

Show all necessary steps clearly, neatly, and systematically to receive full credit.

1. Find all solution(s):  $5x^3 + 45x = 2x^2 + 18$ .

2. Simplify:  $\sqrt[3]{54x^7y^3} - x\sqrt{-128x^4y^3} - x^2\sqrt[3]{-2xy^3}$ .

3. Solve and write the solution set in interval notation:  $-|-11-7x|+2 < -10$ .

4. Find the equation of the line passes through  $(-4, 3)$  and perpendicular to  $3x - 5y = 7$ . Write the result in standard form.

5. Solve:  $\sqrt{3x+7} + \sqrt{x+2} = 1$ .

6. Simplify and write in standard form:  $\frac{-2i}{(3-i)^2}$ .

7. Solve:  $\frac{-3}{x+4} + \frac{7}{x-4} = \frac{-5x+4}{x^2-16}$ .

8. Test for symmetry:  $y^2 = \frac{\sqrt[3]{x}}{x^3}$ .

9. Solve and write the solution set in set-builder notation:  $-\frac{7}{3}x < 14$  and  $-3x + 2 \geq 20$ .

10. Find center and radius of the circle:  $x^2 + y^2 + 4x - 20y + 95 = 0$ .

11. The relationship between Celsius  $C$  and Fahrenheit  $F$  degrees of measuring temperature is linear. Find a linear equation relation  $C$  and  $F$  if  $0^\circ C$  corresponds to  $32^\circ F$  and  $100^\circ C$  corresponds to  $212^\circ F$ . Use the equation to find the Celsius measure of  $70^\circ F$ .

12. Solve for  $D$ :  $A = B \cdot \sqrt[3]{\frac{C}{D}} - E$ .

13. Consider  $A(1, 4)$  and  $B(-3, 2)$  are the endpoints of a diameter of a circle.

a. Find the slope of the segment  $AB$ .

b. Find the center of the circle.

c. Find the radius of the circle.

d. Write equation of the circle in standard form.

e. Write the equation of the tangent line to the circle at the point  $(1, 4)$ . Write the result in slope-intercept form.