

**BASIC ALGEBRA Exam 3 (One Step Ch 3) FORMS A and B Dr. Rapalje****BASIC ALGEBRA Exam 3A\***

Name \_\_\_\_\_

Show all work on this test or on separate paper! Calculators ARE allowed on this test!

1.  $\frac{21}{49}$

2.  $\frac{26x^8y^4}{39x^2y^{10}}$

3.  $\frac{x^2 - 4}{4x + 8}$

4.  $\frac{x^2 - 25}{x^2 - 10x + 25}$

5.  $\frac{x^2 - 3x}{x^2 + 5x - 24}$

6.  $\frac{32x^3}{48y^2} \cdot \frac{12x^5}{30y^3}$

7.  $\frac{42x^2}{27y^3} \div \frac{14x^8}{9y^2}$

8.  $\frac{x^2 - 8x}{x^2 - 7x + 12} \cdot \frac{x^2 - 4x + 3}{x^2 - 9x + 8}$

9.  $\frac{4x^2 - 9y^2}{4x^2 - 4xy - 3y^2} \div \frac{4x^2 + 8xy + 3y^2}{4x^2 - y^2}$

10.  $\frac{5}{12} + \frac{7}{20}$

11.  $\frac{5}{12} - \frac{7}{20}$

In 12 - 14, find the least common denominator (LCD).

12.  $\frac{1}{8}$ ,  $\frac{1}{10}$

13.  $\frac{1}{8x^3}$ ,  $\frac{1}{12y^3}$ ,  $\frac{1}{40xy^5}$

14.  $\frac{1}{x^2-10x+25}$ ,  $\frac{1}{x^2-25}$

In 15 - 19, add or subtract as indicated.

15.  $\frac{3}{2x^2} + \frac{5}{6xy}$

16.  $\frac{4x}{x-2} - \frac{8}{x-2}$

17.  $\frac{x^2+9}{x+3} + \frac{6x}{x+3}$

18.  $\frac{4}{x^2-9} + \frac{2}{x^2-5x+6}$

19.  $\frac{4x}{x^2+6x+5} - \frac{3x}{x^2+5x+4}$

In 20 - 24, solve the equations for  $x$ . Check answers as necessary.

20.  $\frac{x+6}{3} = \frac{x+8}{5}$

21.  $\frac{x}{x+8} = \frac{3}{x+13}$

22.  $\frac{x}{x-2} = \frac{3}{x-2}$

23.  $\frac{x}{3} - \frac{x+2}{2} = 1$

24.  $ax = bx + c$

25. If 15 pounds of dog food cost \$3.59, how much would 40 pounds cost?

26. If you can buy 9 apples for \$3.95, how many apples can you buy for \$20?

# BASIC ALGEBRA EXAM 3A\* Solutions

1.  $\frac{21}{77} = \frac{7 \cdot 3}{7 \cdot 11} = \frac{3}{11}$

2.  $\frac{2^2 \times 8y^4}{33^2 \times x^2 y^{10}} = \frac{2 \times 6}{3 \times 6} = \frac{2}{3}$

3.  $\frac{x^2 - 4}{4x + 8} = \frac{(x-2)(x+2)}{4(x+2)} = \frac{x-2}{4}$

4.  $\frac{x^2 - 25}{x^2 - 10x + 25} = \frac{(x-5)(x+5)}{(x-5)(x-5)} = \frac{x+5}{x-5}$

5.  $\frac{x^2 - 3x}{x^2 + 5x - 24} = \frac{x(x-3)}{(x+8)(x-3)} = \frac{x}{x+8}$

6.  $\frac{32x^3}{48y^2} \cdot \frac{4}{30y^3} = \frac{8x^3}{30y^5} = \frac{4x^3}{15y^5}$

7.  $\frac{42x^2}{27y^3} \div \frac{14x^2}{9y^2} = \frac{42x^2}{27y^3} \cdot \frac{9y^2}{14x^2} = \frac{1}{3y}$

8.  $\frac{x(x-8)}{(x-3)(x-4)} \cdot \frac{(x-3)(x-4)}{(x-8)(x-4)} = \frac{x}{x-4}$

