

PreCalc 11 Chapter 7 Rev Pack v1 Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 0 DIF: Easy REF: 7.1 Equivalent Rational Expressions
LOC: 11.AN4 TOP: Algebra and Number KEY: Conceptual Understanding
2. ANS: B PTS: 0 DIF: Moderate REF: 7.1 Equivalent Rational Expressions
LOC: 11.AN4 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge
3. ANS: A PTS: 0 DIF: Moderate REF: 7.1 Equivalent Rational Expressions
LOC: 11.AN4 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge
4. ANS: B PTS: 0 DIF: Easy REF: 7.1 Equivalent Rational Expressions
LOC: 11.AN4 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge
5. ANS: B PTS: 1 DIF: Easy REF: 7.2 Multiplying and Dividing Rational Expressions LOC: 11.AN5
TOP: Algebra and Number KEY: Conceptual Understanding | Procedural Knowledge
6. ANS: A PTS: 1 DIF: Easy REF: 7.2 Multiplying and Dividing Rational Expressions LOC: 11.AN5
TOP: Algebra and Number KEY: Conceptual Understanding | Procedural Knowledge
7. ANS: D PTS: 0 DIF: Easy REF: 7.3 Adding and Subtracting Rational Expressions with Monomial Denominators
LOC: 11.AN5 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge
8. ANS: B PTS: 0 DIF: Easy REF: 7.3 Adding and Subtracting Rational Expressions with Monomial Denominators
LOC: 11.AN5 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge
9. ANS: C PTS: 0 DIF: Moderate REF: 7.3 Adding and Subtracting Rational Expressions with Monomial Denominators
LOC: 11.AN5 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge
10. ANS: A PTS: 0 DIF: Moderate REF: 7.3 Adding and Subtracting Rational Expressions with Monomial Denominators
LOC: 11.AN5 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge
11. ANS: B PTS: 0 DIF: Moderate REF: 7.3 Adding and Subtracting Rational Expressions with Monomial Denominators
LOC: 11.AN5 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge
12. ANS: B PTS: 0 DIF: Easy REF: 7.4 Adding and Subtracting Rational Expressions with Binomial and Trinomial Denominators
LOC: 11.AN5 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge

13. ANS: D PTS: 0 DIF: Easy
REF: 7.4 Adding and Subtracting Rational Expressions with Binomial and Trinomial Denominators
LOC: 11.AN5 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge
14. ANS: C PTS: 0 DIF: Moderate
REF: 7.4 Adding and Subtracting Rational Expressions with Binomial and Trinomial Denominators
LOC: 11.AN5 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge
15. ANS: A PTS: 0 DIF: Easy REF: 7.5 Solving Rational Equations
LOC: 11.AN6 TOP: Algebra and Number KEY: Procedural Knowledge
16. ANS: B PTS: 0 DIF: Moderate REF: 7.5 Solving Rational Equations
LOC: 11.AN6 TOP: Algebra and Number KEY: Procedural Knowledge
17. ANS: C PTS: 0 DIF: Moderate REF: 7.5 Solving Rational Equations
LOC: 11.AN6 TOP: Algebra and Number KEY: Procedural Knowledge
18. ANS: D PTS: 0 DIF: Moderate REF: 7.5 Solving Rational Equations
LOC: 11.AN6 TOP: Algebra and Number KEY: Procedural Knowledge
19. ANS: C PTS: 0 DIF: Easy
REF: 7.6 Applications of Rational Equations LOC: 11.AN6
TOP: Algebra and Number KEY: Procedural Knowledge | Problem-Solving Skills
20. ANS: A PTS: 0 DIF: Easy
REF: 7.6 Applications of Rational Equations LOC: 11.AN6
TOP: Algebra and Number KEY: Procedural Knowledge | Problem-Solving Skills
21. ANS: B PTS: 0 DIF: Moderate
REF: 7.6 Applications of Rational Equations LOC: 11.AN6
TOP: Algebra and Number KEY: Procedural Knowledge | Problem-Solving Skills
22. ANS: B PTS: 0 DIF: Moderate
REF: 7.6 Applications of Rational Equations LOC: 11.AN6
TOP: Algebra and Number KEY: Procedural Knowledge | Problem-Solving Skills

SHORT ANSWER

23. ANS:

$$\frac{10x^2 - 25x + 15}{90 - 40x^2} = \frac{-(x-1)}{2(2x+3)}$$

The non-permissible values are $x = \frac{3}{2}$ and $x = -\frac{3}{2}$.

