

Precalculus Accelerated Summer Review Packet

1. Identify which of the following numbers are rational numbers.

$$3, -\frac{1}{4}, -3, 6\pi, 9, 0.3, \sqrt{7}, -\frac{1}{5}$$

[A] $\sqrt{7}, 9, -\frac{1}{5}, 3$ [B] $-\frac{1}{4}, 0.3, -\frac{1}{5}, 3, -3, 9$ [C] $3, \sqrt{7}$ [D] $6\pi, 9$

2. Write the rational number as the ratio of two integers. [A] $\frac{42}{5}$ [B] $\frac{42}{25}$ [C] $\frac{28}{33}$ [D] $\frac{21}{25}$
 0.84

3. Identify the numbers that are *not* integers.

$$21, \sqrt{2}, 2.24, 0, -5.4444, \frac{2}{9}, -5$$

4. Simplify the expression. [A] $9x$ [B] $\frac{16x^{12}}{9}$ [C] $16x^{12}$ [D] $\frac{9}{16x^{12}}$
 $\left(\frac{3x^{-3}}{4x^3}\right)^{-2}$

5. Evaluate each expression.

(a) $\frac{1}{2^{-5}}$ (b) $(-8)^{-2}$ (c) $\sqrt[3]{-8}$ (d) 2^0

6. Simplify the expression.

$$\frac{(7^4 x^{-2} y)^{-1}}{(7^5 x^4 y^3)^{-4}}$$

7. Find the product written in scientific notation.

$$(3.5 \times 10^{-4})(9.9 \times 10^1)$$

[A] 13.4×10^{-2} [B] 13.4×10^{-3} [C] 3.465×10^{-2} [D] 3.465×10^{-1}

Simplify the expression.

8. $7\sqrt{3} - 3\sqrt{36} - 2\sqrt{27}$ [A] $\sqrt{3} - 18 - 2\sqrt{27}$ [B] $2\sqrt{66}$ [C] $-17\sqrt{3}$ [D] $\sqrt{3} - 18$

9. $-\sqrt{3} - 2\sqrt{25} + 7\sqrt{27}$

10. Rationalize the denominator of the expression. Then simplify the answer.

$$\frac{4}{7-\sqrt{3}}$$

[A] $\frac{4}{13}$

[B] $\frac{14+2\sqrt{3}}{23}$

[C] $\frac{28+\sqrt{3}}{46}$

[D] $\frac{4\sqrt{3}}{7\sqrt{3}-3}$

11. Rationalize the numerator of the expression. Then simplify the answer.

$$\frac{5-\sqrt{7}}{7}$$

[A] $\frac{18}{35+7\sqrt{7}}$

[B] $\frac{5\sqrt{7}-7}{7\sqrt{7}}$

[C] $\frac{32}{49}$

[D] $\frac{18}{35+\sqrt{7}}$

12. Rationalize the denominator of the expression. Then simplify the answer.

$$\frac{\sqrt{x}}{\sqrt{x}-\sqrt{2}}$$

13. Perform the operation and simplify.

$$x^{-1/5} \cdot x^{-5/7}$$

[A] $\frac{1}{x^{1/7}}$

[B] $x^{32/35}$

[C] $\frac{1}{x^{32/35}}$

[D] $x^{1/7}$

14. Write the expression as a single radical. Then simplify your answer.

$$\sqrt[3]{\sqrt{6x}}$$

[A] $\sqrt{6x^6}$

[B] $\sqrt[3]{6x}$

[C] $\sqrt[9]{6x}$

[D] $\sqrt{7x^6}$

Perform the operations and identify the result written in standard form.

15. $2z^2(4z^3 + 5z^2 + 4z - 1)$

[A] $6z^5 + 7z^4 + 6z^3 + z^2$

[B] $8z^6 + 10z^4 + 6z^2$

[C] $8z^5 + 2z^4 + 4z^3 - z^2$

[D] $8z^5 + 10z^4 + 8z^3 - 2z^2$

16. $5x(x+4) + (x+3)(x-4)$

Multiply or find the special product.

17. $(5x - y^3)^3$

[A] $-x^3 + 15x^2y^3 - 30xy^6 - 3y^9$

[B] $125x^3 - 25x^2y^3 + 5xy^6 - y^9$

[C] $125x^3 - 75x^2y^3 + 15xy^6 - y^9$

[D] $125x^3 - y^9$

Multiply or find the special product.

18. $[(x+7)+4][(x+7)-4]$

19. Factor out the common factor.

$$4x(x+3) + (x+3)$$

Completely factor the expression.

20. $-6x^4 + 150x^2$

21. $x^3 - 125$

Factor the trinomial.