9.  $\frac{4x^2 - 9y^2}{4x^2 + 4xy + y^2} \div \frac{4x^2 + 8xy + 3y^2}{4x^2 - y^2} = \frac{(2x-3y)(2x+3y)}{(2x+y)(2x+y)} \cdot \frac{(2x-y)(2x+y)}{(2x+3y)(2x+y)} = \frac{2x-y}{2x+y}$

10.  $\frac{5}{12} + \frac{1}{20}$  LCD = 60  
 $\frac{5 \cdot 5}{12 \cdot 5} + \frac{1 \cdot 3}{20 \cdot 3} = \frac{25}{60} + \frac{3}{60} = \frac{28}{60} = \frac{7}{15}$

11.  $\frac{5}{12} - \frac{7}{20}$  LCD = 60  
 $\frac{5 \cdot 5}{12 \cdot 5} - \frac{7 \cdot 3}{20 \cdot 3} = \frac{25}{60} - \frac{21}{60} = \frac{4}{60} = \frac{1}{15}$

12.  $\frac{1}{8}, \frac{1}{10}$   
 $\frac{1}{2^3}, \frac{1}{2 \cdot 5}$  LCD =  $2^3 \cdot 5 = 40$

13.  $\frac{1}{8x^3}, \frac{1}{12y^3}, \frac{1}{40xy^5}$   
 LCD =  $2^3 \cdot 3 \cdot 5 \cdot x^3 \cdot y^5 = 120x^3y^5$

14.  $\frac{1}{(x-5)^2} + \frac{1}{(x-5)(x+5)}$  LCD =  $(x-5)^2(x+5)$

15.  $\frac{3}{2x^2y} + \frac{5}{6xy}$  LCD =  $6x^2y$

16.  $\frac{4x}{x-2} - \frac{8}{x-2} = \frac{4x-8}{x-2} = \frac{4(x-2)}{x-2} = 4$

17.  $\frac{x^2+9}{x+3} + \frac{6x}{x+3} = \frac{x^2+6x+9}{x+3} = \frac{(x+3)(x+3)}{x+3} = x+3$

18.  $\frac{4}{(x-3)(x+3)(x-2)} + \frac{2}{(x-3)(x-2)(x+3)} = \frac{4x-8+2x+6}{(x-3)(x+3)(x-2)} = \frac{6x-2}{(x-3)(x+3)(x-2)}$

19.  $\frac{4x(x+4)}{(x+5)(x+1)(x+4)} - \frac{3x(x+5)}{(x+4)(x+1)(x+5)} = \frac{4x^2+16x-3x^2-15x}{(x+5)(x+1)(x+4)} = \frac{x^2+x}{(x+5)(x+1)(x+4)} = \frac{x(x+1)}{(x+5)(x+1)(x+4)} = \frac{x}{(x+5)(x+4)}$

20.  $\frac{x+6}{3} = \frac{x+8}{5}$   
 $5(x+6) = 3(x+8)$   
 $5x+30 = 3x+24$   
 $2x = -6$   
 $x = -3$

21.  ~~$\frac{x}{x+8} = \frac{3}{x+13}$~~   
 $x(x+13) = 3(x+8)$   
 $x^2+13x = 3x+24$   
 $x^2+10x-24 = 0$   
 $(x+12)(x-2) = 0$   
 $x = -12, x = 2$   
 Denominators okay!

22.  ~~$\frac{x}{x-2} = \frac{3}{x-2}$~~   
 $x(x-2) = 3(x-2)$   
 $x^2-2x = 3x-6$   
 $x^2-5x+6 = 0$   
 $(x-3)(x-2) = 0$   
 $x = 3, x = 2$   
 Reject

23.  $\frac{x}{8} - \frac{x+2}{2} = 1$   
 $2(x) - 3(x+2) = 6$   
 $2x - 3x - 6 = 6$   
 $-x - 6 = 6$   
 $-x = 12$   
 $x = -12$

24.  $\frac{ax}{-bx} = \frac{bx}{-bx}$   
 $\frac{ax-bx}{-bx} = \frac{c}{-bx}$   
 $\frac{x(a-b)}{-bx} = \frac{c}{-bx}$   
 $\frac{x(a-b)}{a-b} = \frac{c}{a-b}$   
 $x = \frac{c}{a-b}$

25.  $\frac{15 \text{ lb}}{\$3.59} = \frac{40 \text{ lb}}{\$x}$   
 $15x = 40(3.59)$   
 $x = \frac{40(3.59)}{15}$   
 $x = \$9.57$

26.  $\frac{9 \text{ apples}}{\$3.95} = \frac{x \text{ apples}}{\$20}$   
 $3.95x = 9 \cdot 20$   
 $x = \frac{180}{3.95} = 45.57$   
 $x = 45 \text{ apples}$   
 Note: Not enough money for 46 apples

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.  
CALCULATORS ARE EXPECTED ON THIS TEST. REDUCE ALL FRACTIONS.

