Section 9-1: Sets, Relations, and Functions

1. 080403b, P.I. A.G.3
Which set of ordered pairs is *not* a function?

[A] {(0,0), (1,1), (2,2), (3,3)}

[B] {(1,2), (3,4), (4,5), (5,6)}

[C] {(4,1), (5,1), (6,1), (7,1)}

[D] {(3,1), (2,1), (1,2), (3,2)}

2. 060715b, P.I. A.G.3
Which set of ordered pairs does *not* represent a function?

[A] {(3,-2), (4,-3), (5,-4), (6,-5)}

[B] {(3,-2), (3,-4), (4,-1), (4,-3)}

[C] {(3,-2), (5,-2), (4,-2), (-1,-2)}

[D] {(3,-2), (-2,3), (4,-1), (-1,4)}

3. 060406b, P.I. A2.A.41
If $f(x) = 4x^0 + (4x)^{-1}$, what is the value of $f(4)$?

[A] -12 [B] 0 [C] $1\frac{1}{16}$ [D] $4\frac{1}{16}$

4. 080701b, P.I. A2.A.41
If $f(x) = (x^{-x} - x^0 + 2^x)$, then $f(3)$ is equal to

[A] $8\frac{1}{27}$ [B] -21

[C] $7\frac{1}{27}$ [D] -22

5. 080628a, P.I. A.A.39
Point (*k*, -3) lies on the line whose equation is $x - 2y = -2$. What is the value of *k*?

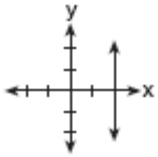
[A] 6 [B] -8 [C] -6 [D] 8

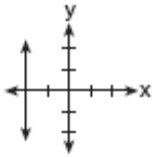
6. 060721a, P.I. A.A.39
The graph of the equation $2x + 6y = 4$ passes through point $(x,-2)$. What is the value of *x*?

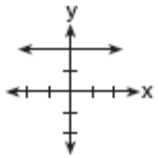
[A] 8 [B] 16 [C] -4 [D] 4

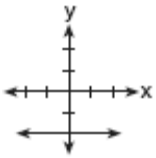
Section 9-3: Graphing a Line Parallel to an Axis

7. 060523a, P.I. A.A.36
Which graph represents the equation $x = 2$?

[A] 

[B] 

[C] 

[D] 

Section 9-4: The Slope of a Line

Finding the Slope of a Line

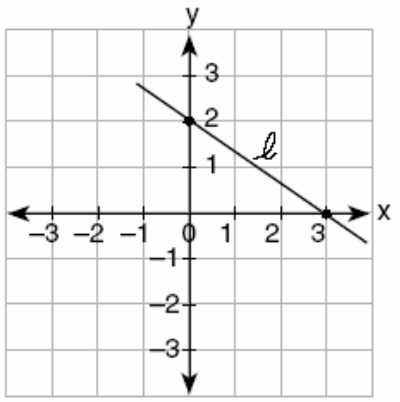
8. 080417a, P.I. A.A.32
If the value of dependent variable *y* increases as the value of independent variable *x* increases, the graph of this relationship could be a

[A] line with a positive slope

[B] vertical line [C] horizontal line

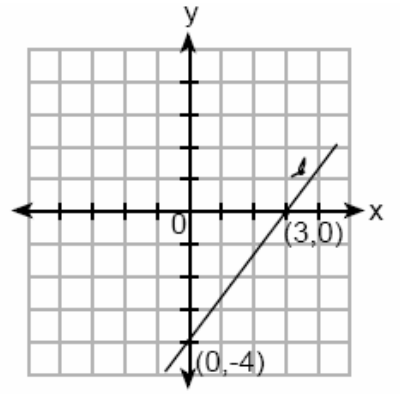
[D] line with a negative slope

9. 010115a, P.I. 8.G.13
What is the slope of line ℓ in the accompanying diagram?



[A] $-\frac{2}{3}$ [B] $-\frac{3}{2}$ [C] $\frac{3}{2}$ [D] $\frac{2}{3}$

10. 069918a, P.I. 8.G.13
What is the slope of line ℓ shown in the accompanying diagram?



