statements is true about the functions $f(x)$ and $g(x)$?

x	f(x)
–2	12
0	7
2	2
4	–3
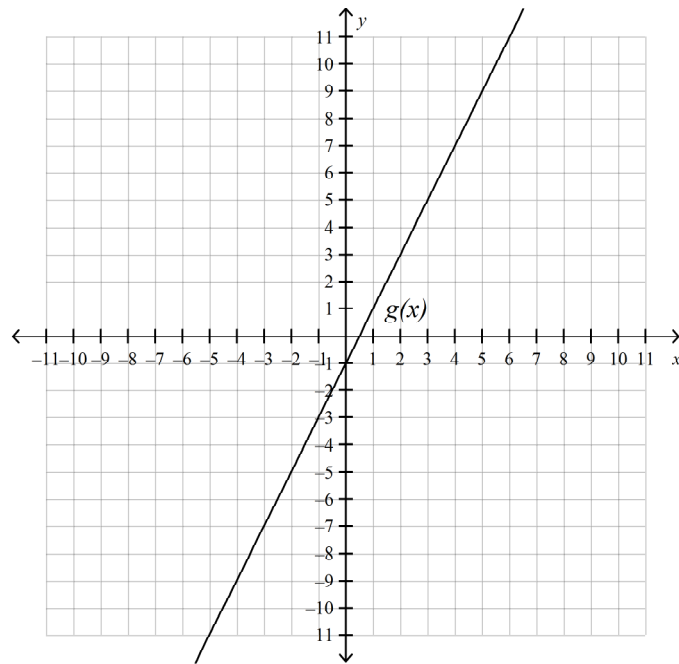
    a.   The function $f(x)$ has a greater rate of change than the function $g(x)$.
    b.   The rates of change cannot be determined.
    c.   The rates of change for both $f(x)$ and $g(x)$ are equal.
    d.   The function $g(x)$ has a greater rate of change than the function $f(x)$.

_____   64. The function $f(x)$ represents the total bill from a rental store that charges $12 to rent a steamer plus an additional $2.00 an hour. A second rental store uses the function $g(x) = 15 + x$ to represent the total bill for a similar steamer.

Which of the following statements is true about the functions $f(x)$ and $g(x)$?

    a.   The function $g(x)$ has a greater rate of change than the function $f(x)$.
    b.   The rates of change cannot be determined.
    c.   The function $f(x)$ has a greater rate of change than the function $g(x)$.
    d.   The rates of change for both $f(x)$ and $g(x)$ are equal.

_____ 65. Which of the following statements is true about the functions $f(x)$ and $g(x)$?

x	$f(x)$
−1	4.5
0	9
1	18
2	36
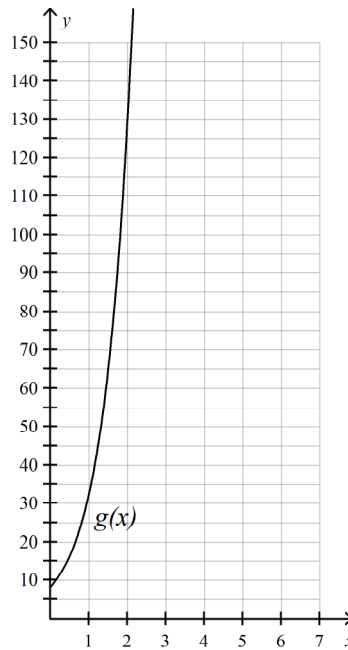
a. The y-intercept of the function $f(x)$ is equal to the y-intercept of the function $g(x)$.
b. The y-intercepts cannot be determined.
c. The y-intercept of the function $f(x)$ is greater than the y-intercept of the function $g(x)$.
    function $g(x)$.
d. The y-intercept of the function $f(x)$ is less than the y-intercept of the function $g(x)$.

_____ 66. Which of the following statements is true about the functions $f(x)$ and $g(x)$ over the interval $[0, 2]$?

$$f(x) = 70\left(1 + \frac{0.35}{4}\right)^{4x}$$
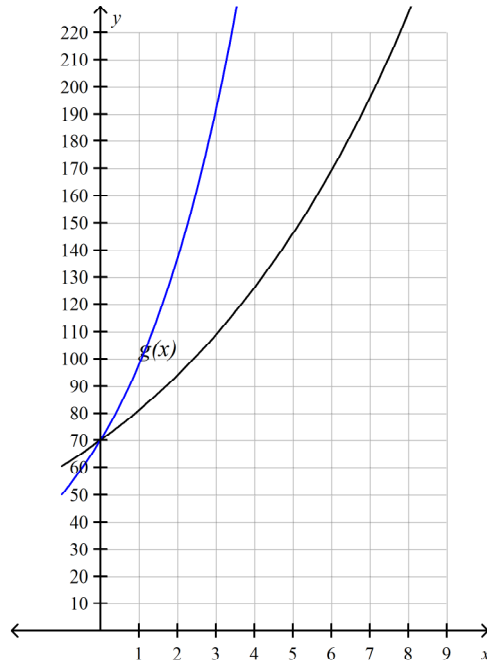
a. The rates of change cannot be determined.
b. The function $g(x)$ has a greater rate of change than the function $f(x)$ over the interval $[0, 2]$.
c. The rates of change for both $f(x)$ and $g(x)$ are equal over the interval $[0, 2]$.
d. The function $f(x)$ has a greater rate of change than the function $g(x)$ over the interval $[0, 2]$.

