

INTERMEDIATE ALGEBRA EXAM 2 Y* NAME _____

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.
TURN IN ALL WORKSHEETS. CALCULATORS ARE PERMITTED ON THIS TEST.

$$x^3 - y^3 = (x - y)(x^2 + xy + y^2)$$
$$x^3 + y^3 = (x + y)(x^2 - xy + y^2)$$

In 1 - 5, factor completely:

1. $x^2 - 12x + 35$

2. $x^4 - 8x^2 - 9$

3. $8x^3 + 125y^3$

4. $x^3 - 12x^2 - 4x + 48$

5. $(2x+3y)^2 + 10(2x+3y) + 25$

In 6 - 8, solve for x:

6. $x(x - 7) = 0$

7. $x^2 - 10 = -3x$

8. $x(2x - 7) = -5$

In 9 - 14, perform the indicated operations (add, subtract, multiply, or divide.)
REDUCE ALL FRACTIONS COMPLETELY!

9. $\frac{x^3 + 4x^2 - xy - 4y}{x^3 + 64}$

10. $\frac{x^2 - x}{x^2 - x - 12} \div \frac{x^2 - 1}{x^2 - 3x - 4}$

INTERMEDIATE ALGEBRA EXAM 2 Y* NAME _____

11. $\frac{y^2 - 2y}{y - 3} - \frac{4y - 9}{y - 3}$

12. $\frac{5}{6x^2y^3} + \frac{8}{9x^4}$

13. $\frac{4x}{x^2 - 12x + 36} - \frac{9}{x^2 - 7x + 6}$

In 14 – 17, solve for x:

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

15. $\frac{x}{x - 5} + \frac{12}{x - 2} = \frac{15}{(x - 5)(x - 2)}$

16. $F = \frac{9}{5}x + 32$

17. $P = \frac{xy}{4 + x}$

18. If candy costs \$2.29 for a 3 ounce bag, how much would 1 pound (i.e., 16 ounces) cost? (Give equation)

19. y varies directly as the square of x, and inversely as z. If y=12 when x=4 and z=8, then find y when x=9 and z=27.

INTERMEDIATE ALGEBRA EXAM 2 Y* NAME _____

In 20 – 21, divide:

20. $\frac{x^3 + 10x^2 - 5x}{10x^2}$

21. $\frac{x^3 + 3x^2 - 7x - 10}{x + 2}$

In 22 - 25, simplify the complex fractions:

22. $\frac{\frac{1}{3} - \frac{1}{x}}{\frac{1}{3} + \frac{1}{x}}$

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

24. $[2x^{-1} - (2x)^{-1}]^{-1}$

25. $\frac{(3x)^{-2} + 3x^{-2}}{x^{-2} + 3^{-2}}$

INTERMEDIATE ALGEBRA EXAM 2 Y* Solutions

1. $x^2 - 12x + 35$
 $(x-7)(x-5)$

2. $x^4 - 8x^2 - 9$
 $(x^2-9)(x^2+1)$
 $(x-3)(x+3)(x^2+1)$

3. $8x^3 + 125y^3$
 $(2x+5y)(4x^2-10xy+25y^2)$

4. $x^3 - 12x^2 - 4x + 48$
 $x^2(x-12) - 4(x-12)$
 $(x-12)(x^2-4)$
 $(x-12)(x-2)(x+2)$

