1. Which of the following is an algebraic expression for "twice the sum of a number and 5"?

   A $2(n - 5)$

   B $2(n + 5)$

   C $2n + 5$

   D $2 + n + 5$

2. Henry opened a savings account by depositing \$150. He also signed an automatic draft agreement to have \$125 deposited directly from his pay check each month. If x is the number of months that have passed since Henry opened the account, which of the following shows how much Henry has deposited into his savings account?

   A $f(x) = 150 + 125x$

   B $f(x) = 150x + 125$

   C $f(x) = (150 + 125)x$

   D $f(x) = 150 + 125(12x)$

3. Three less than four times a number is 17. Which equation could be used to find the number?

   A $4x - 3 = 17$

   B $3 - 4x = 17$

   C $4(x - 3) = 17$

   D $^{-}3(4x) = 17$

4. The length of a rectangle is 10 units greater than the width, x. Which of the following expressions gives the area, A, of the rectangle?

   A $A = x(10 + x)$

   B $A = x + (x + 10)$

   C $A = x(10 - x)$

   D $A = 10x^2$

5. There are 24 yards of rope with which to enclose a rectangular area. If w is the width of the rectangle, what is the area function for the roped-off rectangle?

A $A = w^2 + 12w$

B $A = ^-12w^2$

C $A = ^-w^2 + 12w$

D $A = ^-w^2 - 12w$

---

6. Local scientists have been asked to study the population of gnats around a lake. After five days, the scientists generated these results:

Day	1	2	3	4	5
Gnats	4	16	64	256	1,024

How can the data ***best*** be described?

A The population doubles daily.

B The population quadruples daily.

C The population increases by 4 daily.

D The population increases daily by squaring.

7. Which of the following equations describes the data in the table below?

x (% reduction (or increase) in dietary fat)	$^{-}6$	$^{-}4$	$^{-}2$	1	5
y (weight loss (or gain) in pounds)	$^{-}15$	$^{-}11$	$^{-}7$	$^{-}1$	7

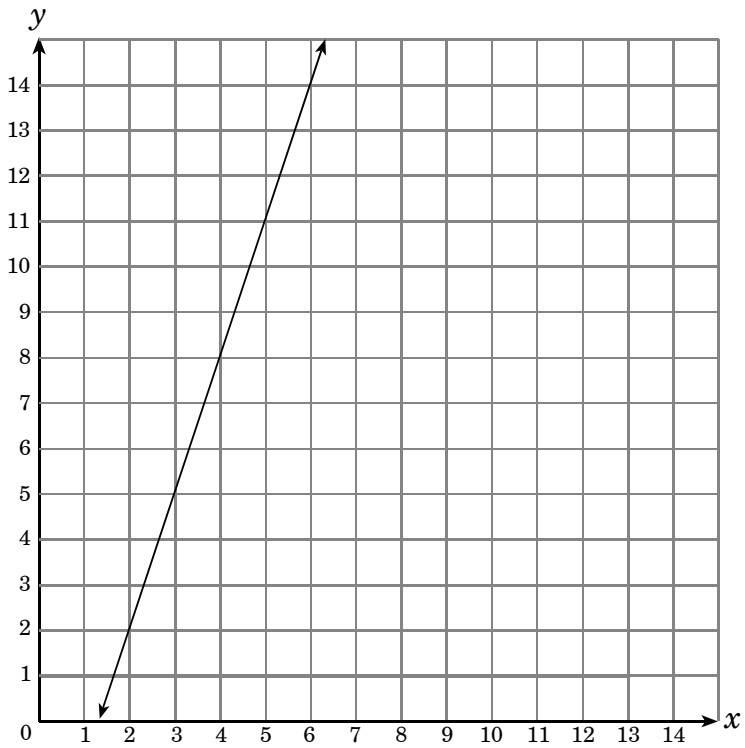
A $2x + y = {}^{-}27$

B $x - y = 3$

C $x + y = {}^{-}21$

D $2x - y = 3$

8. What is the relationship between the input (x) and output (y)?



A The output is twice the input.

B The output is seven less than four times the input.

C The output is two more than the input.

D The output is four less than three times the input.