_____ 67. Which of the following statements is true about the functions $f(x) = 3(7)^x$ and $g(x) = 3 + 7x$ where $x > 0$?

a. The rate of change of an exponential function cannot be determined.
b. The rate of change of the function $f(x)$ is never greater than the rate of change of the function $g(x)$.
c. The rate of change of the function $g(x)$ will eventually be greater than the rate of change of the function $f(x)$.
d. The rate of change of the function $f(x)$ is always greater than the rate of change of the function $g(x)$.

_____ 68. The function $f(x)$ represents the amount of air remaining in an air mattress that originally had 4,000 cubic inches of air and is losing 11% of its air every minute, x. The function $g(x) = 4000(1 - 0.07)^x$ represents the amount of air remaining in a second air mattress.

Which of the following statements is true about the functions $f(x)$ and $g(x)$?

    a. The function $f(x)$ has a lesser rate of change than the function $g(x)$ over the interval [2, 5].
    b. The rates of change cannot be determined.
    c. The function $f(x)$ has a greater rate of change than the function $g(x)$ over the interval [2, 5].
    d. The function $f(x)$ has an equal rate of change with the function $g(x)$ over the interval [2, 5].

69. What explicit equation represents the pattern in the table below?

x	y
1	−27
2	−39
3	−51
4	−63
5	−75

70. Darnell's car displays the number of gallons remaining in his gas tank. When he fills his tank, he has 15 gallons of gas. After traveling 1 mile, Darnell has 14.92 gallons of gas. After traveling 2 miles, Darnell has 14.84 gallons of gas. After traveling 3 miles, Darnell has 14.76 gallons of gas. What equation represents the remaining gallons of gas after traveling x miles?

71. What explicit equation represents the pattern in the table below?

x	y
1	11
2	−99
3	891
4	−8019

72. A population of bears is decreasing. The population this year is 300 bears. After 1 year, it is estimated that the population will be 240 bears. After 2 years, it is estimated that the population will be 192 bears. What equation describes the bear population in any year x?

73. What equation represents the relationship between x and y shown in the graph below?
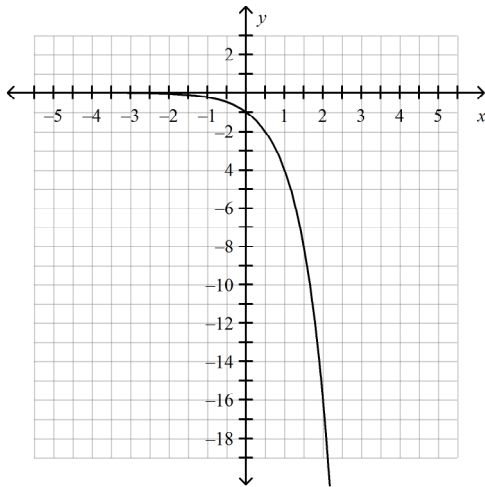
74. If $f(x) = 4x - 8$ and $g(x) = 7x + 5$, what is $(f + g)(x)$?

75. Given the graph of $f(x)$ below, what is the graph of $f(x) - 4$?
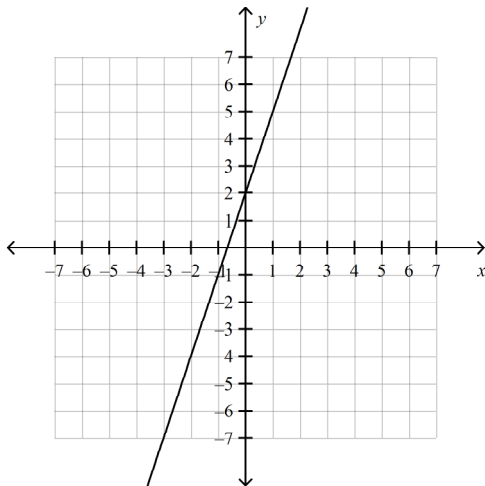
76. If $f(x) = 4^x$ and $g(x) = 5$, what is $(f \div g)(x)$?

77. Given the graphs of $f(x)$ and $g(x)$ below, what is the function rule for $g(x)$ in terms of $f(x)$?
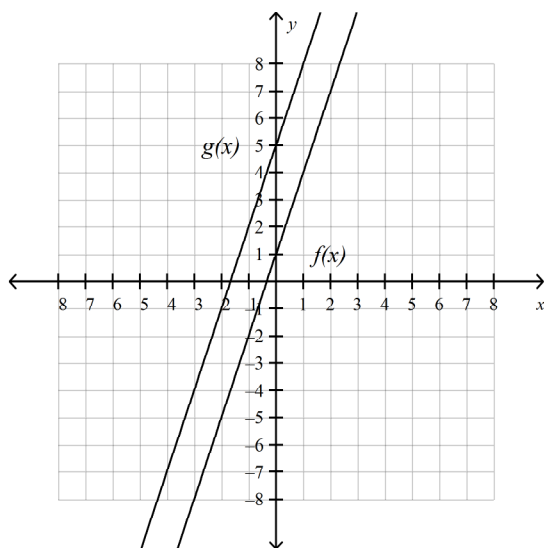
78. Given the graphs of $f(x)$ and $g(x)$ below, what is the function rule for $g(x)$ in terms of $f(x)$?
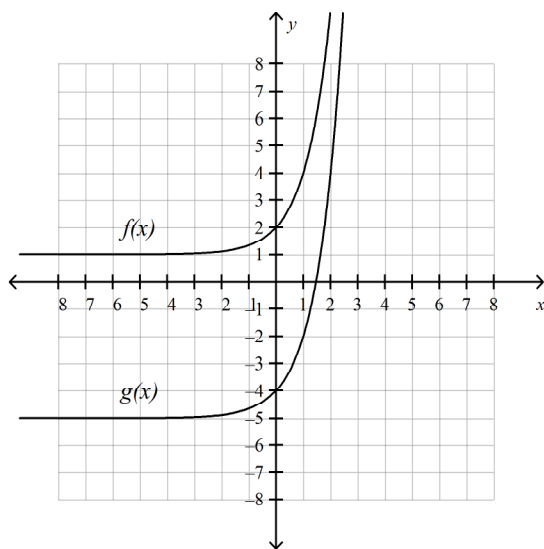
79. $f(x) = \left(\dfrac{1}{3}\right)^x - 1$ and $g(x) = \left(\dfrac{1}{3}\right)^x - 2$. If $g(x)$ can be written as $f(x) + k$, what is the value of k?