PTS: 0 DIF: Difficult REF: 7.1 Equivalent Rational Expressions
LOC: 11.AN4 TOP: Algebra and Number
KEY: Conceptual Understanding | Procedural Knowledge

24. ANS:

$$\frac{x^4 - 625y^4}{5x^2 + 21xy - 20y^2} = \frac{(x - 5y)(x^2 + 25y^2)}{5x - 4y}$$

The non-permissible values are $x = -5y$ and $x = \frac{4}{5}y$.

PTS: 0 DIF: Difficult REF: 7.1 Equivalent Rational Expressions

LOC: 11.AN4 TOP: Algebra and Number

KEY: Conceptual Understanding | Procedural Knowledge

25. ANS:

$$\frac{5p^4}{6m^3}, m \neq 0, p \neq 0$$

PTS: 1 DIF: Easy REF: 7.2 Multiplying and Dividing Rational Expressions

LOC: 11.AN5 TOP: Algebra and Number

KEY: Conceptual Understanding | Procedural Knowledge

26. ANS:

$$\frac{a + 5b}{a - 2b}, a \neq -2b, a \neq 2b, a \neq 5b, a \neq -5b$$

PTS: 1 DIF: Moderate REF: 7.2 Multiplying and Dividing Rational Expressions

LOC: 11.AN5 TOP: Algebra and Number

KEY: Conceptual Understanding | Procedural Knowledge

27. ANS:

$$\frac{(3m + 1)(4m + 1)}{(5m + 3)(m - 1)}, m \neq \frac{1}{2}, m \neq -1, m \neq -\frac{3}{5}, m \neq 1$$

PTS: 1 DIF: Difficult REF: 7.2 Multiplying and Dividing Rational Expressions

LOC: 11.AN5 TOP: Algebra and Number

KEY: Conceptual Understanding | Procedural Knowledge

28. ANS:

$$\frac{6}{9x - 5y}, x \neq \frac{5y}{9}, x \neq -\frac{5y}{9}, x \neq y, x \neq -y, x \neq \frac{3y}{4}$$