9. Shirley used data to find an equation relating the number of hours that students spent per day working at a part-time job and their grade point average (GPA). She found that the top GPA was 3.90 if the student did not work at all, and for every hour a student worked, 0.10 points were lost. Which of the following ***best*** describes the relationship Shirley found between the number of hours a student worked and the student's GPA?

A As the number of hours worked decreased, the GPA decreased.

B As the number hours worked increased, the GPA increased.

C As the number of hours worked decreased, the GPA increased.

D no apparent relationship between the number of hours worked and the GPA

10. The function $h(t) = -16t^2 + 400$ can be used to study the relationship between the height, $h(t)$, of a falling object that is dropped from an altitude of 400 feet and the time, t, it takes to hit the ground. What is the independent variable for the function?

A $h(t)$

B -16

C t

D 400

11. Mailing a letter costs 37¢ for the first ounce and 23¢ for each additional ounce. Suppose that we want to write a cost function to describe this situation. Which of the following is an independent variable?

A the letter's weight

B the mailing cost

C 37¢

D the number of stamps needed

12. Jill uses data to find an equation relating the number of hours (h) that students spent working per day at after-school jobs with their last math test grade (G). If her equation is $G = -5.25h + 95$, what is the dependent variable in this relationship?

A the test grade

B the student

C after-school jobs

D the hours worked

13. Given $f(x) = -3x^2 + 5$, what is the range of the function?

A all real numbers less than or equal to 5

B all integers less than or equal to 5

C all nonnegative real numbers

D all nonnegative integers

14. In the equation $3x + y = 12$, if an x-value is increased by 2, what would be the effect on the corresponding y-value?

A The value of y will be 3 times as large.

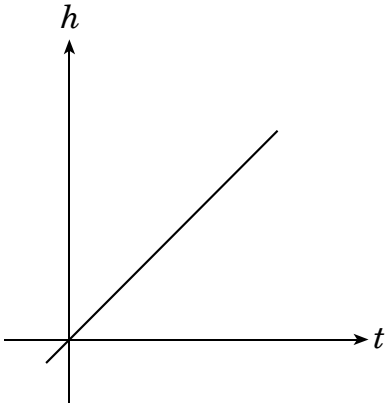
B The value of y will decrease to be $\frac{1}{2}$ as large.

C The value of y will increase by 6.

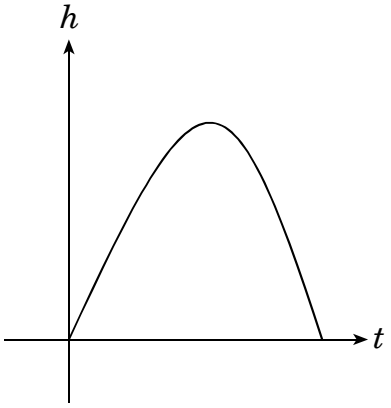
D The value of y will decrease by 6.

15. An object is shot upward from ground level with an initial velocity of 64 feet per second. Its height after t seconds is given by $h = 64t - 16t^2$. Which graph ***best*** represents this function?