80. What is the common difference of the sequence?

    18, 16, 14, 12, ...

81. What is the constant ratio of the sequence?

    −4, −24, −144, −864, ...

82. The explicit formula for an arithmetic sequence is given as $a_n = x + (n-1)(-2)$. The sixth term of the sequence is 4. What is the missing value?

83. Identify the property of equality that justifies the missing step to solve the given equation.

Equation	Steps
$3x + (x - 5) = 59$	Original equation
$4x - 5 = 59$	Associative property of addition
$4x = 64$	
$x = 16$	Division property of equality

84. What is the solution to the equation $6x + 2(4x - 13) + 6 = 50 + 15x$?

85. What is the solution to the inequality $10x - 7 \le 9x - 3$?

86. What is the solution to the inequality $5x - 23 \ge 2(2 + 4x)$?

87. What is the solution to the equation $9^x = 6{,}561$?

88. The explicit formula for a geometric sequence is given as $a_n = x(8)^{n-1}$. The third term is 256. What is the missing value?

89. Three times a number plus 6 times another number is –3. The sum of the two numbers is 4. What are the numbers?

_____   90. Which graph represents the solution to the system $\begin{cases} 2x + y = 7 \\ -x + 3y = 0 \end{cases}$?

a.

c.

b.

d.
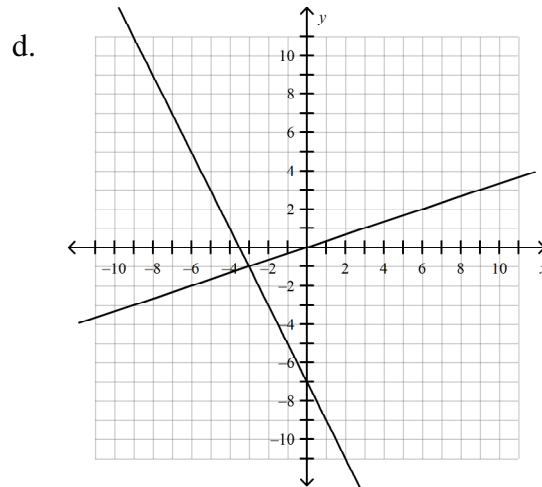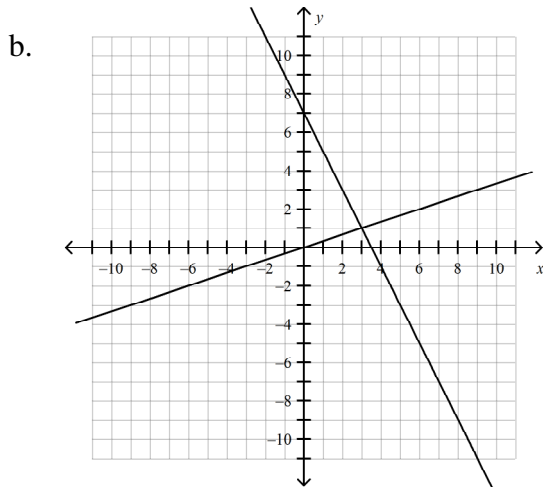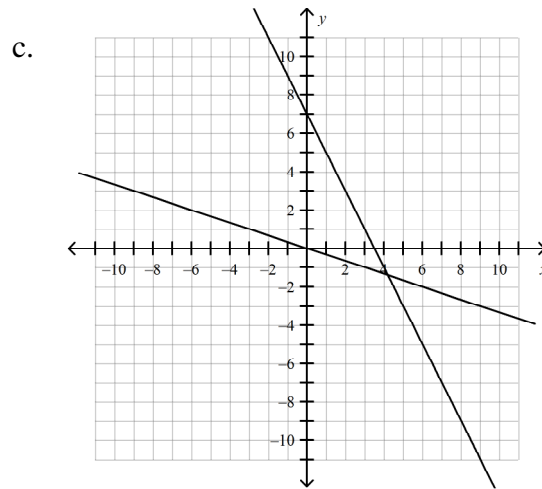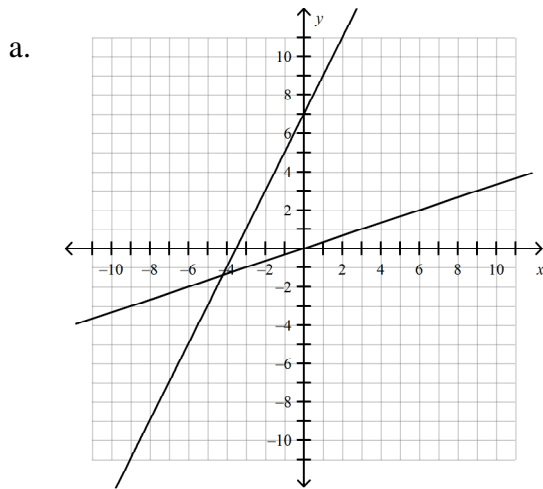
91. Matt invests $3,300 into two savings accounts. One account earns 5% annual interest; the other earns 3% annual interest. At the end of 1 year, Matt has earned $129.00 in interest. How much did he invest at each rate?