[A] $-\frac{3}{4}$ [B] $\frac{4}{3}$ [C] $\frac{3}{4}$ [D] $-\frac{4}{3}$

11. fall0716ia, P.I. A.A.33
What is the slope of the line containing the points (3,4) and (-6,10)?

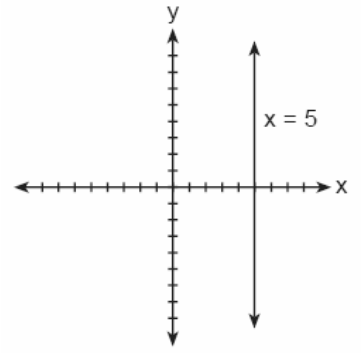
[A] $-\frac{3}{2}$ [B] 2 [C] $-\frac{2}{3}$ [D] $\frac{1}{2}$

12. 060618a
If a line is horizontal, its slope is

[A] negative [B] 1

[C] undefined [D] 0

13. 060012a, P.I. A.A.37
The accompanying figure shows the graph of the equation $x = 5$.



What is the slope of the line $x = 5$?

[A] 5 [B] undefined [C] 0 [D] -5

14. 060613a, P.I. A.A.36
Which statement describes the graph of $x = 4$?

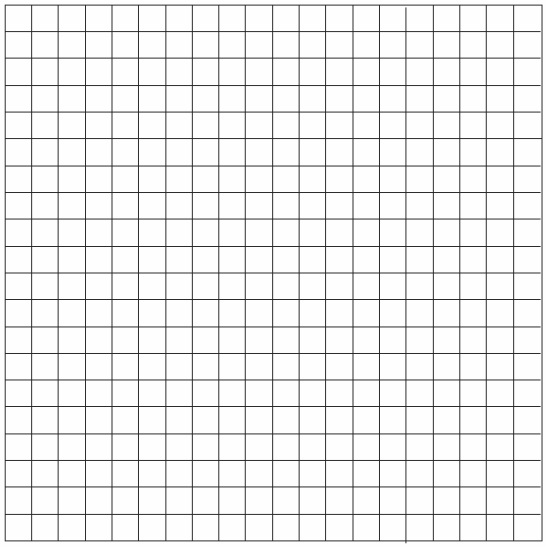
[A] It has a slope of 4.

[B] It passes through the point (0, 4).

[C] It is parallel to the *x*-axis.

[D] It is parallel to the *y*-axis.

15. 010024a
A straight line with slope 5 contains the points (1,2) and (3,*K*). Find the value of *K*. [The use of the accompanying grid is optional.]



16. 080728a
Line segment *AB* has a slope of $\frac{3}{4}$. If the coordinates of point *A* are (2,5), the coordinates of point *B* could be

[A] (6,2) [B] (5,9)

[C] (6,8) [D] (-1,1)

Section 9-5: The Slope of Parallel and Perpendicular Lines

Parallel Lines

17. 080009a, P.I. A.A.38
Which equation represents a line parallel to the line $y = 2x - 5$?

[A] $y = -2x - 5$ [B] $y = -\frac{1}{2}x - 5$

[C] $y = 5x - 2$ [D] $y = 2x + 5$

18. 010522a, P.I. A.A.38
Which equation represents a line that is parallel to the line whose equation is $2x + 3y = 12$?

[A] $6y + 4x = 2$ [B] $6y - 4x = 2$

[C] $4x - 6y = 2$ [D] $6x + 4y = -2$

19. 060105a
Which properties best describe the coordinate graph of two distinct parallel lines?

[A] different slopes and same intercepts

[B] same slopes and different intercepts

[C] same slopes and same intercepts

[D] different slopes and different intercepts

20. 060210a
If two lines are parallel and the slope of one of the lines is *m*, what is the product of their slopes?