PTS: 1 DIF: Difficult REF: 7.2 Multiplying and Dividing Rational Expressions

LOC: 11.AN5 TOP: Algebra and Number

KEY: Conceptual Understanding | Procedural Knowledge

29. ANS:

$$\frac{16x^3 + 15y^3}{12x^5y^5}, x \neq 0, y \neq 0$$

PTS: 0 DIF: Moderate

REF: 7.3 Adding and Subtracting Rational Expressions with Monomial Denominators

LOC: 11.AN5 TOP: Algebra and Number

KEY: Conceptual Understanding | Procedural Knowledge

30. ANS:

$$\frac{5a^3 - 5a^2 - 3a^2b^3 + 3b^3}{15a^3b^3}, a \neq 0, b \neq 0$$

PTS: 0

DIF: Moderate

REF: 7.3 Adding and Subtracting Rational Expressions with Monomial Denominators

LOC: 11.AN5 TOP: Algebra and Number

KEY: Conceptual Understanding | Procedural Knowledge

31. ANS:

$$\frac{2d^3m - 10d + 5m}{2dm}, d \neq 0, m \neq 0$$

PTS: 0

DIF: Moderate

REF: 7.3 Adding and Subtracting Rational Expressions with Monomial Denominators

LOC: 11.AN5 TOP: Algebra and Number

KEY: Conceptual Understanding | Procedural Knowledge

32. ANS:

$$y = \frac{1}{16}$$

PTS: 0

DIF: Easy

REF: 7.5 Solving Rational Equations

LOC: 11.AN6

TOP: Algebra and Number

KEY: Procedural Knowledge

33. ANS:

360 mL of liquid fertilizer

PTS: 0

DIF: Easy

REF: 7.6 Applications of Rational Equations

LOC: 11.AN6 TOP: Algebra and Number

KEY: Procedural Knowledge | Problem-Solving Skills

34. ANS:

0.02 L of acetic acid

PTS: 0

DIF: Easy

REF: 7.6 Applications of Rational Equations

LOC: 11.AN6 TOP: Algebra and Number

KEY: Procedural Knowledge | Problem-Solving Skills

PROBLEM

35. ANS:

$$\begin{aligned} \frac{x^4 - 34x^2 + 225}{4x^4 - 8x^3 - 60x^2} &= \frac{(x^2 - 9)(x^2 - 25)}{4x^2(x^2 - 2x - 15)} \\ &= \frac{(x + 3)(x - 3)(x + 5)(x - 5)}{4x^2(x + 3)(x - 5)} \\ &= \frac{(x - 3)(x + 5)}{4x^2}, x \neq -3, x \neq 5, x \neq 0 \end{aligned}$$

PTS: 0 DIF: Difficult REF: 7.1 Equivalent Rational Expressions

LOC: 11.AN4 TOP: Algebra and Number

KEY: Procedural Knowledge | Communication

36. ANS:

$$\begin{aligned} \frac{1 - \frac{9}{m^2}}{1 - \frac{3}{m}} &= \frac{\frac{m^2 - 9}{m^2}}{\frac{m - 3}{m}} \\ &= \frac{\frac{(m + 3)(m - 3)}{m^2}}{\frac{m - 3}{m}} \\ &= \frac{(m + 3)(m - 3)}{m^2} \cdot \frac{m}{m - 3} \\ &= \frac{(m + 3)}{m} \end{aligned}$$

$$\text{So, } \frac{1 - \frac{9}{m^2}}{1 - \frac{3}{m}} = \frac{(m + 3)}{m}, m \neq 0, m \neq 3$$

PTS: 1 DIF: Difficult REF: 7.2 Multiplying and Dividing Rational Expressions

LOC: 11.AN5 TOP: Algebra and Number

KEY: Procedural Knowledge | Communication

37. ANS:

One form can be found by simplifying:

$$\frac{-3(x+5)(x-9)}{2x(x-9)(x+1)} = \frac{-3(x+5)}{2x(x+1)}, x \neq 0, x \neq 9, x \neq -1$$

Another form can be found by multiplying the numerator and denominator by the same monomial or binomial.

For example:

$$\begin{aligned} \frac{-3(x+5)(x-9)}{2x(x-9)(x+1)} &= \frac{-3(x+5)(x-9)}{2x(x-9)(x+1)} \cdot \frac{(x+1)}{(x+1)} \\ &= \frac{-3(x+5)(x-9)(x+1)}{2x(x-9)(x+1)^2} \\ &= \frac{-3(x+5)(x-9)(x+1)}{2x(x-9)(x+1)^2}, x \neq 0, x \neq 9, x \neq -1 \end{aligned}$$

PTS: 1 DIF: Difficult REF: 7.2 Multiplying and Dividing Rational Expressions

LOC: 11.AN5 TOP: Algebra and Number

KEY: Procedural Knowledge | Communication | Problem-Solving Skills

38. ANS:

The least common multiple of $2b^2$, $3b^4$, $4b^6$, $5b^8$, and $6b^{10}$ is: $60b^{10}$ A common denominator for the first five terms is: $60b^{10}$ Write the sum of the first five terms with the common denominator $60b^{10}$ and simplify.

$$\begin{aligned} &\frac{1}{2b^2} + \frac{2}{3b^4} - \frac{3}{4b^6} + \frac{4}{5b^8} - \frac{5}{6b^{10}} \\ &= \frac{1}{2b^2} \cdot \frac{30}{30} \cdot \frac{b^8}{b^8} + \frac{2}{3b^4} \cdot \frac{20}{20} \cdot \frac{b^6}{b^6} - \frac{3}{4b^6} \cdot \frac{15}{15} \cdot \frac{b^4}{b^4} + \frac{4}{5b^8} \cdot \frac{12}{12} \cdot \frac{b^2}{b^2} - \frac{5}{6b^{10}} \cdot \frac{10}{10} \\ &= \frac{30b^8 + 40b^6 - 45b^4 + 48b^2 - 50}{60b^{10}}, b \neq 0 \end{aligned}$$

