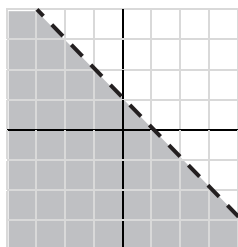1. $3 \times 4 - (6 - 2)^2 \div 8$

    $= 3 \times 4 - 4^2 \div 8$ Parentheses

    $= 3 \times 4 - 16 \div 8$ Exponents

    $= 12 - 16 \div 8$ Multiplication

    $= 12 - 2$ Division

    $= 10$ Subtraction

2. $3(x - 2) + 2a = a - x$

    $3(x - 2) + 2(2) = 2 - x$ Plug in $a = 2$.

    $3x - 2 = 2 - x$ Simplify each side.

    $4x - 2 = 2$ Add x to both sides.

    $4x = 4$ Add 2 to both sides.

    $x = 1$ Divide both sides by 4.

3. $\dfrac{1}{6} + \dfrac{1}{4}x = \dfrac{1}{3}x$

    $2 + 3x = 4x$ Multiply both sides by 12.

    $2 - x = 0$ Subtract $4x$ from both sides.

    $-x = -2$ Subtract 2 from both sides.

    $x = 2$ Divide both sides by -1.

4. The answer is B.

    A) $2x = 4$ B) $0 = 7$

        $x = 2$ No solution

    C) $-1 = -1$ D) $2x = 0$

        True for all x $x = 0$

5. The answers are A and B.

    A) $9 - 2(0) > (0) + 3$ B) $9 - 2(1) > (1) + 3$

        $9 > 3$ $7 > 4$

        Solution   Solution

    C) $9 - 2(2) > (2) + 3$ D) $9 - 2(3) > (3) + 3$

        $5 > 5$ $3 > 6$

        Not a solution   Not a solution

6. $3 \leq 3 - 4x < 5$

    $0 \leq -4x < 2$ Subtract 3 from all sides.

    $0 \geq x > -\dfrac{1}{2}$ Divide all sides by -4 and flip the inequality sign.

    $-\dfrac{1}{2} < x \leq 0$ Write in ascending order.

7. $2|x + 1| - 5 = 3$

    $2|x + 1| = 8$

    $|x + 1| = 4$ Isolate the absolute value.

    $x + 1 = 4$ or $x + 1 = -4$ Rewrite as two equations.

    $x = 3, x = -5$ Solve each equation.

    The positive solution is 3.

8. The answer is A.

    Isolate the absolute value and you get $|x| \leq -1$. This inequality has no solutions because an absolute value can never be negative.

9. Let $x =$ regular price

    $0.2x =$ amount of discount

    Sale price = regular price $-$ amount of discount, so $x - 0.2x = 24$.

    Solve for x, and you get $x = 30$.

    The regular price was $30.

10. Let $x =$ Carol's age now

    $x + 7 =$ Victor's age now

    $x - 3 =$ Carol's age 3 years ago

    $(x + 7) - 3 =$ Victor's age 3 years ago

    Victor's age 3 years ago = twice Carol's age 3 years ago, so $(x + 7) - 3 = 2(x - 3)$.

    Solve for x, and you get $x = 10$.

    Carol is 10 years old. Victor is 17 years old.

11. Let $x =$ score of the fourth quiz

    Average = (sum of four scores)/4 ≥ 90, so $(90 + 84 + 92 + x)/4 \geq 90$.

    Solve for x, and you get $x \geq 94$.

    Scott must score at least 94 points.

12. $m = \dfrac{4 - (-2)}{2 - 0} = 3$ Find the slope using the slope formula.

    $b = -2$ $(0, -2)$ is the y-intercept.

    $y = mx + b$ Slope-intercept form

    $y = 3x - 2$ Plug in m and b.

13. The answer is D.

    Lines parallel to the x-axis are horizontal lines. Horizontal lines have an equation of the form $y = k$ where k is a constant.

14. The slope of the given line is -2. The slope of the parallel line is also -2 because parallel lines have the same slope. The y-intercept is 3.

    $y = mx + b$ Slope-intercept form

    $y = -2x + 3$ Plug in m and b.

    $-1 = -2k + 3$ Plug in $(k, -1)$.

    $k = 2$ Solve for k.

15. Convert $x - 3y = 6$ to slope-intercept form and you get $y = (1/3)x - 2$. The slope of the given line is $1/3$.

    The slope of the perpendicular line is -3 because perpendicular lines have the slopes that are opposite (negative) reciprocals of each other.

    $y - y_1 = m(x - x_1)$ Point-slope form

    $y + 2 = -3(x - 1)$ Plug in m and $(1, -2)$.

    $y = -3x + 1$ Slope-intercept form

16.

x-intercept: $(1, 0)$
y-intercept: $(0, 1)$

17. The answer is B.

   A) Has vertex $(0, -2)$.   B) Has vertex $(2, 0)$.
   C) Has vertex $(0, 2)$.   D) Has vertex $(-2, 0)$.

18. The answer is C.

The initial value is 30,000 and the rate of change is $-1,200$, so the equation is $y = 30000 - 12000x$

19. $4x$ = number of seats from 4-seat tables
$6x$ = number of seats from 6-seat tables
Total number of seats = 88, so $4x + 6y = 88$.

Given $y = 8$, $4x + 6(8) = 88$.
Solve for x, and you get $x = 10$.
There are 10 4-seat tables.

20. Let x = width of the pen

Perimeter = 2(width + length) $\leq$ 200,
so $2(x + 60) \leq 200$.

Solve for x, and you get $x \leq 40$.
The maximum possible width is 40 feet.

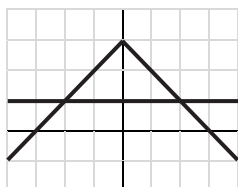**21.** $1 < x < 3$ Solve the first inequality.
$-6 < y < -1$ Solve the second inequality.
$-5 < x + y < 2$ Add the inequalities.

22.

Area = $\frac{1}{2}$(base)(height)

     = $\frac{1}{2}(4)(2) = 4$

The area is 4 square units.