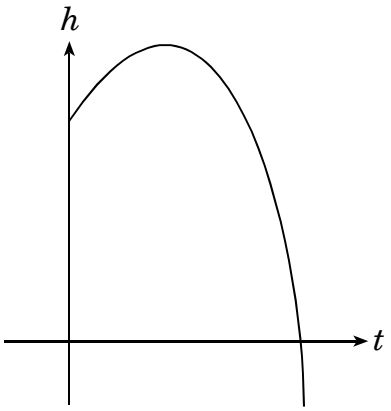
A



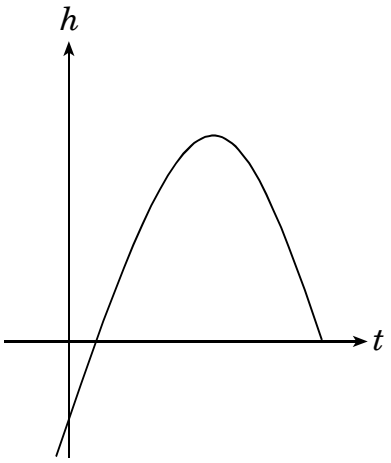
B



C

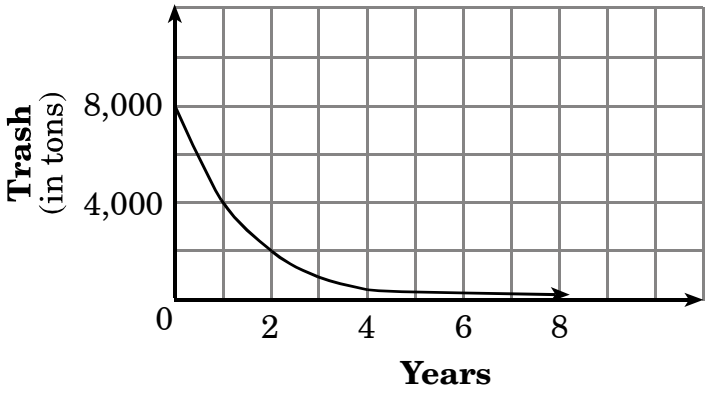


D



16. A chemist presented this graph to local government officials who needed to know the rate at which trash decays inside a landfill.

Rate of Decay of Trash in Landfill



Which is the correct interpretation of the rate of decay?

A Half of the trash will decay every year.

B Half of the trash will decay every two years.

C Half of the trash will decay every three years.

D Half of the trash will decay every six months.

17. Denisha bought a car for \$15,000. The value depreciates linearly. After 3 years the value is \$11,250. What is the amount of yearly depreciation?

A \$2,000

B \$1,500

C \$1,250

D \$750

18. Mark burns 34 calories when he plays volleyball for 10 minutes. If he plays for 15 minutes, he burns 51 calories. How fast is Mark burning calories?

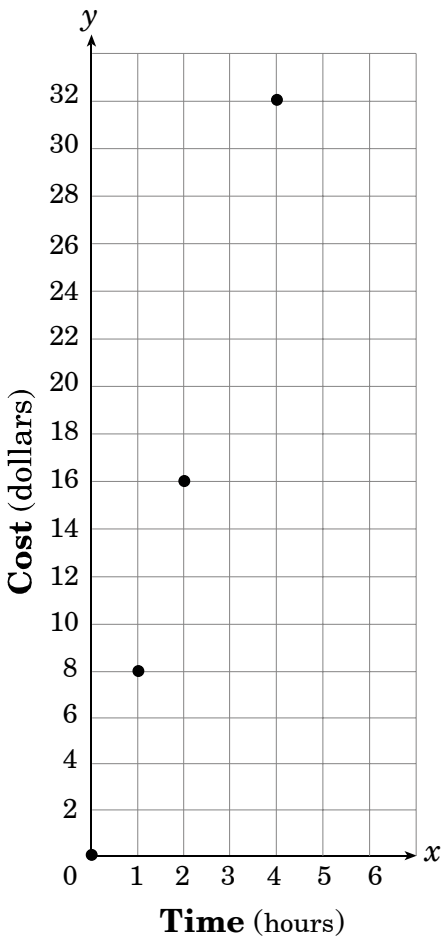
A $\frac{5}{17}$ calories per minute

B $\frac{2}{3}$ calories per minute

C $\frac{3}{2}$ calories per minute

D $\frac{17}{5}$ calories per minute

19. This graph represents how much Juan charges to take care of one child.



How much does Juan charge per hour?

A \$5.00

B \$8.00

C \$10.00

D \$13.00

20. The cost of a large pizza is given by the formula $C(t) = 1.5t + 7.50$, where $C(t)$ is the cost of the pizza and t is the number of toppings. What does the slope represent?

A number of toppings

B cost per slice

C cost of each topping

D cost of the pizza with no toppings

21. A line has a slope of $\frac{2}{3}$ and a y-intercept of $^{-}4$. Which of the following is the equation of the line?

A $2x - 3y = 12$

B $2x - 3y = {}^{-}4$

C $3x - 2y = {}^{-}4$

D $3x - 2y = 12$

22. A bank has a checking account plan that charges a \$3.25 monthly service fee plus \$0.15 per check written during that month. If n is the number of checks written, which equation represents the bank's monthly charges (C) for its checking account plan?