5. $(2x+3y)^2 + 10(2x+3y) + 25$
 $[(2x+3y) + 5][(2x+3y) + 5]$
 $(2x+3y+5)^2$

6. $x(x-7) = 0$
 $x=0 \quad x=7$

7. $x^2 - 10 = -3x$
 $x^2 + 3x - 10 = 0$
 $(x+5)(x-2) = 0$
 $x = -5 \quad x = 2$

8. $x(2x-7) = -5$
 $2x^2 - 7x + 5 = 0$
 $(2x-5)(x-1) = 0$
 $x = 5/2 \quad x = 1$

9. $\frac{x^3 + 4x^2 - xy - 4y}{x^3 + 64}$

$\frac{x^2(x+4) - y(x+4)}{(x+4)(x^2+4x+16)}$

$\frac{(x+4)(x^2-y)}{(x+4)(x^2+4x+16)}$

$\frac{x^2-y}{x^2+4x+16}$

10. $\frac{x^2-x}{x^2-x-12} \div \frac{x^2-1}{x^2-3x-4}$

$\frac{x(x-1)}{(x-4)(x+3)} \cdot \frac{(x-4)(x+1)}{(x-1)(x+1)}$

$\frac{x}{x+3}$

11. $\frac{y^2-2y}{y-3} \div \frac{y-9}{y-3}$

$\frac{y^2-2y-4y+9}{y-3}$

$\frac{y^2-6y+9}{y-3}$

$\frac{(y-3)(y-3)}{y-3} = y-3$

12. $\frac{5}{6xy^3} + \frac{8}{9x^4}$

LCD = $18x^4y^3$

$\frac{5 \cdot 3x^2 + 8 \cdot 2y^3}{6x^2y^3 \cdot 3x^2 + 9x^4 \cdot 2y^3}$

$\frac{15x^2 + 16y^3}{18x^4y^3}$

13. $\frac{4x}{(x-6)^2} - \frac{9}{(x-6)(x-1)}$

LCD = $(x-6)^2(x-1)$

$\frac{4x(x-1) - 9(x-6)}{(x-6)^2(x-1)}$

$\frac{4x^2 - 4x - 9x + 54}{(x-6)^2(x-1)}$

$\frac{4x^2 - 13x + 54}{(x-6)^2(x-1)}$

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

$x(x-4) = 6(x+4)$

$x^2 - 4x = 6x + 24$

$x^2 - 10x - 24 = 0$

$(x-12)(x+2) = 0$

$x = 12 \quad x = -2$

15. $\frac{x}{x+5} + \frac{6}{x-2} = \frac{15}{(x+5)(x-2)}$

$x^2 - 2x + 12x - 60 = 15$

$x^2 + 10x - 75 = 0$

$(x+15)(x-5) = 0$

$x = -15 \quad x = 5$ Reject!

16. $F = \frac{9}{5}C + 32$

$F - 32 = \frac{9}{5}C$

$\frac{5}{9}(F-32) = \frac{5}{9} \cdot \frac{9}{5}C$

$C = \frac{5}{9}(F-32) = \frac{5F-160}{9}$

17. $P = \frac{xy}{4+x}$

$P(4+x) = xy$

$4P + Px = xy$

$4P = xy - Px$

$\frac{4P}{y-P} = \frac{x(y-P)}{y-P}$

$x = \frac{4P}{y-P}$

18. $\frac{2.29}{3g} = \frac{x}{16g}$

$3x = 16(2.29)$

$x = \frac{16(2.29)}{3}$

$x = 12.21$

19. $y = \frac{kx^2}{2} \quad y = \frac{6x^2}{2}$

$12 = \frac{k \cdot 4^2}{2} \quad y = \frac{6 \cdot 8}{2}$

$12 = \frac{16k}{2} \quad y = 18$

$12 = 8k$

$k = 6$

$\frac{x^3 + 10x^2 - 5x}{10x^2} = \frac{x^3 + 10x^2 - 5x}{10x^2} = \frac{x}{10} + 1 - \frac{1}{2x}$

21. $\frac{x^3 + 3x^2 - 7x - 10}{x+2}$

$\begin{array}{r|rrrr} -2 & 1 & 3 & -7 & -10 \\ & \downarrow & -2 & -2 & 18 \\ \hline & 1 & 1 & -9 & 8 \end{array}$

$x^2 + x - 9 + \frac{8}{x+2}$

22. $\frac{3x}{1} \left(\frac{1}{3} - \frac{1}{x} \right) = \frac{x-3}{x+3}$

$\frac{3x}{1} \left(\frac{1}{3} + \frac{1}{x} \right) = \frac{x+3}{x+3}$

25. $\frac{(3x)^2 + 3x^{-2}}{x^{-2} + 3^{-2}}$

$= \frac{9x^2 + \frac{3}{x^2}}{\frac{1}{9x^2} + \frac{3}{x^2}}$

$= \frac{9x^2 \cdot \frac{1}{9x^2} + \frac{3}{x^2} \cdot \frac{1}{x^2}}{\frac{1}{9x^2} \cdot \frac{1}{x^2} + \frac{3}{x^2} \cdot \frac{1}{x^2}}$

$\left(\frac{1}{x} - \frac{2}{x-2} \right) \div \left(\frac{1}{2} + \frac{2}{x-2} \right)$

$\frac{x-2-2x}{x(x-2)} \div \frac{x-2+4}{2(x-2)}$

$\frac{-x-2}{x(x-2)} \cdot \frac{2(x-2)}{x+2}$

$\frac{-1(x+2)}{x} \cdot \frac{2}{x+2} = -\frac{2}{x}$

24. $\left[\frac{2x^{-1} - (2x)^{-1}}{\frac{2}{x} - \frac{1}{2x}} \right]^{-1} = \left[\frac{\frac{4}{2x} - \frac{1}{2x}}{\frac{3}{2x}} \right]^{-1} = \left(\frac{3}{2x} \right)^{-1} = \frac{2x}{3}$

$\frac{1+9 \cdot 3}{9+x^2} = \frac{28}{9+x^2}$