BASIC ALGEBRA EXAM 3 XR NAME _____

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, reduce all fractions completely:

1. $\frac{28}{98}$

2. $\frac{24xy^6}{16x^3y^3}$

3. $\frac{85x^5}{17x^{15}}$

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

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

6. $\frac{12x^2-18x}{4x^2-9}$

In 7 – 8, multiply or divide the fractions.

7. $\frac{x^2-9}{x^2-6x+9} \bullet \frac{x^2-16}{x^2+7x+12}$

8. $\frac{12x+24y}{2x^2-4xy} \div \frac{4xy+8y^2}{x^2-4y^2}$

In 9 – 14, add or subtract the fractions. Reduce if possible.

9. $\frac{6}{x} + \frac{4}{x}$

10. $\frac{6}{25x} + \frac{9}{25x}$

11. $\frac{x^2}{x+5} - \frac{25}{x+5}$

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12. $\frac{x}{x^2-16} + \frac{4}{x^2-16}$ **13.** $\frac{x^2}{x-4} - \frac{19x-60}{x-4}$ **14.** $\frac{x^2-10x}{x-8} + \frac{x^2-x-40}{x-8}$

In 15 – 18, find the least common denominator only.

15. $\frac{1}{8}, \frac{1}{6}$ **16.** $\frac{1}{27}, \frac{1}{36}$ **17.** $\frac{1}{20}, \frac{1}{32}$

18. $\frac{1}{x^2-8x+16}, \frac{1}{x^2-5x+4}$

In 19 – 22, add or subtract the fractions.

19. $\frac{5}{2x^3} + \frac{3}{8x^2}$ **20.** $\frac{5}{27xy^2} - \frac{4}{9y^3}$

21. $\frac{4}{x^2-4} + \frac{2}{x^2-6x+8}$ **22.** $\frac{2x}{x^2-5x+4} - \frac{3}{x^2-8x+16}$

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In 23 – 28, solve for x.

23. $\frac{x}{x+2} = \frac{4}{5}$

24. $\frac{x}{x+8} = \frac{2}{x-4}$

25. $\frac{3}{x-2} = \frac{7}{x-2}$

(Note: #28 Optional)

26. $\frac{x-6}{6} + \frac{x}{3} = -2$

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

28a) $ax + b = -c$

b) $ax - bx = c$

In 29 –31, write an equation and solve.

29. If 18 ounces of peanut butter cost $2.59, how much would 32 ounces cost?

30. If 7.5 ounces of potato chips cost $1.79, how many ounces can you buy for $10?

31. If 9 pounds of salt are mixed with 120 liters of water, how much salt should be mixed with 3000 liters of water to obtain a salt solution of the same strength?

1. $\frac{28}{98} = \frac{14}{49} = \frac{2}{7}$ ÷2 ÷7

2. $\frac{24xy^6}{16x^3y^3} = \frac{3y^3}{2x^2}$ ÷8

3. $\frac{85x^5}{17x^{15}} = \frac{5}{x^{10}}$ ÷17

4. $\frac{x-5}{x^2-25} \cdot \frac{1}{x+5}$

$= \frac{1}{(x-5)(x+5)} \cdot \frac{1}{x+5}$

$= \frac{1}{x+5}$

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

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

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

6. $\frac{12x^2-18x}{4x^2-9}$

$= \frac{6x(2x-3)}{(2x-3)(2x+3)}$

$= \frac{6x}{2x+3}$

7. $\frac{x^2-9}{x^2-6x+9} \cdot \frac{x^2-16}{x^2+7x+12}$

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

$= \frac{x-4}{x-3}$

8. $\frac{12x+24y}{2x^2-4xy} \div \frac{4xy+8y^2}{x^2-4y^2}$

$= \frac{3\cancel{2}(x+2y)}{2x(x-2y)} \cdot \frac{(x-2y)(x+2y)}{\cancel{4}y(x+2y)}$