A $C = 3.25n + 0.15$

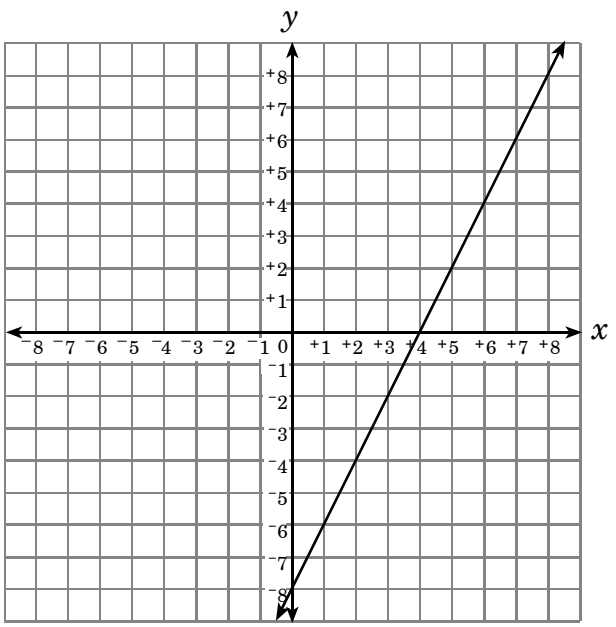
B $C = 0.15n + 3.25$

C $C = 0.015n + 3.25$

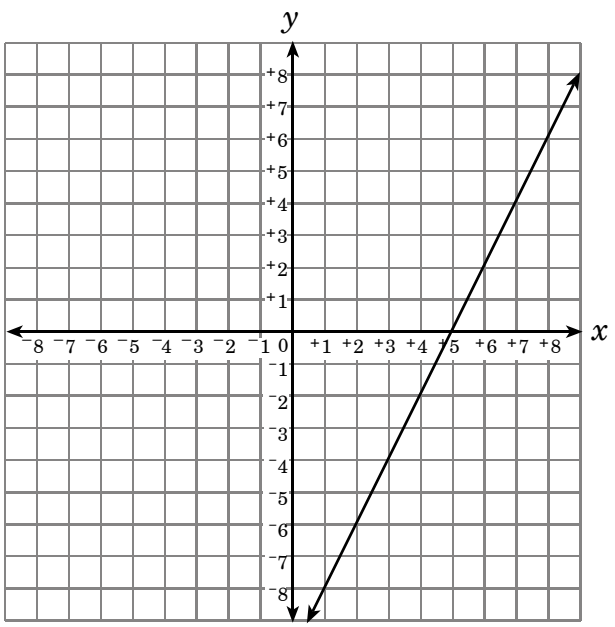
D $C = 0.015n - 3.25$

23. Which line has a slope of 2 and passes through $(-1, -12)$?

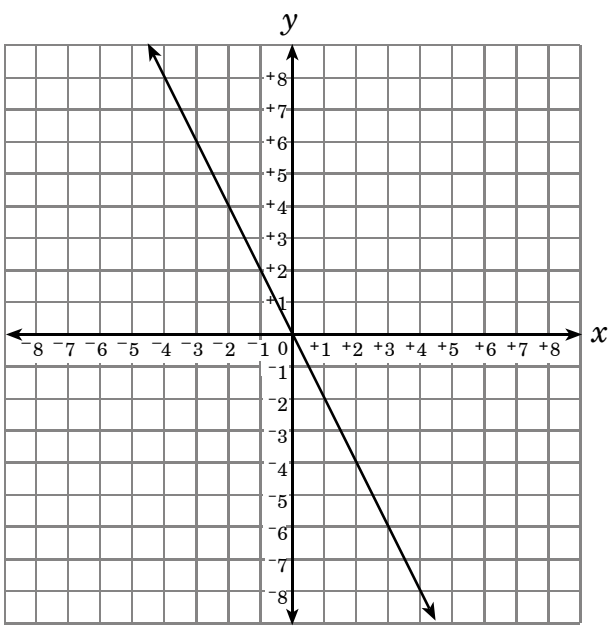
A



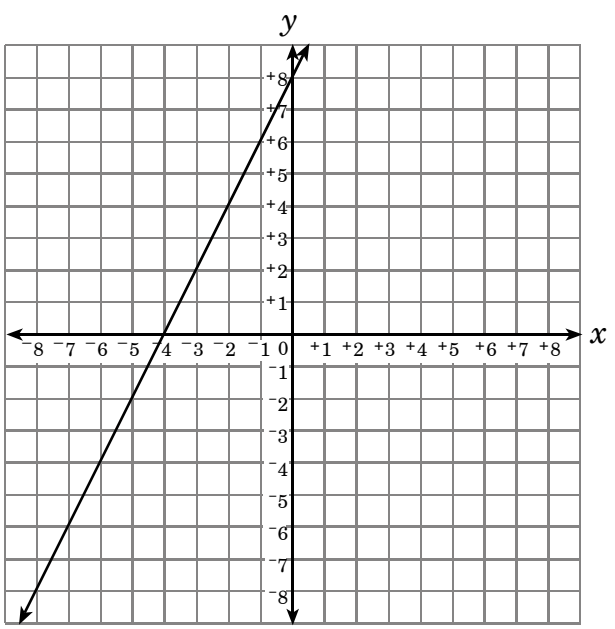
B



C



D



24. In planning a summer trip for his family, Jill's dad made up a mileage and cost table.

Mileage	Cost
50 miles	\$67.45
150 miles	\$102.45
175 miles	\$111.20

If the relationship between mileage and cost is linear, what equation would apply?

A $C = 50m + 50$

B $C = 0.35m + 49.95$

C $C = 0.35m - 50$

D $C = 0.50m + 49.95$

25. Smith's Video Store charges \$2.40 for each video rented plus a \$1.00 surcharge. The store decided to lower the surcharge to \$0.50. Which equation represents the new fee for renting m videos?

A $P = 1.90m + 1.00$

B $P = 1.90m + 0.50$

C $P = 2.40m + 0.50$

D $P = 2.40m + 1.50$

26. If the slope of a line changes from $^{-}4$ to $\frac{^{-}1}{4}$ and the y-intercept changes from $^{-}2$ to 0, then the graph of the line will be affected in what ways?

A less steep; up 2 units

B less steep; down 2 units

C steeper; up 2 units

D steeper; down 2 units

27. The drama club is selling tickets to a play for \$10 each. The cost to rent the theater and costumes is \$500. In addition the printers are charging \$1 per ticket to print the tickets. How many tickets ***must*** the drama club sell to make a profit?