92. Tickets to the concert cost $6.00 for adults and $3.50 for children. A group of 12 people went to the concert and paid $62.00 for tickets. How many adult tickets were purchased? How many children's tickets were purchased?

93. What is the solution to the system $\begin{cases} y = 4x - 3 \\ 4x - y = 3 \end{cases}$?

94. What is the solution to the system $\begin{cases} 6x + y = 11 \\ -6x + 5y = -161 \end{cases}$?

_____ 95. The histogram below represents which data set?
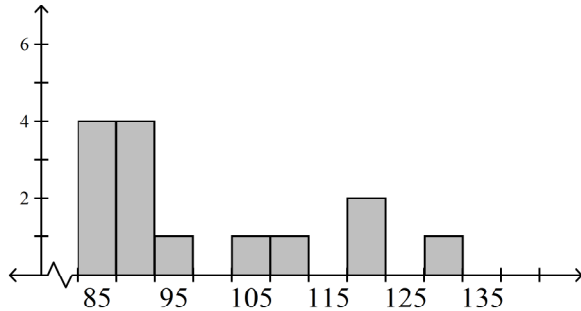
a. Data Set 3: 85, 90, 95, 105, 110, 120, 130
b. Data Set 4: 85, 85, 85, 85, 90, 90, 90, 95, 105, 120, 130
c. Data Set 1: 85, 85, 85, 85, 90, 90, 90, 90, 95, 105, 110, 120, 120, 130
d. Data Set 2: 85, 85, 85, 85, 85, 90, 90, 90, 95, 105, 110, 120, 120, 130

_____ 96. Look at the data presented in the dot plots below. Which comparison is true?

Data Set 1   **Data Set 2**
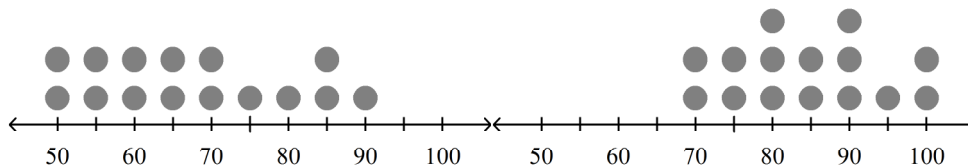
a. Data Set 1: greater mean; Data Set 1: greater variation
b. Data Set 2: greater mean; Data Set 1: greater variation
c. Data Set 1: greater mean; Data Set 2: greater variation
d. Data Set 2: greater mean; Data Set 2: greater variation

97. What is the median of the data set used to create the box plot below?
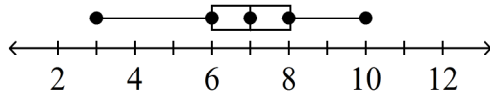
98. What is the mean absolute deviation of the data below?

151 209 157 125 206 222 131 115 172 150
149 221 151 194 134 137 153 182 216 160

99. What is the interquartile range of the data below?

    36 60 58 58 51 40 52 52 31 55 54 31 45 43 38

100. Which value in the data set below is an outlier?

    111 117 122 148 114 137 130 114 122 111
    114 114 126 121 116 113 115 137 116 128

____ 101. Which box plot represents the data below?

    89 90 90 96 98 99 103 104 105 112 125 125 126 127 127

a.

b.

c.
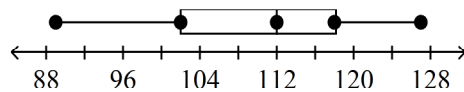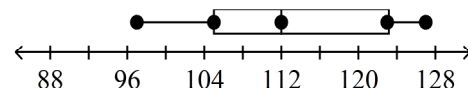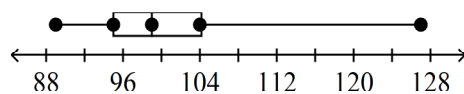
d.
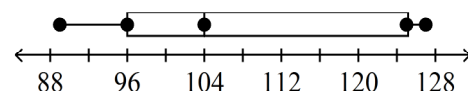
Honors Math 2 Placement Test Study Guide
Answer Section

1. ANS:
    5

    PTS: 1   REF: MI 1.1   NAT: A-SSE.1a
    TOP: Interpreting Structure in Expressions
    KEY: term | algebraic expression   MSC: Progress Assessment
2. ANS:
    5, –5, and –11

    PTS: 1   REF: MI 1.1   NAT: A-SSE.1a
    TOP: Interpreting Structure in Expressions
    KEY: coefficient | algebraic expression   MSC: Progress Assessment
3. ANS:
    b can be any number greater than 0.

    PTS: 1   REF: MI 1.1   NAT: A-SSE.1b
    TOP: Interpreting Structure in Expressions
    KEY: base | exponent | factor | variable   MSC: Progress Assessment
4. ANS:
    –9 and d

    PTS: 1   REF: MI 1.1   NAT: A-SSE.1a
    TOP: Interpreting Structure in Expressions
    KEY: factor | algebraic expression   MSC: Progress Assessment
5. ANS:
    f must be positive.

    PTS: 1   REF: MI 1.1   NAT: A-SSE.1b
    TOP: Interpreting Structure in Expressions
    KEY: algebraic expression | variable | product | negative numbers
    MSC: Progress Assessment
6. ANS:
    b_2 must be less than 23.

