Part A: Answer each of the following questions. Each solution is worth 4¾ points. Show all calculations.

1. Evaluate the following expression:

   $5 + 2(3 \cdot 4)$

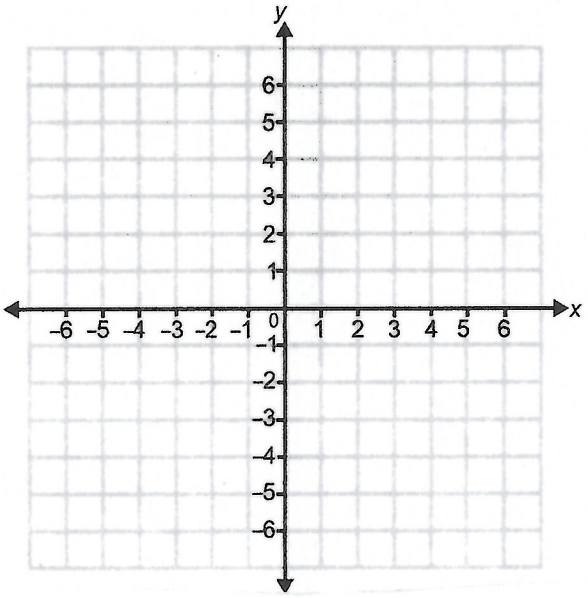
2. Simplify the following expression:

   $(xy^{-4} \div 2x^{-2}y^3)^2$

3. Jan has a piece of string. The string is 108 inches. He cuts the string into three different pieces. One piece is two inches more than the shortest piece, and the longest piece is four inches longer than the shortest piece. What's the length of the longest piece?

4. Find the x- and y-intercepts of this equation. Then graph the line:

   $-3x + 4y = 8$



5. Write the equation of the line passing through $(-3, 5)$ and parallel to the line $y = 2x + 6$.

6. Given the function $f(x) = 2x - 1$, find the value of $f(4)$.

7. Solve this system by substitution to find the point of intersection.

   $y = x + 2$

   $2x + 4y = 8$

8. Solve the system of equations given below.

   $2x + y + z = 14$

   $3x + 4y + z = 35$

   $x + 5y - 2z = 29$

9. Simplify this expression.

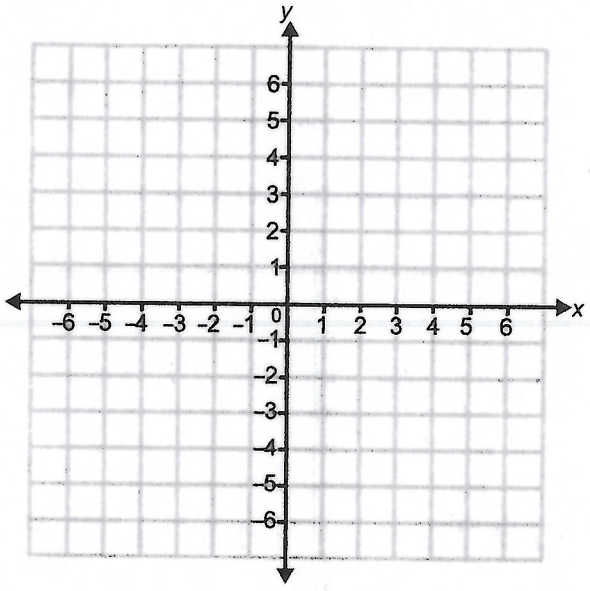
   $\left(\frac{2}{3x-1}\right) - 4$

10. Solve the inequality and graph the solution set. Give each result in set-builder notation and interval notation.

    $-3 \leq 3x < 12$

11. Solve the following inequality. Write the solution in interval notation and graph the solution.

    $|2y + 4| < 10$



12. Divide the polynomials.

    $\frac{2x^3 + 3x^2 + 2}{x + 2}$

13. Simplify the following expression:

$(2x^3 + 3x^2 + 8) - (x^2 + 4x)$

14. Find the following product:

$(2x - 4)(3x + 2)$

15. Factor this expression:

$8a^4b + 64a^2b^2$

16. Factor the following expression, if possible.

$x^3 + x^2 - 4x$

17. Solve the following proportion:

$$\frac{x+2}{6} = \frac{2x+1}{30}$$

18. Simplify the following expression fully:

$$\frac{\frac{1}{a}+\frac{1}{b}}{\frac{a}{b}-\frac{b}{a}}$$

19. Simplify the following expression:

$$\frac{20x^3y^2 + 10x^2y - 10xy}{5xy}$$

20. Simplify the following radical:

$\sqrt[4]{16a^4b^8}$

21. Simplify the following expression:

$\sqrt{2} + \sqrt{64}$

22. Find the product. Give your answer in $a + bi$ form.

$(2 + \sqrt{-30})(3 + \sqrt{-30})$