[A] 0 [B] $2m$ [C] m^2 [D] 1

21. 010309a
Line *P* and line *C* lie on a coordinate plane and have equal slopes. Neither line crosses the second or third quadrant. Lines *P* and *C* must

[A] form an angle of 45° [B] be vertical

[C] be perpendicular [D] be horizontal

Perpendicular Lines

22. 060528a, P.I. G.G.63
Which equation represents a line that is perpendicular to the line whose equation is $-2y = 3x + 7$?

[A] $y = \frac{3}{2}x - 3$ [B] $2y = 3x - 3$

[C] $y = \frac{2}{3}x - 3$ [D] $y = x + 7$

23. 080630a, P.I. G.G.63
Which line is perpendicular to the line whose equation is $5y+6=-3x$?

[A] $y=-\frac{5}{3}x+7$ [B] $y=-\frac{3}{5}x+7$

[C] $y=\frac{3}{5}x+7$ [D] $y=\frac{5}{3}x+7$

24. 060729a
If the product of x and $\frac{1}{m}$ is -1, $m\neq 0$, then x is equivalent to

[A] m [B] $-m$ [C] $-\frac{1}{m}$ [D] $1-m$

25. 010834a, P.I. G.G.64
Write an equation of a line that is perpendicular to the line $y=\frac{2}{3}x+5$ and that passes through the point (0,4).

26. 080130a, P.I. G.G.63
Shanaya graphed the line represented by the equation $y=x-6$. Write an equation for a line that is parallel to the given line. Write an equation for a line that is perpendicular to the given line. Write an equation for a line that is identical to the given line but has different coefficients.

27. 060722a, P.I. G.G.63
Which statement describes the lines whose equations are $y=\frac{1}{3}x+12$ and $6y=2x+6$?

[A] They are perpendicular to each other.

[B] They intersect each other.

[C] They are parallel to each other.

[D] They are segments.

Section 9-6: The Intercepts of a Line

Slope and y-Intercept

28. 089919a, P.I. A.A.37
What is the slope of the line whose equation is $3x-4y-16=0$?

[A] $\frac{3}{4}$ [B] 3 [C] $\frac{4}{3}$ [D] -4

29. 060205a, P.I. A.A.37
What is the slope of the linear equation $5y-10x=-15$?

[A] 2 [B] 10 [C] -15 [D] -10

30. 060428a, P.I. A.A.37
The line $3x-2y=12$ has

[A] a slope of 3 and a y-intercept of -2

[B] a slope of $-\frac{3}{2}$ and a y-intercept of 6

[C] a slope of $\frac{3}{2}$ and a y-intercept of -6

[D] a slope of -3 and a y-intercept of -6

31. 080619a, P.I. A.A.39
The graph of the equation $x+3y=6$ intersects the y-axis at the point whose coordinates are

[A] (0,2) [B] (0,6)

[C] (0,18) [D] (6,0)

32. 010203a, P.I. A.A.37
What is the slope of the line whose equation is $2y = 5x + 4$?

[A] $\frac{2}{5}$ [B] 2 [C] $\frac{5}{2}$ [D] 5

33. 010408a, P.I. 8.G.16
An equation of the line that has a slope of 3 and a *y*-intercept of -2 is

[A] $y = -x$ [B] $y = -2x + 3$

[C] $x = 3y - 2$ [D] $y = 3x - 2$

34. 010605a
What is the *y*-intercept of the graph of the line whose equation is $y = -\frac{2}{5}x + 4$?

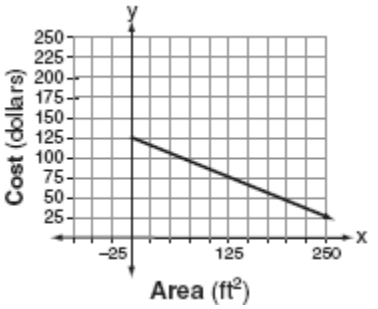
[A] $-\frac{5}{2}$ [B] 4 [C] 0 [D] $-\frac{2}{5}$

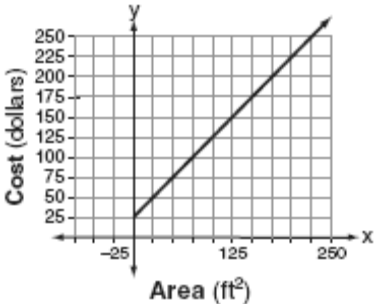
35. 060521a, P.I. A.A.34
If point (-1,0) is on the line whose equation is $y = 2x + b$, what is the value of *b*?