    PTS: 1   REF: MI 1.1   NAT: A-SSE.1b
    TOP: Interpreting Structure in Expressions
    KEY: order of operations | term | variable   MSC: Progress Assessment
7. ANS:
    92 songs

    PTS: 1

8. ANS: C   PTS: 1   REF: MI 1.1   NAT: A-SSE.1a
    TOP: Interpreting Structure in Expressions
    KEY: algebraic expression | order of operations   MSC: Progress Assessment
9. ANS:
    $x > 45$

    PTS: 1
10. ANS:
    $x + 0.087x + 352.45 \le 575$

    PTS: 1
11. ANS:
    more than about 74 minutes

    PTS: 1   REF: MI 1.2   NAT: A-CED.1
    TOP: Creating Equations and Inequalities in One Variable   KEY: equation | rate | solution
    MSC: Progress Assessment
12. ANS:
    about 53 mph

    PTS: 1   REF: MI 1.2   NAT: A-CED.1
    TOP: Creating Equations and Inequalities in One Variable
    KEY: equation | rate | solution | variable   MSC: Progress Assessment
13. ANS:
    about 1,655,666 plants

    PTS: 1   REF: MI 1.2   NAT: A-CED.1
    TOP: Creating Equations and Inequalities in One Variable
    KEY: exponential decay | rate | solution | variable   MSC: Progress Assessment
14. ANS:
    2,496 bacteria

    PTS: 1   REF: MI 1.2   NAT: A-CED.1
    TOP: Creating Equations and Inequalities in One Variable
    KEY: exponential equation | quantity | rate | solution   MSC: Progress Assessment
15. ANS:
    $11 - 0.875x \le 1$

    PTS: 1   REF: MI 1.2   NAT: A-CED.1
    TOP: Creating Equations and Inequalities in One Variable
    KEY: inequality | quantity | solution set | variable   MSC: Progress Assessment

16. ANS:
    1024 grams

    PTS: 1
17. ANS:
    at least 36 weeks

    PTS: 1
18. ANS: C   PTS: 1   REF: MI 1.3   NAT: A-CED.2
    TOP: Creating and Graphing Equations in Two Variables
    KEY: dependent variable | independent variable | linear equation | slope | y-intercept
    MSC: Progress Assessment
19. ANS:
    $y = 0.40x + 75$

    PTS: 1   REF: MI 1.3   NAT: A-CED.2
    TOP: Creating and Graphing Equations in Two Variables
    KEY: independent variable | dependent variable | linear equation
    MSC: Pre-Assessment
20. ANS: D   PTS: 1
21. ANS:
    $A = 850(1.0135)^{2x}$

    PTS: 1   REF: MI 1.3   NAT: A-CED.2
    TOP: Creating and Graphing Equations in Two Variables
    KEY: compound interest | dependent variable | independent variable | exponential growth
    MSC: Progress Assessment
22. ANS: D   PTS: 1   REF: MI 1.3   NAT: A-CED.2
    TOP: Creating and Graphing Equations in Two Variables
    KEY: independent variable | dependent variable | exponential growth | exponential equation
    MSC: Pre-Assessment

23. ANS:
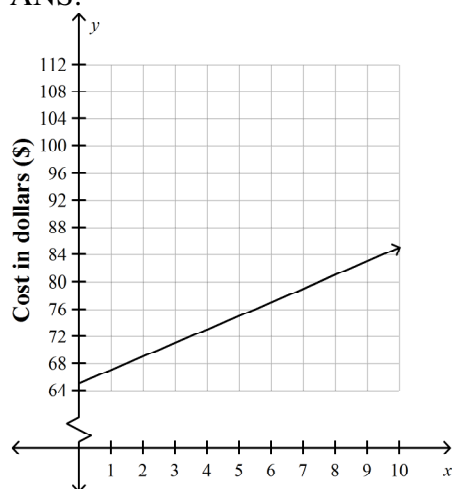
Number of movies rented

PTS: 1　　　　REF: MI 1.3　　　NAT: A-CED.2
TOP: Creating and Graphing Equations in Two Variables
KEY: dependent variable | independent variable | linear equation | slope | y-intercept
MSC: Progress Assessment

24. ANS: D　　　　PTS: 1　　　　REF: MI 1.4　　　NAT: A-CED.3
TOP: Representing Constraints　　　KEY: solution set　　MSC: Progress Assessment

25. ANS:
2

PTS: 1　　　　REF: MI 1.4　　　NAT: A-CED.3
TOP: Representing Constraints　　　KEY: constraint | inequality
MSC: Progress Assessment

26. ANS:
10

PTS: 1　　　　REF: MI 1.4　　　NAT: A-CED.3
TOP: Representing Constraints　　　KEY: constraint | solution set
MSC: Progress Assessment

27. ANS: B　　　　PTS: 1　　　　REF: MI 1.4　　　NAT: A-CED.3
TOP: Representing Constraints
KEY: constraint | inequality | system of inequalities | algebraic inequality
MSC: Pre-Assessment

28. ANS:
$c \geq 0$ and $c \leq 94.25$

PTS: 1　　　　REF: MI 1.4　　　NAT: A-CED.3
TOP: Representing Constraints
KEY: algebraic inequality | constraint | inequality | system of inequalities
MSC: Progress Assessment

29. ANS:
    $y = -7x - 3$

    PTS: 1   REF: MI 1.5   NAT: A-CED.4   TOP: Rearranging Formulas
    KEY: literal equation | solving for a variable   MSC: Pre-Assessment
30. ANS:
    $y = -18x + 9$

    PTS: 1   REF: MI 1.5   NAT: A-CED.4   TOP: Rearranging Formulas
    KEY: literal equation | solving for a variable | reciprocal   MSC: Progress Assessment
31. ANS:
    $r = \dfrac{I}{pt}$

