For full credit, circle your answers and <u>show all your work</u>!

1. Solve the inequality $3|2x + 1| - 5 < 12$

2. Factor the expressions below:
   (a)
   $$\frac{\sqrt{\dfrac{(b+y)^3}{(a+x)}}}{b+y}$$

   (b)
   $$\frac{(A+B)^2 - 2AB}{A^2 + B^2}$$

3. Simplify the expression and eliminate any negative exponents:
   $$\frac{b^{-1}(bd)^2 c}{(ab^{-1}d)^2 a^{-2} b a^{-1} b}$$

4. Rationalize the Numerator:
   $$\frac{\sqrt{a+h} - a}{h}$$

5. Factor the expression completely and simplify your answer. Write your answer with positive exponents. Begin by factoring out the lowest power of each common factor.

   $$(x^2 + 3)^{-1/3} - x^2(x^2 + 3)^{-4/3}$$

6. Perform the indicated operations and simplify:
   $$\frac{(x+h)^{-2} - x^{-2}}{h}$$

7. Solve the inequality:
   $$x < -\frac{21}{x - 10}$$

8. Factor the expression completely.

$$x^5 + 6x^3 + x^2 + 6$$

9. Find all solutions to the equations:

$$(x^2 + 4x)^2 + 2(x^2 + 4x) - 3 = 0$$

10. The line segment between $(2, 1)$ and $(-5, 2)$ is called AB. Find the equation of the line that intersects AB at its midpoint and is perpendicular to AB.

11. A wizard wants to make a Polyjuice Potion that is exactly 8% fluxweed. He will do so by mixing Terrible Tea, which is 10.5% fluxweed and Tasty Tonic which is 4.3% fluxweed. How much of each should the wizard use in order to create 10 oz of Polyjuice Potion.