

Precalculus Summer Review Answers

Topic 1: Basic Review

A. Chose the numbers from the following set which belong in each category: $\left\{-2, 0, 1, 2, \frac{13}{12}, 6, 7, \sqrt{5}, \sqrt{-7}, \pi\right\}$

1. $\{1, 2, 6, 7\}$

2. $\{0, 1, 2, 6, 7\}$

3. $\{-2, 0, 1, 2, 6, 7, \pi\}$

4. $\left\{-2, 0, 1, 2, \frac{13}{12}, 6, 7\right\}$

5. $\{\sqrt{5}, \pi\}$

6. $\{\sqrt{-7}\}$

B. Name the Property that justifies each statement.

7. Transitive Property of Equality

8. Distributive Property

9. Commutative Property of Addition

10. Associative Property of Multiplication

C. Perform the indicated operations and simplify whenever possible:

11. -4

12. -3

13. $-\frac{169}{72}$

14. $-\frac{2}{3}$

15. 4.9×10^{-6}

16. 932,000,000

17. Trinomial

18. Degree 7

19. $P(-2) = 18$

20. -5

Topic 2: Polynomials

A. Perform the indicated operations and simplify.

1. $3x^2 - 3$

2. $2x^{2n} + 3x^n - 2$

3. $x^3 - 5x^2 - 11x + 15$

4. $x + 4$

B. Factor each polynomial completely.

5. $3a(2a-5)$

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

7. $x^n(x^n - 1)$

8. $(x+12)(x-11)$

9. $(2x+1)(x+3)$

10. $(7x+2)^2$

11. $(x-3)(x^2 + 3x + 9)$

12. $(a-2b)(a^2 - ab + b^2)$

13. $(x^2 - 2)(y-3)$

14. $(a^{n+1} - 3a)^2$ or $a^2(a^n - 3)^2$

Topic 3: Algebraic Fractions**A. Reduce the following:**

1. $1-4y$

2. $-\frac{a}{2}$

3. $\frac{x+4}{x+3}$

4. $\frac{x+y}{x-y}$

B. Divide by using long division .

5. $5x+7 + \frac{2}{(2x-1)}$

6. $3x^2 + 1 + \frac{1}{2x^2 - 5}$

C. Divide by using synthetic division.

7. $x^3 - x^2 + x - 1$

8. $2x^2 - 3x + 9$

D. Multiply or Divide:

9. $\frac{x}{2}$

10. $x+y$

11. $\frac{-(x+5)}{(x-2)}$ or $\frac{-x-5}{x-2}$

12. $\frac{2x-3y}{4y^2}$

E. Add or Subtract:

13. $\frac{-13}{2xy}$

14. $\frac{1}{x-1}$

15. $\frac{2x+9}{20x}$

16. $\frac{x-2}{x-3}$

F. Simplify the complex fractions.

17. $\frac{x}{x-1}$

18. $\frac{4}{5}$

Topic 4: Exponents and Radicals

A: Find the value or simplify:

1. 8

2. -16

3. 1

4. 8

5. 4

6. 2

7. -5

8. 5

9. .2

10. $\frac{1}{2}$

11. $\frac{4}{3}$

12. $3a^2$

B. Use the rules for exponents to simplify:

13. -54

14. x^6

15. 2^{2x+1}

16. $\frac{x}{3}$

17. a^{x^2-9}

18. a^4b^4

19. $81x^8y^{12}$

20. $256x^8$

21. $-6x^5y^5z^4$

22. 1

23. $2x$

24. $x^2yz^2\sqrt{yz}$

25. $a^5b^2\sqrt[3]{ab^2}$

26. $-5y\sqrt[3]{x^2y}$

C. Simplify – rationalize all denominators

27. $4\sqrt{x}$

28. $\frac{\sqrt{2x}}{2x}$

29. $\frac{\sqrt{2y}}{2}$

30. $\frac{10+5\sqrt{7}}{-3}$ or $\frac{-10-5\sqrt{7}}{3}$

31. $\frac{5\sqrt[3]{9y^2}}{3y}$

32. $\frac{\sqrt{15x}}{5x}$

33. $\frac{3\sqrt{2}}{2}$

34. $-7-4\sqrt{3}$

D. Write as a radical:

35. $\sqrt{3}$

36. $\sqrt[3]{4^2} = \sqrt[3]{16} = 2\sqrt[3]{2}$

37. $\sqrt{x^3} = x\sqrt{x}$

38. $2\sqrt{x}$

E. Write with a fractional exponent:

39. $5^{\frac{1}{2}}$

40. $a^{\frac{1}{3}}$

Topic 5: Linear Equations and Inequalities

A. Solve each linear equation.

1. $x = -\frac{1}{3}$

2. $x = \frac{15}{4}$

3. $y = -1$

4. $x = 6$

5. $x = 0$

6. $x = \frac{5}{3}$

7. $x = 4$

8. $a = \frac{2S - nl}{n}$

9. $h = \frac{2A}{b_1 + b_2}$

10. The numbers are 29, 30, 31

11. The original length is 12 cm and the width is 7 cm.
12. The rate of the boat in still water is 4 mph.
13. If the second pump works alone it will take 12 hour to fill the tank.

B: Solve by substitution or addition method.