    PTS: 1   REF: MI 1.5   NAT: A-CED.4   TOP: Rearranging Formulas
    KEY: formula | rearranging formulas   MSC: Progress Assessment
32. ANS:
    $h = \dfrac{3V}{\pi r^2}$

    PTS: 1   REF: MI 1.5   NAT: A-CED.4   TOP: Rearranging Formulas
    KEY: formula | rearranging formulas   MSC: Progress Assessment
33. ANS:
    $\{-17, -5, 19, 31\}$

    PTS: 1
34. ANS: C   PTS: 1   REF: MI 2.1   NAT: A-REI.11
    TOP: Graphs As Solution Sets and Function Notation
    KEY: system of equations | solution set | function   MSC: Progress Assessment
35. ANS:
    $f(2) = 1.5$

    PTS: 1   REF: MI 2.1   NAT: F-IF.2
    TOP: Graphs As Solution Sets and Function Notation
    KEY: function notation | exponential function | function | solution set
    MSC: Progress Assessment
36. ANS: C   PTS: 1   REF: MI 2.1   NAT: A-REI.11
    TOP: Graphs As Solution Sets and Function Notation
    KEY: system of equations | function | solution set   MSC: Progress Assessment

37. ANS:
    After 12 days, DeAndre will have 2,187 beetles.

    PTS: 1   REF: MI 2.1   NAT: F-IF.2
    TOP: Graphs As Solution Sets and Function Notation
    KEY: function notation | exponential function | evaluate functions
    MSC: Progress Assessment
38. ANS: C   PTS: 1   REF: MI 2.1   NAT: F-IF.2
    TOP: Graphs As Solution Sets and Function Notation
    KEY: linear function | function notation | evaluate functions   MSC: Progress Assessment
39. ANS:
    $f(x) > 4$

    PTS: 1   REF: MI 2.1   NAT: F-IF.1
    TOP: Graphs As Solution Sets and Function Notation
    KEY: exponential function | range   MSC: Progress Assessment
40. ANS: A   PTS: 1   REF: MI 2.2   NAT: A-REI.12
    TOP: Solving Linear Inequalities in Two Variables and Systems of Inequalities
    KEY: linear inequality | solution set | graph inequalities   MSC: Progress Assessment
41. ANS: B   PTS: 1   REF: MI 2.2   NAT: A-REI.12
    TOP: Solving Linear Inequalities in Two Variables and Systems of Inequalities
    KEY: linear inequality | solution set | graph inequalities   MSC: Progress Assessment
42. ANS: A   PTS: 1   REF: MI 2.2   NAT: A-REI.12
    TOP: Solving Linear Inequalities in Two Variables and Systems of Inequalities
    KEY: linear inequality | system of inequalities   MSC: Progress Assessment
43. ANS: B   PTS: 1   REF: MI 2.2   NAT: A-REI.12
    TOP: Solving Linear Inequalities in Two Variables and Systems of Inequalities
    KEY: linear inequality | system of inequalities   MSC: Progress Assessment
44. ANS: D   PTS: 1   REF: MI 2.2   NAT: A-REI.12
    TOP: Solving Linear Inequalities in Two Variables and Systems of Inequalities
    KEY: linear inequality | system of inequalities   MSC: Progress Assessment
45. ANS:
    –23

    PTS: 1   REF: MI 2.3   NAT: F-IF.3   TOP: Sequences As Functions
    KEY: sequence | arithmetic sequence | discrete function | explicit formula
    MSC: Progress Assessment
46. ANS:
    –13

    PTS: 1   REF: MI 2.3   NAT: F-IF.3   TOP: Sequences As Functions
    KEY: sequence | recursive formula | discrete function | arithmetic sequence
    MSC: Progress Assessment

47. ANS:
    637

    PTS: 1   REF: MI 2.3   NAT: F-IF.3   TOP: Sequences As Functions
    KEY: sequence | geometric sequence | discrete function | explicit formula
    MSC: Progress Assessment
48. ANS:
    32

    PTS: 1   REF: MI 2.3   NAT: F-IF.3   TOP: Sequences As Functions
    KEY: sequence | recursive formula | discrete function | geometric sequence
    MSC: Progress Assessment
49. ANS:
    −1

    PTS: 1   REF: MI 2.3   NAT: F-IF.3   TOP: Sequences As Functions
    KEY: sequence | discrete function | recursive formula   MSC: Progress Assessment
50. ANS: B   PTS: 1   REF: MI 2.4   NAT: F-IF.5
    TOP: Interpreting Graphs of Functions
    KEY: linear function | rate of change | positive function   MSC: Progress Assessment
51. ANS: C   PTS: 1   REF: MI 2.4   NAT: F-IF.4
    TOP: Interpreting Graphs of Functions   KEY: maximum | minimum | linear function
    MSC: Progress Assessment
52. ANS:
    −$26.08 per week

    PTS: 1   REF: MI 2.4   NAT: F-IF.6
    TOP: Interpreting Graphs of Functions   KEY: rate of change | exponential function
    MSC: Progress Assessment
53. ANS:
    −$5 per week

    PTS: 1   REF: MI 2.4   NAT: F-IF.6
    TOP: Interpreting Graphs of Functions   KEY: rate of change | linear function
    MSC: Progress Assessment
54. ANS:
    2.7

    PTS: 1   REF: MI 2.4   NAT: F-IF.6
    TOP: Interpreting Graphs of Functions   KEY: rate of change | linear function
    MSC: Progress Assessment

55. ANS:
    30

    PTS: 1 REF: MI 2.4 NAT: F-IF.6
    TOP: Interpreting Graphs of Functions KEY: rate of change | exponential function
    MSC: Progress Assessment
56. ANS:
    (0, –3) and (15, 0)