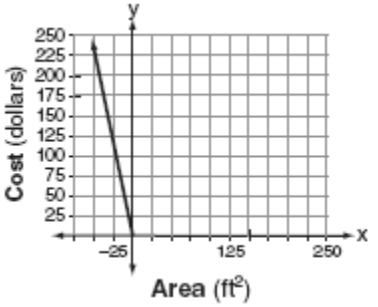
[A] 0 [B] 1 [C] 2 [D] 3

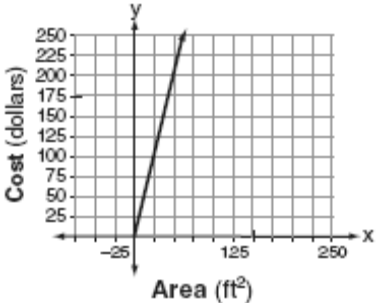
Section 9-7: Graphing Linear Functions Using their Slopes

36. 080703a, P.I. A.G.4
Super Painters charges $1.00 per square foot plus an additional fee of $25.00 to paint a living room. If *x* represents the area of the walls of Francesca's living room, in square feet, and *y* represents the cost, in dollars, which graph best represents the cost of painting her living room?

[A]


[B]


[C]


[D]


Section 9-9: Graphing First-Degree Inequalities in Two Variables

37. fall0715ia, P.I. A.A.4
An electronics store sells DVD players and cordless telephones. The store makes a $75 profit on the sale of each DVD player (d) and a $30 profit on the sale of each cordless telephone (c). The store wants to make a profit of at least $255.00 from its sales of DVD players and cordless phones. Which inequality describes this situation?

[A] $75d + 30c \geq 255$ [B] $75d + 30c < 255$

[C] $75d + 30c > 255$ [D] $75d + 30c \leq 255$

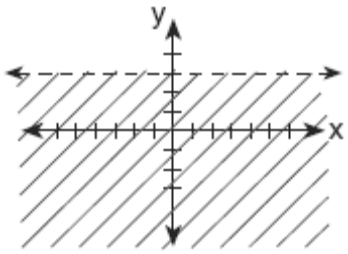
38. 080220a, A.G.6
In the graph of $y \leq -x$, which quadrant is completely shaded?

[A] III [B] IV [C] I [D] II

39. 080513a, P.I. A.A.21
Which ordered pair is not in the solution set of $y > 2x + 1$?

[A] (1,4) [B] (2,5) [C] (1,6) [D] (3,8)

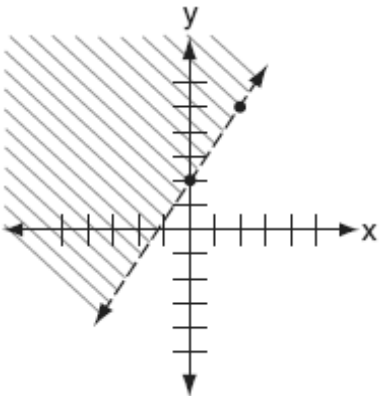
40. 010629a, P.I. A.G.6
Which inequality is represented by the accompanying graph?



