

1. **Factor completely.**

(a) $x^2 - 11x + 30$

(b) $8x^3 + 125y^3$

(c) $3x^3 - 5x^2 - 48x + 80$

(d) $21x^3 - 71x^2 - 22x$

2. **Solve** the equation $3x^2 + 13x - 10 = 0$, by factoring.

3. **Simplify** $\frac{a^2 - 2a - 15}{a^2 - 7a} \cdot \frac{a^2}{a^2 + 2a - 35}$

4. (a) For what value(s) of the variable a is the expression

$$\frac{2a - 15}{a^2 - 7a} + \frac{3a}{a^2 - 2a - 35} \text{ undefined?}$$

(b) **Simplify** $\frac{2a - 15}{a^2 - 7a} + \frac{3a}{a^2 - 2a - 35}$

5. **Simplify** $\frac{\frac{2}{xy} - \frac{3}{x^2}}{\frac{3}{xy} + \frac{2}{y^2}}$

6. Solve $\frac{1}{15} + \frac{1}{x} = \frac{1}{6}$

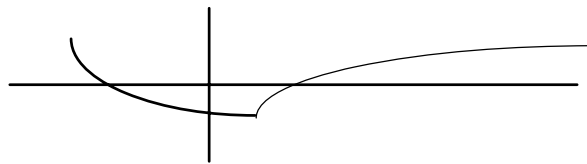
7. **Solve** the equation $\frac{2x}{x^2 - 1} + \frac{1}{x + 1} = 1$, and **check**.

ELEMENTARY ALGEBRA TEST TWO SAMPLE QUESTIONS.
SHOW ALL CALCULATIONS AND SIMPLIFY ANSWERS. PAGE 2 OF 3.

In the following word problems you must show how to use **algebra** to solve the problem. Set up an appropriate **equation**. Solve it. **Check**, and answer with a **sentence**.

8. April and May can mow the lawn in 40 minutes, working together. April can mow it alone in 90 minutes. How long would it take May, working alone? Give answer to nearest tenth of a minute.
9. Cody leaves home at noon, walking North at a rate of 1.5 mi/hr. At 2:00 pm that day, Mara leaves the same house, bicycling North at a rate of 3.5 mi/hr. Find **what time** Mara catches up with Cody, and **how far** from home they are then.
10. Juanita has \$6,000 to invest and she wants to make 4% in interest. How much should she place into a 3% investment and a 6% investment, respectively, to get exactly 4% of \$6,000 in interest in one year?
11. A fish swims at 2 miles per hour in still water. It swims 24 miles upstream, then returns the same 24 miles. The round trip takes 25 hours. Find the speed of the current.
12. Find the **slope** of the straight line through the points $(-5, 7)$ and $(3, -3)$.
13. A straight line has slope $m = \frac{3}{5}$ and passes through the point $(10, -5)$.
- (a) Write down the **point-slope equation**.
- (b) Find the **slope-intercept equation**.

14. Consider the line with equation $5x - 4y = 20$.
- (a) Find the (x, y) -coordinates of the **x-intercept**
 - (b) Find (x, y) -coordinates of the **y-intercept**
 - (c) Find the **slope** of the line
 - (d) Find the **slope-intercept equation** of the line
15. Determine if each of the relations below is a **function or not**, giving a detailed, **valid reason** in each case.
- (a) $\{(2, 8), (3, 9), (6, 2), (4, 9)\}$
 - (b) $x^2 + y = 20$
 - (c) $x + |y| = 20$
 - (d)



16. If $f(x) = 7x - 3$, compute $f(5)$
17. **Solve** the system of equations, using **substitution** or **addition** method, and **check** your answer.
- $$\begin{aligned} 12x + 5y &= 19 \\ 8x - 7y &= -8 \end{aligned}$$
18. (a) **Set up a system of two equations in x and y for the following problem:**
- “Al wants to make 14 liters of a 36% acid solution. Al has 30% acid solution and 50% acid solution on hand. How much of each should Al mix?”
- (b) Solve the problem.

(100 points total.)