

**DIRECTIONS: Show all your work clearly on a separate paper. No calculators allowed!**

1. Solve the following equations for  $x$ .

(a)  $a^2c + b^2x = 2$

(b)  $abx - c = x$

(c)  $4x^2 - 13x + 3 = 0$

(d)  $x^2 + 6x + 1 = 0$

(e)  $\frac{x+2}{x-3} - \frac{7}{x+3} = \frac{30}{x^2-9}$

(f)  $|3x - 4| = 8$

2. Solve the inequality  $3x \leq 4(x - 2)$ . State the answer using set notation and interval notation.

3. Fill in the blanks to complete the square and make the equation true.

(a)  $x^2 + 12x + \underline{\hspace{1cm}} = (x + \underline{\hspace{1cm}})^2$

(b)  $x^2 - \frac{2}{3}x + \underline{\hspace{1cm}} = (x - \underline{\hspace{1cm}})^2$

4. Determine the equation following described lines and then sketch their graphs.

(a) Has slope  $-2$  and  $y$ -intercept  $(0,1)$ .

(b) Goes through the points  $(-1, -5)$  and  $(2,4)$ .

(c) Is horizontal and goes through the point  $(3, -2)$ .

(d) Is parallel to the  $y$ -axis and goes through the point  $(1,4)$ .

5. A triangle with an area of  $12 \text{ cm}^2$  has a height that is  $5 \text{ cm}$  more than its base. Compute the height of the triangle.

6. A rectangular parking lot of width  $w$  and length  $l$  is fenced all around the perimeter. One width of the lot is fenced with cement costing  $\$28$  per foot, while the other three sides use a chain-link fence costing  $\$14$  per foot. Determine the formula for the cost of the entire fence.

7. A rectangular box has a square base of side length  $x$  and height  $h$ , with an open top. Determine the formulas for its volume and surface area.

8. State the circumference and area of circle with radius  $r$ .