[A] $y \geq 3$ [B] $y < 3$

[C] $y \leq 3$ [D] $y > 3$

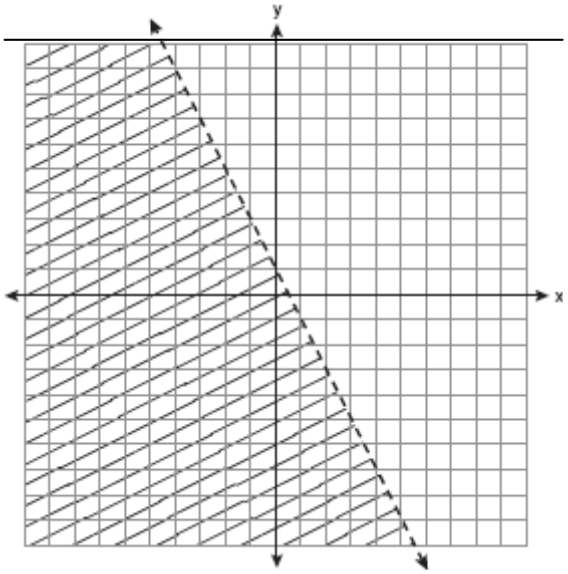
41. 010828a, P.I. A.G.6
Which inequality is shown in the accompanying diagram?



[A] $y \leq \frac{3}{2}x + 2$ [B] $y > \frac{3}{2}x + 2$

[C] $y \geq \frac{3}{2}x + 2$ [D] $y < \frac{3}{2}x + 2$

42. fall0720ia, P.I. A.G.6
Which inequality is represented by the graph below?

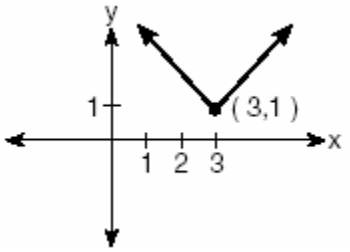


[A] $y < -\frac{1}{2}x + 1$ [B] $y < 2x + 1$

[C] $y < -2x + 1$ [D] $y < \frac{1}{2}x + 1$

Section 9-10: Graphs Involving Absolute Value

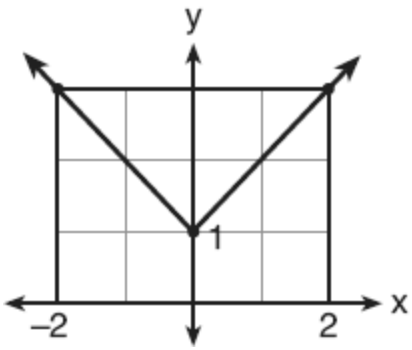
43. 060314b, P.I. A.G.4
Which equation is represented by the accompanying graph?



[A] $y = |x-3|+1$ [B] $y = |x+3|-1$

[C] $y = (x-3)^2+1$ [D] $y = |x|-3$

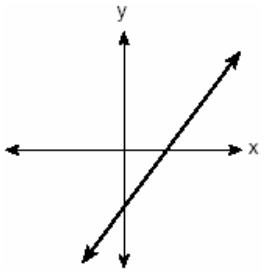
44. 080707b, P.I. A.G.4
Which equation represents the function shown in the accompanying graph?



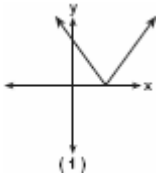
[A] $f(x) = |x+1|$ [B] $f(x) = |x|-1$

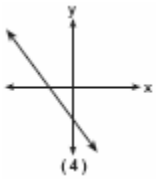
[C] $f(x) = |x-1|$ [D] $f(x) = |x|+1$

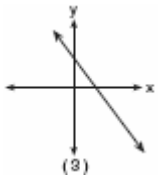
45. 010414b, P.I. A.G.4
The graph below represents $f(x)$.

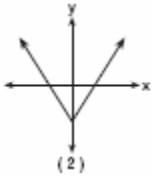


Which graph best represents $|f(x)|$?

[A] 

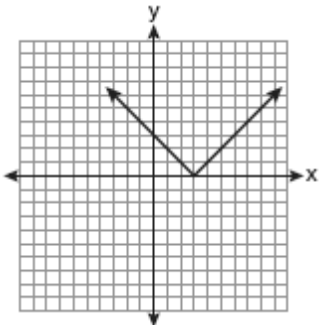
[B] 

[C] 

[D] 

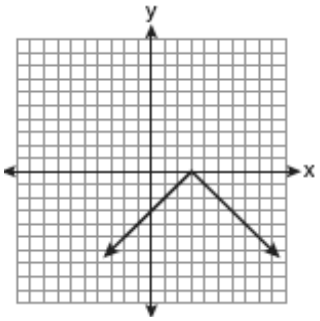
46. fall0722ia, P.I. A.G.4

The diagram below shows the graph of $y = |x - 3|$.

