1. What is/are the solutions of the equation \(4(2 - x) + 5(2x + 3) = 7?\)
   (a) \(x = -8/7\)  (b) \(x = 8/3\)  (c) \(x = -8/3\)  (d) All real numbers  (e) None of these

2. What is/are the solutions of the equation \(5(1 - 2x) + 3(2 - x) = 11 - 13x?\)
   (a) \(x = -11/13\)  (b) \(x = -11/13\)  (c) \(x = 3\)  (d) All real numbers  (e) None of these

3. What is/are the solutions of the equation \(\frac{1}{2}(x + 5) + 2(4 - x) = 2 - \frac{3}{2}x?\)
   (a) \(x = 7/3\)  (b) \(x = 3/2\)  (c) \(x = -4/5\)  (d) All real numbers  (e) None of these

4. Which of the following inequalities is equivalent to \(3 - 4x + 2(1 + x) \leq x + 17?\)
   (a) \(x \geq 4\)  (b) \(x \leq -4\)  (c) \(x \geq 4\)  (d) \(x \geq -4\)  (e) None of these

5. Which of the following inequalities is equivalent to \(\frac{1}{3}(x + 5) - \frac{1}{2}(2 - x) > 4?\)
   (a) \(x > 0\)  (b) \(x < 0\)  (c) \(x > 4\)  (d) \(x < -4\)  (e) None of these

6. What is the \(y\)-coordinate of the point on the line \(2x + 5y = 48\) whose \(x\)-coordinate is 4?
   (a) 14  (b) 8/3  (c) 24  (d) 8  (e) None of these

7. What is the slope of the line \(4 = 2x + 7y?\)
   (a) \(-2/7\)  (b) \(7/2\)  (c) \(2/7\)  (d) \(-7/2\)  (e) None of these

8. What is the equation of the line through the points \((3, -4)\) and \((-2, 5)\)?
   (a) \(9x - 5y = 7\)  (b) \(9x + 5y = 7\)  (c) \(9x + 5y = -17\)  (d) \(5y = 9x + 7\)  (e) None of these

9. What is the slope of the line perpendicular to \(3x + 5y = -16?\)
   (a) \(-3/5\)  (b) \(5/3\)  (c) \(3/5\)  (d) \(-5/3\)  (e) None of these

10. What is the equation of the line, in general form, through the point \((1, -3)\) parallel to the line \(3x + 2y = 7?\)
    (a) \(3x + 2y = -3\)  (b) \(3x + 3 = -2y\)  (c) \(2y = x + 5\)  (d) \(3x + y + 5 = 0\)  (e) None of these

11. What is the point of intersection of the lines \(2x + 3y = 2\) and \(4x - 5y = 26?\)
    (a) \((7, -4)\)  (b) \((-1, -6)\)  (c) \((2, 26)\)  (d) \((4, -2)\)  (e) None of these

12. A line has slope \(-4.\) If the difference in the \(y\)-coordinates of two points on the line is 6, what is the corresponding difference in the \(x\)-coordinates of the points?
    (a) \(-3/2\)  (b) \(2/3\)  (c) \(3/2\)  (d) \(-2/3\)  (e) None of these

13. Which of the following statements describes all points that satisfy the inequalities:
    \[2x + 3y \leq 4, \quad x \geq 0, \quad y \geq -4.\]
    (a) all points above the line \(2x + 3y = 4\)
    (b) all points below the line \(2x + 3y = 4\), to the right of the \(y\)-axis, and above the line \(y = -4\)
    (c) all points in the first quadrant below the line \(2x + 3y = 4\)
    (d) None of the above
14. Which of the following pairs of inequalities describes all points in the first quadrant above the line $4y - 3x = 12$?
(a) $4y - 3x - 12 > 0, x > 0$  (b) $4y - 3x - 12 < 0, y > 0$  (c) $4y - 3x - 12 < 0, x > 0$
(d) $4y - 3x - 12 > 0, y > 0$  (e) None of these

A variable $H$ is related to a variable $T$ by the equation $H = \frac{3}{4}(T - 12)$. Answer questions 15–17 about this relation.

15. What is the $H$-intercept of the graph of this relation?
(a) 9  (b) $\frac{3}{4}$  (c) $\frac{4}{3}$  (d) $-9$  (e) None of these

16. What is the $T$-intercept of the graph of this relation?
(a) 12  (b) 9  (c) $\frac{4}{3}$  (d) $-3/4$  (e) None of these

17. What is the value of $T$ for which $H$ is equal to $T$?
(a) 12  (b) 36  (c) $-36$  (d) $-12$  (e) None of these

A feasible set is described by the following inequalities.

$$4x + 5y \leq 28, \quad y \leq x + 2, \quad x \geq -1, \quad y \geq 0$$

Answer questions 18–20 about this feasible set.

18. How many corners does the feasible set have?
(a) 2  (b) 3  (c) 4  (d) 5  (e) None of these

19. Which of the following points is a corner for the feasible set?
(a) $(0, 2)$  (b) $(3, 4)$  (c) $(-1, 2)$  (d) $(6, 0)$  (e) $(-1, 1)$

20. Which of the points $(-1,1/2), (2,5)$ and $(4,2)$ are in the feasible set?
(a) $(-1,1/2)$ and $(2,5)$ only  (b) $(-1,1/2)$ and $(4,2)$ only  (c) $(2,5)$ and $(4,2)$ only
(d) all three points  (e) None of the points

21. The optimum value of the objective function in a linear programming problem can only occur at a corner of the feasible set. Is this statement true or false?
(a) True  (b) False

22. The feasible set for a linear programming problem to find the optimum value of $P = 2x + 4y + 5$ must always lie in the first quadrant of the $xy$-plane. Is this statement true or false?
(a) True  (b) False

23. The number of corners to the feasible set of a linear programming problem in $x$ and $y$ is:
(a) equal to the number of constraints on $x$ and $y$
(b) less than the number of constraints on $x$ and $y$
(c) less than or equal to the number of constraints on $x$ and $y$
(d) more than the number of constraints on $x$ and $y$
(e) none of the above are valid

24. Which of the following functions is not possible for the objective function in a linear programming problem?
(a) $P = 2x - 3y$  (b) $P = 4 - x + 2y$  (c) $P = 2 + x + 3y$  (d) $P = 1500x$
(e) All of the above are possible objective functions

25. The optimum value of a nonconstant objective function in a linear programming problem occurs at more than one point in the feasible set if:
(a) The optimum value occurs at more than two vertices of the feasible set.
(b) The optimum value occurs at two adjacent vertices of the feasible set.
(c) The feasible set has infinite area.
(d) There are more than six constraints determining the feasible set.
(e) None of these