A 54

B 55

C 56

D 57

28. The length of a rectangle is one inch longer than twice the width. What is the ***maximum*** width of the rectangle when the perimeter is no more than 92 inches?

A 12 inches

B 15 inches

C 18 inches

D 21 inches

29. Solve: $2x + 3 > x$ if $x \in \{-3, -2, -1, 0, 1, 2, 3\}$

A $\varnothing$

B $\{1, 2, 3\}$

C $\{-2, -1, 0, 1, 2, 3\}$

D $\{-3, -2, -1, 0, 1, 2, 3\}$

30. Janie's Boutique had a sale in which sweaters were marked 25% off. If Bridget paid $19.08 for a sweater (after a 6% sales tax was added), what was the original price of the sweater?

A $23.55

B $24.00

C $27.00

D $27.06

31. A region is defined by the following system.

$$y > 2x + 1$$
$$y \leq -x - 2$$

In which quadrants of the coordinate plane is the region located?

A I, II, III

B II, III

C III, IV

D I, II, III, IV

32. Solve: $-2x + y = -1$
$2x + 5y = 7$

A $(1,1)$

B $(-1, 1)$

C $(1, -1)$

D $(-1, -1)$

33. Solve: $y = -2x + 1$
$\frac{1}{2}x - y = 4$

A $(-1, 3)$

B $(1, -1)$

C $(2, -3)$

D $\left(4, -2\right)$

34. A store received $823 from the sale of 5 tape recorders and 7 radios. If the receipts from the tape recorders exceeded the receipts from the radios by $137, what is the cost of a tape recorder?