$= \frac{3(x+2y)}{2xy}$

9. $\frac{6}{x} + \frac{4}{x} = \frac{10}{x}$

10. $\frac{6}{25x} + \frac{9}{25x} = \frac{15}{25x} = \frac{3}{5x}$

11. $\frac{x^2}{x+5} - \frac{25}{x+5} = \frac{x^2-25}{x+5}$

$= \frac{(x-5)(x+5)}{x+5} = x-5$

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

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

13. $\frac{x^2}{x-4} - \frac{19x-60}{x-4}$

$= \frac{x^2-19x+60}{x-4}$

$= \frac{(x-15)(x-4)}{x-4} = x-15$

14. $\frac{x^2-10x}{x-8} + \frac{x^2-x-40}{x-8}$

$= \frac{2x^2-11x-40}{x-8} = \frac{(2x+5)(x-8)}{x-8}$

$= 2x+5$

15. $\frac{1}{8}, \frac{1}{6}$

$8: 2^3$ $6: 2\cdot 3$

$LCD = 2^3 \cdot 3$

$= 24$

16. $\frac{1}{27}, \frac{1}{36}$

$27: 3^3$ $36: 4\cdot 9 = 2^2 \cdot 3^2$

$LCD = 2^2 \cdot 3^3 = 108$

17. $\frac{1}{20}, \frac{1}{32}$

$20 = 2^2 \cdot 5$ $32: 2^5$

$LCD = 2^5 \cdot 5$

$= 160$

18. $\frac{1}{x^2-8x+16}, \frac{1}{x^2-5x+4}$

$(x-4)^2$ $(x-4)(x-1)$

$LCD = (x-4)^2(x-1)$

19. $\frac{5}{2x^3 \cdot 4} + \frac{3}{8x^2 \cdot x}$

$= \frac{20+3x}{8x^3}$

20. $\frac{5 \cdot y}{27xy^2 \cdot y} - \frac{4 \cdot 3x}{9y^3 \cdot 3x}$

$= \frac{5y-12x}{27xy^3}$

21. $\frac{4}{(x-2)(x+2)} \cdot \frac{(x-4)}{(x-4)} + \frac{2}{(x-4)(x-2)} \cdot \frac{(x+2)}{(x+2)}$

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

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

22. $\frac{2x}{(x-4)(x-1)} \cdot \frac{(x-4)}{(x-4)} - \frac{3}{(x-4)^2} \cdot \frac{(x-1)}{(x-1)}$

$= \frac{2x^2-8x-3x+3}{(x-4)^2(x-1)}$

$= \frac{2x^2-11x+3}{(x-4)^2(x-1)}$

23. $\frac{x}{x+2} = \frac{4}{5}$

$5x = 4x+8$

$x = 8$

24. $\frac{x}{x+8} = \frac{2}{x-4}$

$x^2-4x = 2x+16$

$x^2-6x-16 = 0$

$(x-8)(x+2) = 0$

$x = 8 \quad x = -2$

25. $\frac{3}{x-2} = \frac{7}{x-2}$

$3x-6 = 7x-14$

$-3x \quad -3x$

$-6 = 4x-14$

$+14 \quad +14$

$8 = 4x$

$x = 2$

Reject $x \neq 2$.

26. $\frac{6(x-6)}{6} + \frac{2\cancel{6}}{3}\frac{x}{\cancel{3}} = -2$

$x-6+2x = -12$

$3x-6 = -12$

$3x = -6$

$x = -2$

27. $x = 8, -2$

28. a) $x = \frac{-c-b}{a}$

b) $x = \frac{c}{a-b}$

29. $\frac{18}{25} = \frac{32}{x}$

$x = 44.60$

30. $\frac{7.5}{1.79} = \frac{x}{10}$

$x = 41.90$

31. $\frac{9}{120} = \frac{x}{3500}$

$x = 225$