

SKILLS PRACTICE 60

For use with Section 7-10
Fractional Equations and Extraneous
Solutions

NAME _____

DATE _____

Solve by factoring.

1. $x^2 - 14x + 40 = 0$

2. $x^2 - 8x - 7 = 0$

3. $2x^2 - x - 15 = 0$

4. $5x^2 - 25 = 0$

5. $6x^2 - 11x + 4 = 0$

6. $x^2 - 3x - 40 = 0$

7. $2x^2 + x - 1 = 0$

8. $x^2 - 9x + 7 = 0$

9. $x^2 + 6x + 5 = 0$

10. $3x^2 + 2x - 3 = 0$

State the domain and solve. Show any discarded solutions.

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

12. $\frac{2}{x+3} = \frac{4}{x-2}$

13. $\frac{x-3}{x-4} = \frac{x-1}{x+1}$

14. $\frac{6}{x+1} - \frac{3}{x+3} = 0$

15. $\frac{x+1}{x^2+1} = \frac{3}{5}$

16. $\frac{2}{x-4} = \frac{1}{x+4} - \frac{3}{x^2-16}$

17. $\frac{2x-1}{x+4} = \frac{12-3x}{x^2-16} + \frac{2x+1}{x-4}$

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

19. $\frac{x-1}{x-5} = \frac{3-x}{x^2-25} + \frac{x+1}{x+5}$

20. $\frac{2x-1}{3x-2} + \frac{6-2x}{9x^2-4} = \frac{2x+1}{3x-1}$

SKILLS PRACTICE 61

For use with Section 7-11

Variation Functions

NAME _____

DATE _____

1. Given the points: $(8, 300)$, $(24, 100)$ and $(72, 33\frac{1}{3})$
 - a. Name the type of function.
 - b. What is the general equation of the function?
 - c. Find the particular equation of the function.
 - d. If $x = 36$, what is y ?
 - e. If $y = 235$, what is x ?

2. Given the points: $(6, 3.2)$, $(12, 12.8)$, and $(24, 51.2)$
 - a. Name the type of function.
 - b. What is the general equation of the function?
 - c. Find the particular equation of the function.
 - d. If $x = 16.6$, what is y ?
 - e. If $y = 73.4$, what is x ?

3. Given the points: $(2, 75)$, $(10, 3)$, and $(50, 0.12)$
 - a. Name the type of function.
 - b. What is the general equation of the function?
 - c. Find the particular equation of the function.
 - d. If $x = 31.4$, what is y ?
 - e. If $y = 1.95$, what is x ?

4. Given the points: $(3, 5)$, $(12, 320)$, and $(48, 20480)$
 - a. Name the type of function.
 - b. What is the general equation of the function?
 - c. Find the particular equation of the function.
 - d. If $x = 6.2$, what is y ?
 - e. If $y = 445$, what is x ?

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Chapter 7 Review

Rational Algebraic Functions

NAME _____

DATE _____

1. For the function: $f(x) = \frac{x - 8}{x^2 - 9x + 8}$

- Explain why there are no values at $f(1)$ and $f(8)$.
- Find $f(.9)$ and $f(7.9)$.
- What happens to the graph of $f(x)$ at $x = 1$? at $x = 8$?
- Draw the graph of this function.

- Multiply: $(2x - 3)(3x + 4)$
 - Multiply: $(3x - 4)(x^2 - 4x + 8)$
 - Do the squaring: $(4x - 5)^2$

3. Factor completely.

- | | |
|--------------------------|---------------------------|
| a. $(x^2 - 16)$ | b. $x^2 - 10x + 25$ |
| c. $ax - ay + cx - cy$ | d. $9x - 9y - x^3 + x^2y$ |
| e. $x^2 + 24x + 144$ | f. $8x^2 + 10x - 3$ |
| g. $6x^2 - x - 1$ | h. $x^3 - 216$ |
| i. $6x^2 - 13x + 6$ | j. $27 + 8x^3$ |
| k. $x^3 - 6x^2 - x + 30$ | l. $x^5 - y^5$ |

4. Write as a mixed number: $x + 2 \overline{)x^3 - 7x^2 - 5x - 7}$

5. Simplify:

- | | |
|---|---|
| a. $\frac{8x^2 - 4x}{4x^2 - 1} \div \frac{8x^2}{6x + 3}$ | b. $\frac{2x + 6}{x^2 - 1} \cdot \frac{x^2 + 3x + 2}{x^2 + 5x + 6}$ |
| c. $\frac{x^2 - 3x - 10}{x^2 - 25} \cdot \frac{x^2 + 4x - 5}{x^2 + 5x + 6}$ | d. $\frac{6x - 12}{8x^2 - 32} \div \frac{x^2 - 2x - 8}{x^2 + 4x + 4}$ |
| e. $\frac{6}{x - 1} - \frac{2}{x - 2}$ | f. $\frac{4}{1 - x} + \frac{2}{(1 - x)^2}$ |