A $49

B $68

C $84

D $96

35. What are the vertex and y-intercept of the quadratic function $f(x) = -2 + 3x - 3x^2$?

A vertex: $\left(\frac{1}{2}, 1\frac{1}{4}\right)$ y-intercept: -2

B vertex: $\left(\frac{1}{2}, -1\frac{1}{4}\right)$ y-intercept: -2

C vertex: $\left(-\frac{1}{2}, 1\frac{1}{4}\right)$ y-intercept: $2\frac{1}{2}$

D vertex: $\left(-\frac{1}{2}, -1\frac{1}{4}\right)$ y-intercept: $-2\frac{1}{2}$

36. Which of the following is an x-intercept of $y = -8x^2 - 10x + 3$?

A 3

B $\frac{1}{4}$

C $\frac{2}{3}$

D $\frac{3}{2}$

37. Which of the following statements ***best*** describes the solution(s) of $\frac{1}{3}x^2 + \frac{1}{6}x = 3$?

A no solution

B 1 negative solution

C 1 positive solution and 1 negative solution

D 2 positive solutions

38. What are the solutions for $x^2 - 4 = 0$?

A $\{0, -4\}$

B $\{-4, 2\}$

C $\{-2, 2\}$

D $\{0, 2\}$

39. Which is an x-intercept of $y = 2x^2 - 7x + 3$?

A $-\frac{1}{2}$

B $\frac{1}{2}$

C -3

D $\frac{7}{4}$

40. Twelve less than twice the square of a number is equal to the product of $^{-}5$ and the number. What are the solutions?

A $\left\{\frac{^{-}3}{2}, ^{-}4\right\}$

B $\left\{\frac{^{-}3}{2}, 4\right\}$

C $\left\{\frac{3}{2}, 4\right\}$

D $\left\{\frac{3}{2}, ^{-}4\right\}$

41. Solve: $(x - 3)^2 = 16$

A $\{^{-}19, 13\}$

B $\{^{-}13, 19\}$

C $\{^{-}7, 1\}$

D $\{^{-}1, 7\}$

42. The height of an object dropped from a hot-air balloon can be determined by the formula $h = ^{-}16t^2 + s$, where h is the height of the object in feet, t is the elapsed time in seconds, and s is the height of the balloon.

If the balloon is 400 feet from the ground, how long will it take for an object dropped from the balloon to hit the ground?

A 2.5 seconds

B 5 seconds

C 7.5 seconds

D 10 seconds

43. A new automobile is purchased for \$20,000. If $V = 20{,}000(0.8)^x$ gives the car's value after x years, then ***about*** how long will it take for the car to be worth half its purchase price?

A 3 years

B 4 years

C 5 years

D 6 years

44. The population of a town is 345,000. The function $f(t) = 345{,}000(1.2)^t$ gives the predicted population of the town in t years. ***Approximately*** what will the population be in 3 years?

A 350,000

B 600,000

C 700,000

D 1,250,000

45. Alan won $2,000 in an essay contest. He invested the money in a savings account which pays 6% interest compounded annually. Consider the formula:

$A(t) = A_0(1 + r)^t$, where
$A(t)$ is the accumulated amount at time t,
A_0 is the amount invested at time $t = 0$,
r is the interest rate, and
t is time in years.

What is Alan's investment worth after two years?

A $240

B $247

C $2,240

D $2,247

End of Goal 3 Sample Items

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Answers to EOC Mathematics Algebra I Sample Items

Goal 3

1. **Objective 3.01**
   Translate word phrases and sentences into expressions and equations and vice versa.
   Thinking Skill: Analyzing **Correct Answer:** B

2. **Objective 3.01**
   Translate word phrases and sentences into expressions and equations and vice versa.
   Thinking Skill: Analyzing **Correct Answer:** A

3. **Objective 3.01**
   Translate word phrases and sentences into expressions and equations and vice versa.
   Thinking Skill: Analyzing **Correct Answer:** A

4. **Objective 3.01**
   Translate word phrases and sentences into expressions and equations and vice versa.
   Thinking Skill: Analyzing **Correct Answer:** A

5. **Objective 3.01**
   Translate word phrases and sentences into expressions and equations and vice versa.
   Thinking Skill: Generating **Correct Answer:** C