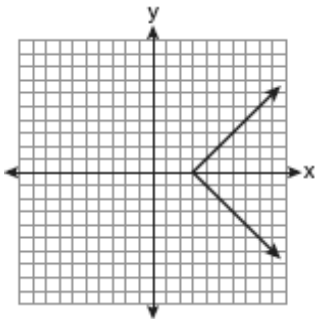


Which diagram shows the graph of $y = -|x - 3|$?

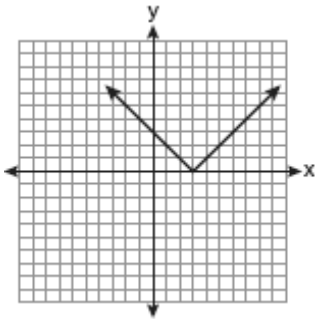
[A]



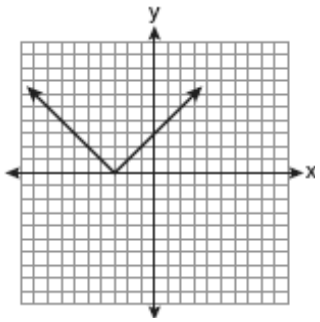
[B]



[C]

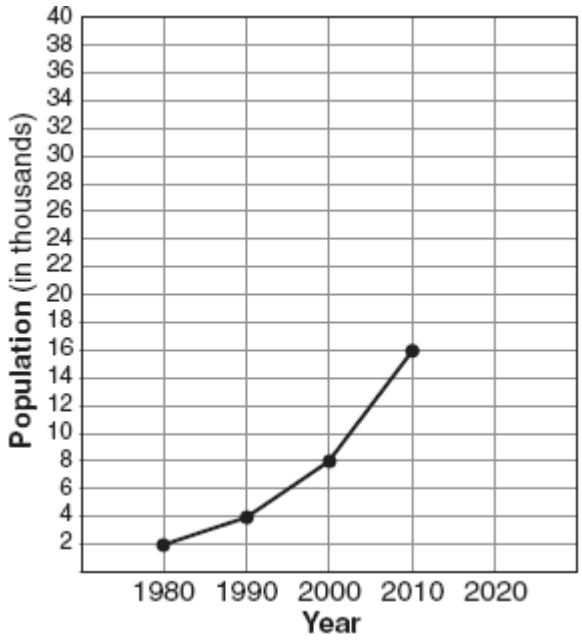


[D]



Section 9-11: Graphs Involving Exponential Functions

47. 080705a, P.I. A2.S.7
The population growth of Boomtown is shown in the accompanying graph.



If the same pattern of population growth continues, what will the population of Boomtown be in the year 2020?

[A] 32,000 [B] 20,000

[C] 64,000 [D] 40,000

48. 060411b
Which equation models the data in the accompanying table?

Time in hours, x	0	1	2	3	4	5	6
Population, y	5	10	20	40	80	160	320

[A] $y = 2^x$ [B] $y = 2x + 5$

[C] $y = 5(2^x)$ [D] $y = 2x$

49. 010525b, P.I. A.A.9
On January 1, 1999, the price of gasoline was $1.39 per gallon. If the price of gasoline increased by 0.5% per month, what was the cost of one gallon of gasoline, to the *nearest cent*, on January 1 one year later?

50. 080224b, P.I. A.A.9
The Franklins inherited $3,500, which they want to invest for their child's future college expenses. If they invest it at 8.25% with interest compounded monthly, determine the value of the account, in dollars, after 5 years.
Use the formula $A = P(1+\frac{r}{n})^{nt}$, where A = value of the investment after t years, P = principal invested, r = annual interest rate, and n = number of times compounded per year.