PTS: 0 DIF: Difficult

REF: 7.3 Adding and Subtracting Rational Expressions with Monomial Denominators

LOC: 11.AN5 TOP: Algebra and Number

KEY: Procedural Knowledge | Communication | Problem-Solving Skills

39. ANS:

For example:

$$\begin{aligned} \frac{x^2 + 7x - 10}{2x^2 - 50} &= \frac{x^2 + 5x + 2x - 10}{2(x+5)(x-5)} \\ &= \frac{x^2 + 5x}{2(x+5)(x-5)} + \frac{2x - 10}{2(x+5)(x-5)} \\ &= \frac{x(x+5)}{2(x+5)(x-5)} + \frac{2(x-5)}{2(x+5)(x-5)} \\ &= \frac{x}{2(x-5)} + \frac{1}{(x+5)} \end{aligned}$$

PTS: 0

DIF: Difficult

REF: 7.4 Adding and Subtracting Rational Expressions with Binomial and Trinomial Denominators

LOC: 11.AN5 TOP: Algebra and Number

KEY: Procedural Knowledge | Communication | Problem-Solving Skills

40. ANS:

 N is 4 less than M , so $N = M - 4$.The sum of the reciprocals of M and N is: $\frac{1}{M} + \frac{1}{M-4}$ Five times the reciprocal of twice the value of M is: $\frac{5}{2M}$ An equation for the two numbers is: $\frac{1}{M} + \frac{1}{M-4} = \frac{5}{2M}$ $M = 0$ and $M = 4$ are non-permissible values.Solve the equation. A common denominator is: $2M(M-4)$

Multiply all terms in the equation by the common denominator and simplify.

$$\begin{aligned} 2M(M-4)\left(\frac{1}{M}\right) + 2M(M-4)\left(\frac{1}{M-4}\right) &= 2M(M-4)\left(\frac{5}{2M}\right) \\ 2(M-4) + 2M &= 5(M-4) \\ 2M - 8 + 2M &= 5M - 20 \\ 4M - 8 &= 5M - 20 \\ -8 + 20 &= 5M - 4M \\ M &= 12 \end{aligned}$$

$$N = M - 4$$

$$N = 12 - 4$$

$$N = 8$$

The larger number M is 12 and the lesser number N is 8.

PTS: 0

DIF: Difficult

REF: 7.6 Applications of Rational Equations

LOC: 11.AN6 TOP: Algebra and Number

KEY: Procedural Knowledge | Communication | Problem-Solving Skills

41. ANS:

Let u km/h represent the average speed of the cyclist when there is no wind.

An equation representing the total riding time is:

$$\frac{4}{u+6} + \frac{4}{u-7} = 3, u > 7$$

Solve the equation. A common denominator is: $(u+6)(u-7)$

Multiply all terms in the equation by the common denominator and simplify.

$$\frac{4}{u+6} + \frac{4}{u-7} = 3$$

$$(u+6)(u-7)\left(\frac{4}{u+6}\right) + (u+6)(u-7)\left(\frac{4}{u-7}\right) = 3(u+6)(u-7)$$

$$4(u-7) + 4(u+6) = 3(u-7)(u+6)$$

$$3u^2 - 11u - 122 = 0$$

Solve the equation $3u^2 - 11u - 122 = 0$ using the quadratic formula.

$$u = \frac{11 \pm \sqrt{(-11)^2 - 4(3)(-122)}}{2(3)}$$

$$u = \frac{11 \pm \sqrt{1585}}{6}$$

$$u \doteq 8.5 \text{ or } u \doteq -4.8$$

Since speed cannot be negative, $u \doteq 8.5$.

The cyclist's average speed when there is no wind is approximately 8.5 km/h.

PTS: 0

DIF: Difficult

REF: 7.6 Applications of Rational Equations

LOC: 11.AN6

TOP: Algebra and Number

KEY: Procedural Knowledge | Communication | Problem-Solving Skills