1.  $\frac{63}{99}$

2.  $\frac{25x^2y^8}{80x^6y^4}$

3.  $\frac{x^2 - 4x}{16 - 4x}$

4.  $\frac{x^2 - 4x - 12}{x^2 - 36}$

5.  $\frac{x^2 + 26x + 169}{x^2 + 13x}$

6.  $\frac{20x^6}{45x^2} \div \frac{18x^{12}}{30x^3}$

7.  $\frac{x-5}{5xy} \cdot \frac{2xy^4}{x^2-25}$

8.  $\frac{x^2 - 4x}{x^2 - 6x + 8} \cdot \frac{x^2 + 4x - 12}{x^2 + 3x - 18}$

9.  $\frac{x^3y^2}{6xy + 12x} \div \frac{y^3}{y^2 - 4}$

10.  $\frac{3}{8} + \frac{1}{12}$

In 11 - 13, find the least common denominator (LCD).

11.  $\frac{1}{15}, \frac{1}{10}$

12.  $\frac{1}{6x^5y^2}, \frac{1}{12xy^3}$

13.  $\frac{1}{x^2-5x+6}, \frac{1}{x^2-6x+9}$

In 14 - 18, add or subtract as indicated.

14.  $\frac{x^2+2x}{x+5} + \frac{5x+10}{x+5}$

15.  $\frac{5}{12x} - \frac{1}{6y}$

16.  $\frac{2x}{3x-9} - \frac{2}{x-3}$

17.  $\frac{4}{x^2-4x} + \frac{4}{x^2+4x}$

18.  $\frac{5}{x^2-2x+1} - \frac{3}{x^2-x}$

In 19 – 24, solve the equations for  $x$ . Check answers as necessary.

19.  $\frac{2}{x+4} = \frac{6}{x-4}$

20.  $\frac{x-8}{x+4} = \frac{1}{4}$

21.  $\frac{6}{x+4} = \frac{8}{x+4}$

22.  $\frac{x}{x+4} = \frac{6}{x-4}$

23.  $\frac{2x}{3} + \frac{3(x-4)}{2} = \frac{1}{2}$

24.  $ax = bc - cx$

25. If a 12-ounce can of tuna costs \$1.59, how much should you expect to pay for a 20-ounce can?

26. If you can buy 6 gallons of bottled water for \$3.79, how many gallons can you expect to buy for \$20?

# BASIC ALGEBRA EXAM 3B\* Solutions

1.  $\frac{63}{99} = \frac{7 \cdot 9}{9 \cdot 11} = \frac{7}{11}$

2.  $\frac{25x^2y^8}{160x^6y^4} = \frac{5y^4}{16x^4}$

3.  $\frac{x^2-4x}{16-4x} = \frac{x(x-4)}{4(4-x)} = \frac{-x}{4}$

4.  $\frac{x^2-4x-12}{x^2-36} = \frac{(x-6)(x+2)}{(x-6)(x+6)} = \frac{x+2}{x+6}$

5.  $\frac{x^2+26x+169}{x^2+13x} = \frac{(x+13)(x+13)}{x(x+13)} = \frac{x+13}{x}$

6.  $\frac{20x^6}{45x^2} \div \frac{18x^{12}}{30x^3} = \frac{20x^6}{45x^2} \cdot \frac{30x^3}{18x^{12}} = \frac{20x^4}{3} \cdot \frac{x}{18x^9} = \frac{20}{27x^5}$

7.  $\frac{x-5}{5xy} \cdot \frac{2xy^4}{(x-5)(x+5)} = \frac{2y^3}{5(x+5)}$

8.  $\frac{x(x-4)}{(x-4)(x+4)} \cdot \frac{(x+6)(x-2)}{(x+6)(x-3)} = \frac{x}{x-3}$