14. $\left(8, -\frac{1}{2}\right)$

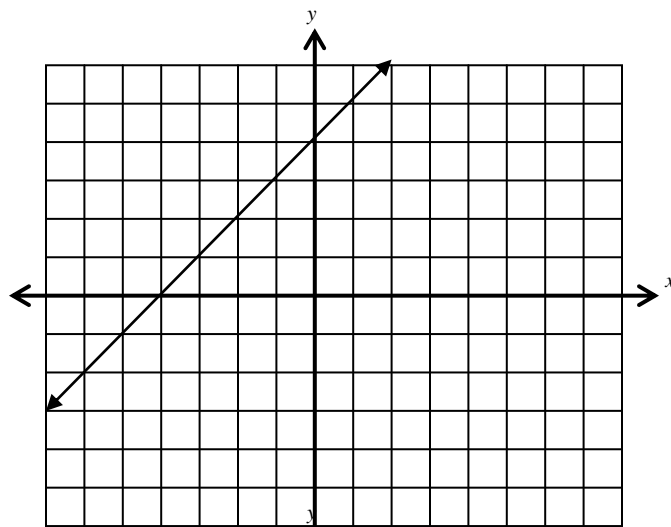
15. $(-4, -9)$

16. no solution

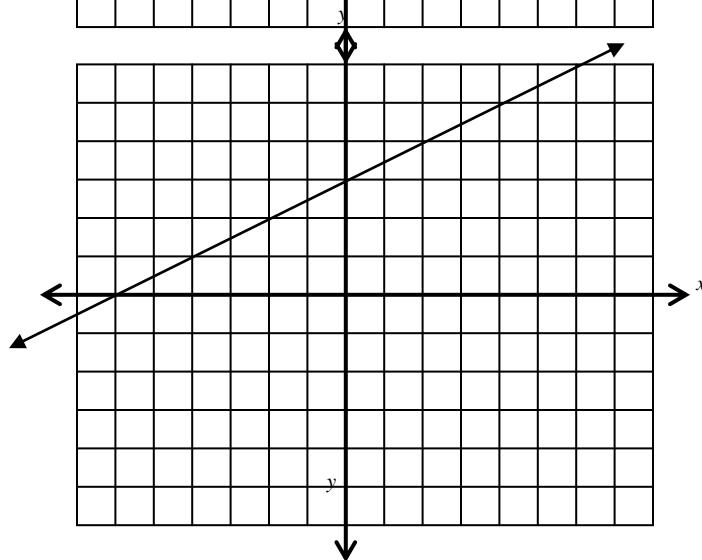
17. all solutions such that $y = 2x - 3$

C. Graph.

18. $y - x = 4$



19. $y = \frac{1}{2}x + 3$



D. Find the equation that satisfies the following conditions:

20. $y = -\frac{5}{2}x + \frac{13}{2}$ or $5x + 2y = -13$

21. $y = -x + 8$ or $x + y = 8$

22. $y = \frac{2}{3}x - 5$ or $2x - 3y = 15$

23. $y = -1$

24. $y = -2$

25. $y = -3x - 3$ or $3x + y = -3$

26. $y = \frac{1}{3}x + \frac{11}{3}$ or $x - 3y = -11$

E. Solve the Linear Inequality for x and graph the solution set on a number line:

27. $x \leq \frac{5}{2}$

28. $x < -4$

Topic 6: Absolute Value Equations and Inequalities

A. Solve each Absolute Value Equation.

B.

1. $x = 1$ or $x = -5$

2. $x = 4$ or $x = 12$

C. Solve each Absolute Value Inequality

3. $x < 1 \cup x > 3$

4. $x \leq 1 \cup x \geq 5$

5. No solution

6. $x < -\frac{14}{5}$ or $x > 2$

Topic 7: Quadratic Equations

A. Solve each Quadratic Equation by factoring.

1. $x = 0$ or $x = -6$

2. $x = 1$ or $x = -6$

3. $x = 1$ or $x = -5$

4. $x = 1$ or $x = -6$

B. Solve each Quadratic Equation by using the Quadratic Formula.

5. $x = \frac{2}{3}$ or $x = -\frac{3}{2}$

6. $x = \frac{-5 \pm \sqrt{7}}{3}$

7. $x = 2 \pm \sqrt{2}$

Topic 8: Imaginary and Complex Numbers

A. Simplify:

1. $3i$

2. $6i\sqrt{2}$

3. $4 + 2i$

4. $2\sqrt{15} - 4i\sqrt{3}$

B. Addition and Subtraction:

5. $8 - i$

6. $-8 + 4i$

7. $6 - 6i$

8. $-6 + i$

C. Multiply:

9. 63

10. $3\sqrt{2} + 6i$

11. $-10i$

12. 1

D. Divide:

13. -3

14. $\frac{3+2i}{4}$

15. $-1+4i$

16. $\frac{-2+i\sqrt{6}}{10}$

Topic 9: Solving equations with Irrational and Complex Solutions

A. Solve the equations containing Radical Expressions.

1. $x = 9$

2. $x = 17$

3. $x = 45$

4. $x = -1$

B. Solve the Quadratic Equations with Radical or Complex solutions.

5. $y = 1 \pm 2i$

6. $x = 3 \pm i$

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

8. $x = 1$ or $x = -\frac{4}{3}$