KEY

Algebra 3-4 Analysis Factoring and Rationals Study Questions

Factor.

1) $x^2 + 10x - 16$

NOT FACTORABLE

2) $4x^2 - 25$

$(2x+5)(2x-5)$

3) $10x^3 - 5x^2$

$5x^2(2x - 1)$

4) $3x^2 - 2x - 5$

$(3x-5)(x+1)$

5) $27x^2 - 90x - 72$

$9(3x^2 - 10x - 8)$

$9(3x+2)(x-4)$

6) $5x^2 + 7x - 6$

$(5x-3)(x+2)$

7) $x^2 + 9x - 2x - 18$

$x(x+9) - 2(x+9)$

$(x-2)(x+9)$

8) $27x^3 - 90x^2 - 72x$

$9x(3x+2)(x-4)$

9) $2x^3 + 10x^2 - 3x - 15$

$2x^2(x+5) - 3(x+5)$

$(2x^2-3)(x+5)$

10) $7x^2 - 63$

$7(x^2-9)$

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

11) $15m^3 - 2 - 6m^2 + 5m$

$15m^3 - 6m^2 + 5m - 2$

$3m^2(5m-2) + 1(5m-2)$

$(3m^2+1)(5m-2)$

12) $3x^4 + 6x^3 - 6x - 3$

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

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

$3(x^3-1)(x+2)$

13) $x^4 + x^2 - 6$

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

14) $2x^{10} - 11x^5 + 14$

$(2x^5 - 7)(x^5 - 2)$

Simplify.

15) $\dfrac{10x^2y^4}{18x^{-1}y^2}$ $\quad \dfrac{5x^3y^2}{9}$

16) $\dfrac{6x^3}{16xy^5} \cdot \dfrac{32x^2y}{18y^2}$ $\quad \dfrac{2x^4}{3y^6}$

17) $\dfrac{x^2-5x+6}{x^2+2x-15} = \dfrac{(x-3)(x-2)}{(x+5)(x-3)}$

$x \neq 3, -5$ $\quad = \dfrac{x-2}{x+5}$

18) $\dfrac{x^2-16}{4x+8} \cdot \dfrac{x^2+5x+6}{x^2-x-12} = \dfrac{(x+4)(x-4)}{4(x+2)} \cdot \dfrac{(x+3)(x+2)}{(x-4)(x+3)}$

$x \neq -2, -3, 4$ $\quad = \dfrac{x+4}{4}$

19) $\dfrac{x^2-5x-6}{5x+15} \div \dfrac{x^2-3x-4}{7x+21}$

$= \dfrac{(x-6)(x+1)}{5(x+3)} \cdot \dfrac{7(x+3)}{(x-4)(x+1)}$

$= \dfrac{7x-42}{5x-20}$ $\quad x \neq -3, -1, 4$

20) $\dfrac{x^2-3x-40}{x^2+2x-15} = \dfrac{(x-8)(x+5)}{(x+5)(x-3)}$

$= \dfrac{x-8}{x-3}$ $\quad x \neq -5, 3$

21) $\dfrac{x^2-7x-8}{2x+6} \div \dfrac{x^2-3x-4}{4x+12}$

$= \dfrac{(x-8)(x+1)}{2(x+3)} \cdot \dfrac{2 \cdot 2(x+3)}{(x-4)(x+1)}$

$= \dfrac{2x-16}{x-4}$ $\quad x \neq -1, -3, 4$

22) $\dfrac{4}{4}\left(\dfrac{5x}{x-7}\right) + \dfrac{2x}{4x-28} = \dfrac{20x+2x}{4(x-7)}$

$= \dfrac{22x}{4x-28}$

$x \neq 7$ $\quad = \dfrac{11x}{2x-14}$

23) $\dfrac{3}{2x^2-2} + \dfrac{2x}{x^2+4x+3}$

$= \dfrac{3}{2(x+1)(x-1)} \cdot \dfrac{x+3}{x+3} + \dfrac{2x}{(x+3)(x+1)} \cdot \dfrac{2(x-1)}{2(x-1)}$

$= \dfrac{3x+9+4x^2-4x}{2(x+1)(x-1)(x+3)} = \dfrac{4x^2-x+9}{2}$

24) $8 - \dfrac{5}{x+\frac{1}{5}} = 8 - \dfrac{5}{\frac{5x+1}{5}} = 8 - 5 \cdot \dfrac{5}{5x+1}$

$= \dfrac{8(5x+1)-25}{5x+1} = \dfrac{40x-17}{5x+1}$

25) Solve. $\dfrac{5(x+4)}{1}\left(\dfrac{4}{5} - \dfrac{6}{x+4}\right) = \dfrac{1}{5x+20} \cdot \dfrac{5(x+4)}{1}$

$4(x+4) - 30 = 1$

$4x + 16 - 30 = 1$

$4x = 15$ $\quad x = \frac{15}{4}$ ✓

26) Solve. $\dfrac{3x}{1}\left(1 + \dfrac{x^2-5x-24}{3x}\right) = \dfrac{x-6}{3x} \cdot 3x$

$3x + x^2 - 5x - 24 = x - 6$

$x^2 - 3x - 18 = 0$

$(x-6)(x+3) = 0$

$x = 6, -3$ ✓ ✓