    PTS: 1 REF: MI 2.5 NAT: F-IF.7a
    TOP: Analyzing Linear and Exponential Functions
    KEY: x-intercept | y-intercept | linear function MSC: Progress Assessment
57. ANS: C PTS: 1 REF: MI 2.5 NAT: F-IF.7a
    TOP: Analyzing Linear and Exponential Functions
    KEY: graph | x-intercept | linear function MSC: Progress Assessment
58. ANS:
    (0, 1)

    PTS: 1 REF: MI 2.5 NAT: F-IF.7e
    TOP: Analyzing Linear and Exponential Functions
    KEY: graph | y-intercept | exponential function MSC: Progress Assessment
59. ANS:
    decay, with a horizontal asymptote of $y = 9$

    PTS: 1 REF: MI 2.5 NAT: F-IF.7e
    TOP: Analyzing Linear and Exponential Functions
    KEY: exponential function | graph | horizontal asymptote | asymptote
    MSC: Progress Assessment
60. ANS:
    (0, –3)

    PTS: 1 REF: MI 2.5 NAT: F-IF.7e
    TOP: Analyzing Linear and Exponential Functions
    KEY: exponential function | y-intercept | graph MSC: Progress Assessment
61. ANS:
    growth, with a horizontal asymptote of $y = -6$

    PTS: 1 REF: MI 2.5 NAT: F-IF.7e
    TOP: Analyzing Linear and Exponential Functions
    KEY: exponential function | horizontal asymptote | asymptote MSC: Progress Assessment

62. ANS:
    (0, –1.9)

    PTS: 1   REF: MI 2.5   NAT: F-IF.7e
    TOP: Analyzing Linear and Exponential Functions
    KEY: exponential function | y-intercept | graph   MSC: Progress Assessment
63. ANS: A   PTS: 1   REF: MI 2.6   NAT: F-IF.9
    TOP: Comparing Functions
    KEY: linear function | compare | comparing functions | graph   MSC: Progress Assessment
64. ANS: C   PTS: 1   REF: MI 2.6   NAT: F-IF.9
    TOP: Comparing Functions
    KEY: compare | comparing functions | linear function | rate of change
    MSC: Progress Assessment
65. ANS: C   PTS: 1   REF: MI 2.6   NAT: F-IF.9
    TOP: Comparing Functions
    KEY: compare | comparing functions | exponential function | graph | y-intercept
    MSC: Progress Assessment
66. ANS: D   PTS: 1   REF: MI 2.6   NAT: F-IF.9
    TOP: Comparing Functions
    KEY: compare | comparing functions | graph | rate of change | exponential function
    MSC: Progress Assessment
67. ANS: D   PTS: 1   REF: MI 2.6   NAT: F-LE.3
    TOP: Comparing Functions
    KEY: compare | comparing functions | exponential function | linear function | rate of change
    MSC: Progress Assessment
68. ANS: C   PTS: 1   REF: MI 2.6   NAT: F-IF.9
    TOP: Comparing Functions
    KEY: compare | comparing functions | exponential function | rate of change
    MSC: Progress Assessment
69. ANS:
    $f(x) = -12x - 15$

    PTS: 1   REF: MI 2.7   NAT: F-BF.1a   TOP: Building Functions
    KEY: equation | explicit equation | linear equation | slope | y-intercept
    MSC: Progress Assessment
70. ANS:
    $f(x) = 15 - 0.08x$

    PTS: 1   REF: MI 2.7   NAT: F-LE.2   TOP: Building Functions
    KEY: equation | explicit equation | y-intercept | slope | linear equation | variable
    MSC: Progress Assessment

71. ANS:
$$f(x) = 11 \times (-9)^{x-1}$$

PTS: 1   REF: MI 2.7   NAT: F-BF.1a   TOP: Building Functions
KEY: equation | explicit equation | exponential equation | variable
MSC: Progress Assessment

72. ANS:
$$f(x) = 300 \times 0.8^x$$

PTS: 1   REF: MI 2.7   NAT: F-BF.1a   TOP: Building Functions
KEY: equation | explicit equation | exponential equation | variable
MSC: Progress Assessment

73. ANS:
$$f(x) = (-1) \times 4^x$$

PTS: 1   REF: MI 2.7   NAT: F-LE.2   TOP: Building Functions
KEY: equation | explicit equation | linear equation | slope | y-intercept | variable
MSC: Progress Assessment

74. ANS:
$11x - 3$
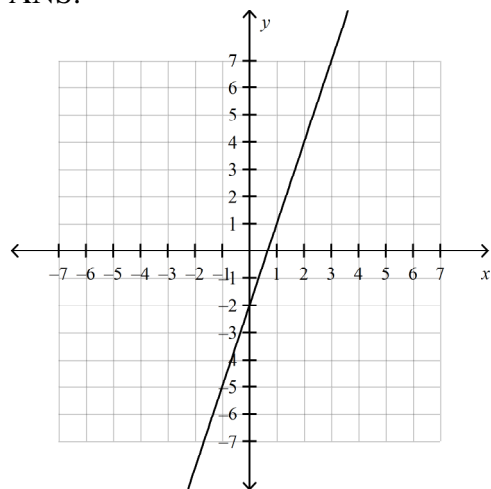
PTS: 1   REF: MI 2.8   NAT: F-BF.1b
TOP: Operating on Functions and Transformations   KEY: function
MSC: Progress Assessment

75. ANS:

PTS: 1   REF: MI 2.8   NAT: F-BF.3
TOP: Operating on Functions and Transformations
KEY: function | transformation | translation | vertical shift   MSC: Progress Assessment