51. 060721b, P.I. A.A.9
A population of wolves in a county is represented by the equation $P(t) = 80(0.98)^t$, where t is the number of years since 1998. Predict the number of wolves in the population in the year 2008.

52. 010813b, P.I. A.A.9
A radioactive substance has an initial mass of 100 grams and its mass halves every 4 years. Which expression shows the number of grams remaining after t years?

[A] $100(\frac{1}{2})^{\frac{t}{4}}$ [B] $100(4)^{\frac{t}{4}}$

[C] $100(\frac{1}{2})^{4t}$ [D] $100(4)^{-2t}$

53. 060607b, P.I. A.A.9
The height, f(x), of a bouncing ball after x bounces is represented by $f(x) = 80(0.5)^x$. How many times higher is the first bounce than the fourth bounce?

[A] 4 [B] 8 [C] 2 [D] 16

54. 080221b, P.I. A.A.9
A used car was purchased in July 1999 for $11,900. If the car depreciates 13% of its value each year, what is the value of the car, to the *nearest hundred dollars*, in July 2002?

55. fall0719ia, P.I. A.A.9
Daniel's Print Shop purchased a new printer for $35,000. Each year it depreciates (loses value) at a rate of 5%. What will its approximate value be at the end of the fourth year?

[A] $28,507.72 [B] $33,250.00

[C] $27,082.33 [D] $30,008.13

[1] D

[2] B

[3] D

[4] C

[5] B

[6] A

[7] A

[8] A

[9] A

[10] B

[11] C

[12] D

[13] B

[14] D

[2] 12 and an appropriate explanation is given.
[1] The student uses an appropriate method, such as showing $\frac{k-2}{3-1}=5$ or graphing of a line through (1,2) having a slope of 5, but the correct answer is not found.
or [1] 12 and no explanation is given.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[15]

[16] C

[17] D

[18] A

[19] B

[20] C

[21] B

[22] C

[23] D

[24] B

[2] A correct equation is written, such as $y=-\frac{3}{2}x+4$ or $(y-4)=-\frac{3}{2}(x-0)$.
[1] An appropriate equation is written, but one computational error is made or one incorrect substitution is made.
[1] An appropriate equation is written, but one conceptual error is made, such as writing an equation for a parallel line going through (0,4) or for a perpendicular line that does not go through (0,4).
or [1] The slope is identified correctly as $-\frac{3}{2}$ or the *y*-intercept as 4, but no equation or an incorrect equation is written.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[25]

[3] Three correct equations are shown, such as $y=x+7$, $y=-x-6$, and $2y=2x-12$.
[2] Only two correct equations are shown.
[1] Only one correct equation is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[26]

[27] C

[28] A

[29] A

[30] C

[31] A

[32] C

[33] D

[34] B

[35] C

[36] B

[37] A

[38] A

[39] B

[40] B

[41] B

[42] C

[43] A

[44] D

[45] A

[46] A

[47] A

[48] C

[2] $1.48, and appropriate work is shown, such as providing a correctly labeled table or solving the equation $(1.39)(1.005)^{12} = C$.
[1] Appropriate work is shown, but one computational or rounding error is made.
or [1] Appropriate work is shown, but one conceptual error is made, such as using 1.05 or 1.5 or using an incorrect exponent.
or [1] A correct equation is written, but no further correct work is shown.
or [1] An incorrect equation of equal difficulty is solved appropriately.
or [1] $1.48, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[49]

[2] 5,279.61, and appropriate work is shown, such as $3{,}500(1+\frac{0.0825}{12})^{(12\times5)}$.
[1] Appropriate work is shown, but one computational or substitution error is made.
or [1] 5,279.61, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[50]

[2] 65, and appropriate work is shown, such as $P(10) = 80(0.98)^{10}$.
[1] Appropriate work is shown, but one computational or rounding error is made.
or [1] Appropriate work is shown, but one conceptual error is made.
or [1] 65, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[51]

[52] A

[53] B

[2] 7,800, and appropriate work is shown.
[1] Appropriate work is shown, but one computational or rounding error is made.
or [1] 7,800, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[54]

[55] A