6. Plot the graph of $f(x) = \frac{2x + 1}{2x^2 - 3x - 2}$.

7. Solve. Indicate any extraneous roots.

- | | |
|--|--|
| a. $x^3 - 7x - 6 = 0$ | b. $4x^2 - 9 = 0$ |
| c. $\frac{3x - 1}{x + 5} + \frac{32}{x^2 - 25} = \frac{3x + 1}{x - 5}$ | d. $\frac{x}{x + 5} - \frac{5}{x - 5} = \frac{x^2 + 25}{x^2 - 25}$ |

SKILLS PRACTICE 60

1. $\{10, 4\}$ 2. no factor 3. $\{3, -2.5\}$
 4. $\{\sqrt{5}, -\sqrt{5}\}$ 5. $\{\frac{4}{3}, \frac{1}{2}\}$ 6. $\{8, -5\}$
 7. $\{\frac{1}{2}, -1\}$ 8. no factor 9. $\{-1, -5\}$
 10. no factor 11. $\{-15\}$ 12. $\{-8\}$
 13. $\{\frac{7}{3}\}$ 14. $\{-5\}$ 15. $\{-\frac{1}{3}, 2\}$
 16. $\{-15\}$ 17. $\{-\frac{4}{5}\}$ 18. \emptyset
 19. $\{\frac{1}{3}\}$ 20. $\{0, \frac{7}{6}\}$

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1. a. inverse variation b. $y = \frac{k}{x}$ c. $y = \frac{2400}{x}$
 d. $y = 66.6$ e. $x = 10.2128$
 2. a. direct square variation b. $y = kx^2$ c. $y = 0.08x^2$ d. $y = 24.49$ e. $x = 28.74$
 3. a. inverse square variation b. $y = \frac{k}{x^2}$ c. $y = \frac{300}{x^2}$ d. $y = 0.30427$ e. $x = 12.40$
 4. a. direct cube variation b. $y = kx^3$ c. $y = 0.1852x^3$ d. $y = 44.14$ e. $x = 13.39$

SKILLS PRACTICE 62

1. a. $f(x) = \frac{x-8}{x^2-9x+8} = \frac{x-8}{(x-8)(x-1)}$
 $\frac{1}{x-1}$; $f(1)$ and $f(8)$ would produce zero denominators, so the function is undefined at these points.
 b. $f(0.9) = -10, f(7.9) = 0.14$
 c. Asym. at $x = 1$, hole at $x = 8$
 d. graph
 2. a. $6x^2 - x - 12$
 b. $3x^3 - 16x^2 + 40x - 32$
 c. $16x^2 - 40x + 25$
 3. a. $(x-4)(x+4)$

- b. $(x-5)^2$
 c. $(x-y)(a+c)$
 d. $(3-x)(3+x)(x-y)$
 e. $(x+12)^2$
 f. $(4x-1)(2x+3)$
 g. $(3x+1)(23x-1)$
 h. $(x-6)(x^2+6x+36)$
 i. $(3x-2)(2x-3)$
 j. $(3+2x)(9-6x+4x^2)$
 k. $(x+2)(x-3)(x-5)$
 l. $(x-y)(x^4+x^3y+x^2y^2+xy^3+y^4)$
 4. $x^2 - 9x + 13 + \frac{-33}{x+2}$

5. a. $\frac{3}{2x}$ b. $\frac{2}{x-1}$ c. $\frac{x-1}{x+3}$
 d. $\frac{3}{4(x-4)}$ e. $\frac{4x-10}{(x-1)(x-2)}$
 6. $f(x) = \frac{2x+1}{2x^2-3x-2} = \frac{2x+1}{(2x+1)(x-2)} = \frac{1}{x-2}$; hole at $-\frac{1}{2}$
 7. a. $\{-1, -2, 3\}$ b. $\{\frac{3}{2}, -\frac{3}{2}\}$
 c. $\{1\}$ d. \emptyset , extraneous root at $x = -5$

SKILLS PRACTICE 63

1. $-8\sqrt{3}$ 2. $-2\sqrt{2}$ 3. $-23\sqrt[3]{5}$
 4. $-13\sqrt[4]{2}$ 5. $\frac{11\sqrt{2}}{4}$ 6. $\frac{26\sqrt{5}}{5}$
 7. $\frac{23\sqrt{3}}{3}$ 8. $\frac{23\sqrt{5}}{5}$ 9. $8 - 2\sqrt{15}$
 10. $7 - 4\sqrt{3}$ 11. 5
 12. -22 13. $8 + \sqrt{15}$
 14. 129 15. $\sqrt[3]{2}$
 16. $\sqrt{5}$ 17. $\frac{5\sqrt{8}}{2}$ 18. $\frac{3\sqrt{9}}{3}$