76. ANS:
$$\frac{4^x}{5}$$

PTS: 1   REF: MI 2.8   NAT: F-BF.1b
TOP: Operating on Functions and Transformations   KEY: function
MSC: Progress Assessment

77. ANS:
$g(x) = f(x) + 4$

PTS: 1   REF: MI 2.8   NAT: F-BF.3
TOP: Operating on Functions and Transformations
KEY: function | transformation | translation | vertical shift   MSC: Progress Assessment

78. ANS:
$g(x) = f(x) - 6$

PTS: 1   REF: MI 2.8   NAT: F-BF.3
TOP: Operating on Functions and Transformations
KEY: function | transformation | translation | vertical shift   MSC: Progress Assessment

79. ANS:
−1

PTS: 1   REF: MI 2.8   NAT: F-BF.3
TOP: Operating on Functions and Transformations
KEY: function | transformation | translation | vertical shift   MSC: Progress Assessment

80. ANS:
−2

PTS: 1   REF: MI 2.9   NAT: F-BF.2
TOP: Arithmetic and Geometric Sequences
KEY: arithmetic sequence | common difference   MSC: Progress Assessment

81. ANS:
6

PTS: 1   REF: MI 2.9   NAT: F-BF.2
TOP: Arithmetic and Geometric Sequences
KEY: geometric sequence | constant ratio   MSC: Progress Assessment

82. ANS:
14

PTS: 1   REF: MI 2.9   NAT: F-BF.2
TOP: Arithmetic and Geometric Sequences
KEY: arithmetic sequence | explicit formula   MSC: Progress Assessment

83. ANS:
Addition property of equality

    PTS: 1   REF: MI 3.1   NAT: A-REI.1
    TOP: Solving Equations and Inequalities   KEY: properties of equality | equation
    MSC: Progress Assessment
84. ANS:
$x = -70$

    PTS: 1   REF: MI 3.1   NAT: A-REI.3
    TOP: Solving Equations and Inequalities   KEY: properties of equality | equation
    MSC: Progress Assessment
85. ANS:
$x \leq 4$

    PTS: 1   REF: MI 3.1   NAT: A-REI.3
    TOP: Solving Equations and Inequalities   KEY: properties of inequality | inequality
    MSC: Progress Assessment
86. ANS:
$x \leq -9$

    PTS: 1   REF: MI 3.1   NAT: A-REI.3
    TOP: Solving Equations and Inequalities   KEY: properties of inequality | inequality
    MSC: Progress Assessment
87. ANS:
$x = 4$

    PTS: 1   REF: MI 3.1   NAT: A-REI.3
    TOP: Solving Equations and Inequalities   KEY: properties of equality | exponential equation
    MSC: Pre-Assessment
88. ANS:
4

    PTS: 1   REF: MI 2.9   NAT: F-BF.2
    TOP: Arithmetic and Geometric Sequences
    KEY: geometric sequence | explicit formula   MSC: Progress Assessment
89. ANS:
9 and –5

    PTS: 1   REF: MI 3.2   NAT: A-REI.6
    TOP: Solving Systems of Equations   KEY: system of equations | solution
    MSC: Progress Assessment

90. ANS: B PTS: 1 REF: MI 3.2 NAT: A-REI.6
TOP: Solving Systems of Equations KEY: system of equations | solution | graphing lines
MSC: Progress Assessment
91. ANS:
$1,500 at 5% and $1,800 at 3%

PTS: 1 REF: MI 3.2 NAT: A-REI.6
TOP: Solving Systems of Equations KEY: system of equations | solution
MSC: Progress Assessment
92. ANS:
8 adult tickets and 4 children's tickets were purchased.

PTS: 1 REF: MI 3.2 NAT: A-REI.6
TOP: Solving Systems of Equations KEY: system of equations | solution
MSC: Progress Assessment
93. ANS:
There are infinitely many solutions to this system of equations.

PTS: 1 REF: MI 3.2 NAT: A-REI.6
TOP: Solving Systems of Equations
KEY: system of equations | solution | infinite solutions | no solution
MSC: Progress Assessment
94. ANS:
(6, –25)

PTS: 1 REF: MI 3.2 NAT: A-REI.6
TOP: Solving Systems of Equations KEY: system of equations | solution
MSC: Progress Assessment
95. ANS: C PTS: 1 REF: MI 4.1 NAT: S-ID.1
TOP: Working with a Single Measurement Variable KEY: histogram
MSC: Progress Assessment
96. ANS: B PTS: 1 REF: MI 4.1 NAT: S-ID.2
TOP: Working with a Single Measurement Variable
KEY: measures of center | measures of spread | dot plot MSC: Progress Assessment
97. ANS:
7

PTS: 1 REF: MI 4.1 NAT: S-ID.1
TOP: Working with a Single Measurement Variable KEY: box plot | median
MSC: Progress Assessment

98. ANS:
    28.8

    PTS: 1   REF: MI 4.1   NAT: S-ID.2
    TOP: Working with a Single Measurement Variable   KEY: mean absolute deviation
    MSC: Progress Assessment
99. ANS:
    17

    PTS: 1   REF: MI 4.1   NAT: S-ID.2
    TOP: Working with a Single Measurement Variable   KEY: interquartile range
    MSC: Progress Assessment
100. ANS:
     148

    PTS: 1   REF: MI 4.1   NAT: S-ID.3
    TOP: Working with a Single Measurement Variable   KEY: outlier
    MSC: Progress Assessment
101. ANS: D   PTS: 1   REF: MI 4.1   NAT: S-ID.1
    TOP: Working with a Single Measurement Variable   KEY: box plot
    MSC: Progress Assessment