6. **Objective 3.02**
   Identify properties and relationships of data in tables, graphs, and equations.
   Thinking Skill: Analyzing **Correct Answer:** B

7. **Objective 3.02**
   Identify properties and relationships of data in tables, graphs, and equations.
   Thinking Skill: Applying **Correct Answer:** D

8. **Objective 3.02**
   Identify properties and relationships of data in tables, graphs, and equations.
   Thinking Skill: Analyzing **Correct Answer:** D

9. **Objective 3.02**
   Identify properties and relationships of data in tables, graphs, and equations.
   Thinking Skill: Analyzing **Correct Answer:** C

10. Objective 3.03
Define and distinguish between relations and functions, dependent and independent variables, domain and range.
Thinking Skill: Knowledge **Correct Answer:** C

11. Objective 3.03
Define and distinguish between relations and functions, dependent and independent variables, domain and range.
Thinking Skill: Organizing **Correct Answer:** A

12. Objective 3.03
Define and distinguish between relations and functions, dependent and independent variables, domain and range.
Thinking Skill: Knowledge **Correct Answer:** A

13. Objective 3.03
Define and distinguish between relations and functions, dependent and independent variables, domain and range.
Thinking Skill: Analyzing **Correct Answer:** A

14. Objective 3.04
Graph and interpret in the context of the problem, relations and functions on the coordinate plane. Include linear equations and inequalities, quadratics and exponentials.
Thinking Skill: Analyzing **Correct Answer:** D

15. Objective 3.04
Graph and interpret in the context of the problem, relations and functions on the coordinate plane. Include linear equations and inequalities, quadratics and exponentials.
Thinking Skill: Analyzing **Correct Answer:** B

16. Objective 3.04
Graph and interpret in the context of the problem, relations and functions on the coordinate plane. Include linear equations and inequalities, quadratics and exponentials.
Thinking Skill: Analyzing **Correct Answer:** A

17. Objective 3.05
Determine and use slopes of linear relationships to solve problems. a) Find the slope of a line given the graph of the line, an equation of the line, or two points on the line. b) Describe the slope of the line in the context of a problem situation.
Thinking Skill: Integrating **Correct Answer:** C

18. Objective 3.05
Determine and use slopes of linear relationships to solve problems. a) Find the slope of a line given the graph of the line, an equation of the line, or two points on the line. b) Describe the slope of the line in the context of a problem situation.
Thinking Skill: Integrating **Correct Answer:** D

19. Objective 3.05
Determine and use slopes of linear relationships to solve problems. a) Find the slope of a line given the graph of the line, an equation of the line, or two points on the line. b) Describe the slope of the line in the context of a problem situation.
Thinking Skill: Analyzing **Correct Answer:** B

20. Objective 3.05
Determine and use slopes of linear relationships to solve problems. a) Find the slope of a line given the graph of the line, an equation of the line, or two points on the line. b) Describe the slope of the line in the context of a problem situation.
Thinking Skill: Analyzing **Correct Answer:** C

21. Objective 3.06
Write the equation of and graph linear relationships given the following information: a) Slope and y-intercept. b) Slope and one point on the line. c) Two points on the line.
Thinking Skill: Integrating **Correct Answer:** A

22. Objective 3.06
Write the equation of and graph linear relationships given the following information: a) Slope and y-intercept. b) Slope and one point on the line. c) Two points on the line.
Thinking Skill: Analyzing **Correct Answer:** B

23. Objective 3.06
Write the equation of and graph linear relationships given the following information: a) Slope and y-intercept. b) Slope and one point on the line. c) Two points on the line.
Thinking Skill: Analyzing **Correct Answer:** B

24. Objective 3.06
Write the equation of and graph linear relationships given the following information: a) Slope and y-intercept. b) Slope and one point on the line. c) Two points on the line.
Thinking Skill: Integrating **Correct Answer:** B

25. Objective 3.07
Investigate and determine the effects of changes in slope and intercepts on the graph and equation of a line. a) Change only slope. b) Change only the x- or y-intercept. c) Change the slope and an intercept.
Thinking Skill: Analyzing **Correct Answer:** C