9.  $\frac{x^2y^2}{6xy+12x} \div \frac{y^3}{y^2-4} = \frac{x^2y^2}{6x(y+2)} \cdot \frac{(y-2)(y+2)}{y^2} = \frac{x^2(y-2)}{6y}$

10.  $\frac{3^3}{8 \cdot 3} + \frac{1 \cdot 2}{12 \cdot 2} = \frac{9+2}{24} = \frac{11}{24}$

11.  $\frac{1}{15} + \frac{1}{10}$   
LCD = 2 \cdot 3 \cdot 5 = 30

12.  $\frac{1}{6x^5y^2} + \frac{1}{12xy^3}$   
LCD =  $12x^5y^3$

13.  $\frac{1}{(x-2)(x-3)} + \frac{1}{x-3}$   
LCD =  $(x-2)(x-3)^2$

14.  $\frac{x^2+2x}{x+5} + \frac{5x+10}{x+5} = \frac{x^2+2x+5x+10}{x+5} = \frac{x^2+7x+10}{x+5} = \frac{(x+5)(x+2)}{x+5} = x+2$

15.  $\frac{5 \cdot y}{12x \cdot y} - \frac{1 \cdot 2x}{6y \cdot 2x} = \frac{5y-2x}{12xy}$

17.  $\frac{4}{x(x-4)(x+4)} + \frac{4(x-4)}{x(x+4)(x-4)} = \frac{4x+16+4x-16}{x(x-4)(x+4)} = \frac{8x}{x(x-4)(x+4)} = \frac{8}{(x-4)(x+4)}$

16.  $\frac{2x}{3(x-3)} - \frac{2 \cdot 3}{(x-3) \cdot 3} = \frac{2x-6}{3(x-3)} = \frac{2(x-3)}{3(x-3)} = \frac{2}{3}$

18.  $\frac{5-x}{(x-1)^2x} - \frac{3}{x(x-1)(x-1)} = \frac{5x-3x+3}{x(x-1)^2} = \frac{2x+3}{x(x-1)^2}$

19.  ~~$\frac{2}{x+4} = \frac{6}{x-4}$~~   
 $2(x-4) = 6(x+4)$   
 $2x-8 = 6x+24$   
 $-6x+8 = 6x+24$   
 $-12x = 16$   
 $x = -\frac{4}{3}$

20.  ~~$\frac{x-8}{x+4} = \frac{4}{x+4}$~~   
 $4(x-8) = x+4$   
 $4x-32 = x+4$   
 $4x-x-32 = 4$   
 $3x = 36$   
 $x = 12$

21.  ~~$\frac{6}{x+4} = \frac{8}{x+4}$~~   
 $6(x+4) = 8(x+4)$   
 $6x+24 = 8x+32$   
 $-8x+24 = 8x+32$   
 $-16x = 8$   
 $x = -\frac{1}{2}$

22.  ~~$\frac{x}{x+4} = \frac{6}{x-4}$~~   
 $x(x-4) = 6(x+4)$   
 $x^2-4x = 6x+24$   
 $x^2-10x-24 = 0$   
 $(x-12)(x+2) = 0$   
 $x=12 \quad x=-2$

23.  $\frac{2x}{3} + 3 \frac{(x-4)}{2} = \frac{1}{2}$   
 $4x+9(x-4) = 3$   
 $4x+9x-36 = 3$   
 $13x = 39$   
 $x = 3$

24.  $ax = bc - cx$   
 $+cx \quad +cx$   
 $ax+cx = bc$   
 $x(a+c) = bc$   
 $\frac{x}{a+c} = \frac{bc}{a+c}$   
 $x = \frac{bc}{a+c}$

25.  $\frac{12g}{1.59} = \frac{20g}{x}$   
 $12x = 20(1.59)$   
 $x = \frac{20(1.59)}{12}$   
 $x = 2.65$

26.  $\frac{6 \text{ gal}}{3.79} = \frac{x \text{ gal}}{20}$   
 $3.79x = 6(20)$   
 $x = \frac{120}{3.79} = 31.66 \text{ gal} \approx 31 \text{ gal.}$