

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

In 1 - 6, factor completely:

1. $x^2 - 3x - 18$ 2. $49x^2 - 16$ 3. $(3x-y)^2 - 6(3x-y) + 8$

4. $2x^3y^3 - 250x^3$ 5. $x^3 - 5x^2 - 9x + 45$ 6. $5x^2 + 32x - 21$

In 7-8, solve for x:

7. $x^2 + 2x = 0$ 8. $x^2 - 12 = 4x$ 9. $R = \frac{x b_1 + x b_2}{2}$

In 10-13, perform the indicated operations (add, subtract, multiply, or divide.) REDUCE ALL FRACTIONS COMPLETELY!

10. $\frac{x^2 - 4}{x^3 - 8}$ 11. $\frac{12 - 4x}{24x - 18y} \div \frac{3x^2 - 4x - 15}{16x^2 - 9y^2}$

$$12. \frac{7}{6x^2y^2} - \frac{9}{8x^4}$$

$$13. \frac{x}{x^2 - 6x + 9} - \frac{3}{x^2 - 9}$$

In 14 - 15, solve the equations for X:

$$14. \frac{x}{x+1} = \frac{5}{x+9}$$

$$15. \frac{4}{x-4} + \frac{2}{x-2} + \frac{x^2-6x+12}{x^2-6x+8} = 0$$

In 16 - 17, divide:

$$16. \frac{4x^3 - 8x^2 + 12}{8x^2}$$

$$17. \frac{x^3 - 7x^2 + 13x - 20}{x - 5}$$

In 18 - 21, simplify the complex fractions:

$$18. \frac{\frac{4}{x} + 2}{2 - \frac{4}{x}}$$

$$19. \frac{\frac{x}{3} - \frac{3}{x}}{\frac{x^2}{9} - \frac{3}{x}}$$

$$20. \left[2x^{-1} - (2y)^{-1} \right]^{-1}$$

$$21. \frac{x^{-1} - y^{-1}}{x^{-1} + y^{-1}}$$

INTERMEDIATE ALG EXAM 2E* Solutions

1. $x^2 - 3x - 18$

$= (x-6)(x+3)$

2. $49x^2 - 16$

$= (7x-4)(7x+4)$

3. $(3x-y)^2 - 6(3x-y) + 8$

$= [(3x-y) - 4][(3x-y) - 2]$

4. $2x^3y^3 - 250x$

$= 2x^3(y^3 - 125)$

$= 2x^3(y-5)(y^2+5y+25)$

5. $x^3 - 5x^2 - 9x + 45$

$= x^2(x-5) - 9(x-5)$

$= (x-5)(x^2-9)$

$= (x-5)(x-3)(x+3)$

6. $5x^2 + 32x - 21$

$= (5x-3)(x+7)$

8. $x^2 - 12 = 4x$

$x^2 - 4x - 12 = 0$

$(x-6)(x+2) = 0$

$x = 6 \quad x = -2$

7. $x^2 + 2x = 0$

$x(x+2) = 0$

$x = 0 \quad x = -2$

9. $R = \frac{x b_1 + x b_2}{1 + 2}$

$2R = x b_1 + x b_2$

$2R = x(b_1 + b_2)$

$x = \frac{2R}{b_1 + b_2}$

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

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

$= \frac{x+2}{x^2+2x+4}$

11. $\frac{12-4x}{24x-18y} \div \frac{3x^2-4x-15}{16x^2-9y^2}$

$= \frac{4(3-x)}{6(4x-3y)} \cdot \frac{(4x-3y)(4x+3y)}{(3x+5)(x-3)}$

$= \frac{-4(4x+3y)}{6(3x+5)} \text{ or } \frac{-2(4x+3y)}{3(3x+5)}$

12. $\frac{7}{6x^2y^2} - \frac{9}{8x^4}$

LCD = $24x^4y^2$

$= \frac{7 \cdot 4x^2}{6x^2y^2 \cdot 4x^2} - \frac{9 \cdot 3y^2}{8x^4 \cdot 3y^2}$

$= \frac{28x^2 - 27y^2}{24x^4y^2}$

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

LCD = $(x-3)^2(x+3)$

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

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

14. $\frac{x}{x+1} = \frac{5}{x+9}$

$x(x+9) = 5(x+1)$

$x^2+9x = 5x+5$

$x^2+4x-5 = 0$

$(x+5)(x-1) = 0$

$x = -5 \quad x = 1$

15. $\frac{4}{x-4} + \frac{2}{x-2} + \frac{x^2-6x+12}{(x-4)(x-2)} = 0$

$4(x-2) + 2(x-4) + x^2-6x+12 = 0$

$4x-8+2x-8+x^2-6x+12 = 0$

$x^2-4 = 0$

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

$x = 2 \quad x = -2$

Reject

16. $\frac{4x^3}{8x^2} - \frac{8x^2}{8x^2} + \frac{12}{8x^2}$

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

17. $\frac{x^3-7x^2+13x-20}{x-5}$

$\begin{array}{r} 5 \overline{) 1-7 \ 13 \ -20} \\ \underline{5 \ -10 \ 15} \\ 1 \ -2 \ 3 \ -5 \end{array}$

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

21. $\frac{x^{-1}-y^{-1}}{x^{-1}+y^{-1}}$

$\frac{xy(\frac{1}{x} - \frac{1}{y})}{xy(\frac{1}{x} + \frac{1}{y})} = \frac{y-x}{y+x}$

18. $x \left(\frac{4}{x} + 2 \right)$

$x \left(2 - \frac{4}{x} \right)$

$= \frac{4+2x}{2x-4}$

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

$= \frac{x+2}{x-2}$

19. $\frac{x}{3} - \frac{3}{x}$

$\frac{x^2-3}{9x}$

$= \left(\frac{x}{3} - \frac{3}{x} \right) \div \left(\frac{x^2-3}{9x} \right)$

$= \frac{x^2-9}{3x} \div \frac{x^2-3}{9x}$

$= \frac{(x-3)(x+3)}{3x} \cdot \frac{9x}{(x-3)(x^2+3x+9)}$

20. $\left[2x^{-1} - (2y)^{-1} \right]^{-1}$

$= \left[\frac{2}{x} - \frac{1}{2y} \right]^{-1}$

$= \left[\frac{4y-x}{2xy} \right]^{-1}$

$= \frac{2xy}{4y-x}$

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