Exercises

1. Solve the following equations
   a) \( \frac{3}{5-2x} - \frac{7}{2} \)
   b) \( \frac{1}{x} + \frac{1}{7} = \frac{3}{7} \)
   c) \( \frac{3x-2}{2x+3} = \frac{3x-1}{2x+1} \)
   d) \( \frac{x}{3} - 4 = \frac{x}{5} \)
   e) \( \frac{x}{2} + \frac{x}{3} = 7 \)
   f) \( x^2 - 4 = 0 \)
   g) \( n^2 - 2n + 4 = 0 \)
   h) \( x^4 - x^2 + 6 = 0 \)

2. Factorize each of the following
   a) \( x^2 - x - 6 \)
   b) \( x^2 - 2x - 24 \)
   c) \( 5^2 - 6S + 8 \)
   d) \( 3x^2 - 3 \)
   e) \( 3x^2y - 9x^3y^3 \)
   f) \( x^4y - 2x^2y + y \)

3. Solve the following inequalities
   a) \( 5x - 2 \leq 2(x - 7) \)
   b) \( 3 < 2x + 1 \leq 12 \)
   c) \( 3 - 8x \geq 4 \)
   d) \( 2x - (7 + x) \leq x \)
e) \(-2(x + 6) > x + 4\)

f) \(3p(1 - p) > 3(2 + p) - 3p^2\)

g) \(3(5 - \frac{7}{3}q) < 9\)

h) \(\left|\frac{5x-6}{13}\right| = 0\)

i) \(|2z - 3| < 5\)

j) \(|3 - 2x| = 7\)

4. **Solve the following**

a) \(x^2 - 4x + 4 = 0\)

b) \(-x^2 + 3x + 10 = 0\)

c) \(x^2 + 9x = -14\)

d) \(0.02w^2 - 0.3w = 20\)

e) \(2z^2 + z = 5\)

f) \(q^2 - 5q = 0\)

g) \(\frac{3}{x-4} + \frac{x-3}{x} = 2\)

h) \(\frac{2x-3}{2x+5} + \frac{2x}{3x+1} = 1\)

i) \(\sqrt{2x - 3} = x - 3\)

j) \(\frac{1}{x^4} - \frac{9}{x^2} + 8 = 0\)

5. **Profit**

The Anderson Company produces a product for which the variable cost per unit is $6 and fixed cost is $80,000. Each unit has a selling price of $10. Determine the number of units that must be sold for the company to earn a profit of $60,000.

6. **Investment**
A total of $10,000 was invested in two business ventures, A and B. At the end of the first year, A and B yielded returns of 6 % and 5.75 %, respectively, on the original investments. How was the original amount allocated if the total amount earned was $588.75

7. Investment

A person wishes to invest $20,000 in two enterprises so that the total income per year will be $1440. One enterprise pays 6 % annually; the other has more risk and pays 7.5 % annually. How much must be invested in each?

8. Investment

A person invested $20,000, part at an interest rate of 6% annually and the remainder at 7% annually. The total interest at the end of 1 year was equivalent to an annual 6.75 % rate on the entire $20,000. How much was invested at each rate?

9. Pricing

The cost of a product to a retailer is $3.40. If the retailer wishes to make a profit of 20% on the selling price, at what price should the product be sold?

10. Profit

A corn refining company produces corn gluten cattle feed at a variable cost of $82 per ton. If fixed costs are $120,000 per month and the feed sells for $134 per ton, how many tons must be sold each month for the company to have a monthly profit of $560,000?

10. Profit

For a company that manufactures aquarium heaters, the combined cost for labor and material is $21 per heater. Fixed costs (costs incurred in a given period, regardless of output) are $70,000. If the selling price of a heater is $35, how many must be sold for the company to earn a profit?

11. Profit

The Davis Company manufactures a product that has a unit selling price of $20 and a unit cost of $15. If fixed costs are $600,000, determine the least number of units that must be sold for the company to have a profit.

14. Profit

To produce 1 unit of a new product, a company determines that the cost for material is $2.50 and the cost of labor is $4. The fixed cost,
regardless of sales volume, is $5000. If the cost to a wholesaler is $7.40 per unit, determine the least number of units that must be sold by the company to realize a profit.