26. Objective 3.07
Investigate and determine the effects of changes in slope and intercepts on the graph and equation of a line. a) Change only slope. b) Change only the x- or y-intercept. c) Change the slope and an intercept.
Thinking Skill: Analyzing **Correct Answer:** A

27. Objective 3.08
Use linear equations or inequalities to solve problems. Solve by: a) Graphing. b) Using properties of equality; justify steps used.
Thinking Skill: Integrating **Correct Answer:** C

28. Objective 3.08
Use linear equations or inequalities to solve problems. Solve by: a) Graphing. b) Using properties of equality; justify steps used.
Thinking Skill: Applying **Correct Answer:** B

29. Objective 3.08
Use linear equations or inequalities to solve problems. Solve by: a) Graphing. b) Using properties of equality; justify steps used.
Thinking Skill: Applying **Correct Answer:** C

30. Objective 3.08
Use linear equations or inequalities to solve problems. Solve by: a) Graphing. b) Using properties of equality; justify steps used.
Thinking Skill: Applying **Correct Answer:** B

31. Objective 3.09
Use systems of linear equations or inequalities in two variables to solve problems. Determine the solution by: a) Graphing. b) Substitution. c) Elimination.
Thinking Skill: Applying **Correct Answer:** B

32. Objective 3.09
Use systems of linear equations or inequalities in two variables to solve problems. Determine the solution by: a) Graphing. b) Substitution. c) Elimination.
Thinking Skill: Applying **Correct Answer:** A

33. Objective 3.09
Use systems of linear equations or inequalities in two variables to solve problems. Determine the solution by: a) Graphing. b) Substitution. c) Elimination.
Thinking Skill: Applying **Correct Answer:** C

Goal 3

34. Objective 3.09
Use systems of linear equations or inequalities in two variables to solve problems. Determine the solution by: a) Graphing. b) Substitution. c) Elimination.
Thinking Skill: Applying **Correct Answer:** D

35. Objective 3.10
Graph quadratic functions. a) Locate the intercepts and the vertex. b) Recognize the x-intercepts of the function as the solutions of the equation.
Thinking Skill: Integrating **Correct Answer:** B

36. Objective 3.10
Graph quadratic functions. a) Locate the intercepts and the vertex. b) Recognize the x-intercepts of the function as the solutions of the equation.
Thinking Skill: Integrating **Correct Answer:** B

37. Objective 3.10
Graph quadratic functions. a) Locate the intercepts and the vertex. b) Recognize the x-intercepts of the function as the solutions of the equation.
Thinking Skill: Integrating **Correct Answer:** C

38. Objective 3.10
Graph quadratic functions. a) Locate the intercepts and the vertex. b) Recognize the x-intercepts of the function as the solutions of the equation.
Thinking Skill: Applying **Correct Answer:** C

39. Objective 3.11
Use quadratic equations to solve problems. Solve by: a) Factoring. b) Locating points on the graph.
Thinking Skill: Applying **Correct Answer:** B

40. Objective 3.11
Use quadratic equations to solve problems. Solve by: a) Factoring. b) Locating points on the graph.
Thinking Skill: Applying **Correct Answer:** D

41. Objective 3.11
Use quadratic equations to solve problems. Solve by: a) Factoring. b) Locating points on the graph.
Thinking Skill: Applying **Correct Answer:** D

42. Objective 3.11
Use quadratic equations to solve problems. Solve by: a) Factoring. b) Locating points on the graph.
Thinking Skill: Applying **Correct Answer:** B

43. Objective 3.12
Use formulas and graphs to solve problems involving exponential functions.
Solve a problem by: a) Locating points on the graph. b) Evaluating an exponential expression.
Thinking Skill: Applying **Correct Answer:** A

44. Objective 3.12
Use formulas and graphs to solve problems involving exponential functions.
Solve a problem by: a) Locating points on the graph. b) Evaluating an exponential expression.
Thinking Skill: Applying **Correct Answer:** B

45. Objective 3.12
Use formulas and graphs to solve problems involving exponential functions.
Solve a problem by: a) Locating points on the graph. b) Evaluating an exponential expression.
Thinking Skill: Applying **Correct Answer:** D