22. $(d+e)z^2 - 12z(d+e) + 32(d+e)$

[A] $(d+e)(z+4)(z+8)$ [B] $(d+e)(z-4)(z-8)$ [C] $(z-4)(z-8)$ [D] $-(d+e)(z^2 + 12z + 32)$

23. $-8x^2 + 8x + 30$

Factor by grouping.

24. $2x^6 + 9x^5 - 6x - 27$

[A] $(x^5 - 3)(2x + 9)$ [B] $(x^4 - 3)(2x - 9)$ [C] $(x^4 - 3)(2x + 9)$ [D] $(x^5 - 3)(2x - 9)$

25. $3x^4 + 8x^3 - 15x - 40$

Find the domain of the expression.

26. $\frac{7}{12+x}$

[A] All real numbers x such that $x \neq -12$

[B] All real numbers x such that $x \neq 0$

[C] All real numbers x such that $x \neq 12$

[D] All real numbers x such that $x \neq 7$

Find the domain of the expression.

27. $\frac{x^2 - 3x - 28}{x^2 - 6x - 27}$

28. Write the rational expression in simplest form.

$$\frac{x^2 - 7x + 6}{x^2 - 9x + 18}$$

29. Find the domain of the expression.

$$\sqrt{x - 36}$$

Perform the operation(s) and simplify.

30. $\frac{x-5}{x^2-36} - \frac{x-7}{x^2-x-42}$

31. $\frac{2x^2+9x-5}{2x^2+x-1} \div \frac{x^2+7x+10}{-5x^2-15x-10}$

Simplify the complex fraction.

32.
$$\frac{\frac{2}{x^2+4x+3} + \frac{1}{x^2-x-2}}{\frac{3}{x^2+x-6} + \frac{1}{x^2+8x+7}}$$

[A] $\frac{4x^2+25x+15}{(x+7)(3x-1)}$

[B] $\frac{4x^2-3x+2}{3(2x-1)(x+4)}$

[C] $\frac{3(2x-1)(x+4)}{4x^2-3x+2}$

[D] $\frac{(x+7)(3x-1)}{4x^2+25x+15}$

33.
$$\frac{(49-x^2)^{1/2} + 9x^2(49-x^2)^{-1/2}}{49-x^2}$$

[A] $\frac{49+8x^2}{(49-x^2)^{3/2}}$

[B] $\frac{49+11x^2}{(49-x^2)^{3/2}}$

[C] $\frac{58x^2}{(49-x^2)^{3/2}}$

[D] None of these

Simplify the complex fraction.

$$34. \frac{\frac{x^2 + 8x + 16}{-6x}}{\frac{x + 4}{-2x}}$$

$$35. \frac{\frac{1}{2x} - \frac{3}{2x}}{\frac{4}{x} - \frac{3}{4x}}$$

36. Determine whether the equation is a conditional or an identity.

$$x^2 - 8x + 9 = (x - 3)^2 - 6$$

37. Solve the equation by extracting square roots.

$$(5x - 5)^2 = 16$$

38. Use the quadratic formula to solve the equation.

$$5x^2 - 14x + 5 = 0$$

Find all real solutions of the equation. Check your solutions in the original equation.

$$39. 30x^4 - 40x^2 + 10 = 0 \quad [\text{A}] \pm\sqrt{\frac{2}{5}}, \pm\sqrt{\frac{5}{6}} \quad [\text{B}] \pm 1, \pm 2 \quad [\text{C}] \pm\sqrt{\frac{1}{3}}, \pm\sqrt{\frac{5}{6}} \quad [\text{D}] \pm\sqrt{\frac{1}{3}}, \pm 1$$

$$40. 343x^3 + 64 = 0$$

$$41. (x - 3)^{4/3} = 81 \quad [\text{A}] 30 \quad [\text{B}] -24 \quad [\text{C}] 30 \text{ or } 24 \quad [\text{D}] -24 \text{ or } 30$$

$$42. \sqrt{x+2} + 5 = -6 \quad [\text{A}] 119 \quad [\text{B}] -3 \quad [\text{C}] 13 \quad [\text{D}] \text{ no solution}$$

$$43. 6x(x+18)^{1/2} + 6(x+18)^{3/2} = 0$$

$$44. \sqrt{4x+3} = \sqrt{3x+4}$$

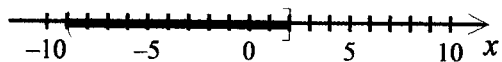
Find all real solutions of the equation. Check your solutions in the original equation.

45. $|x^2 - 5| = 3x + 5$ [A] $-2, 6$ [B] $0, 4$ [C] $0, 5$ [D] $-9, 1$

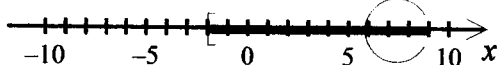
46. $|x - 6| = x^2 - 6$

47. Which is the graph of the inequality? $-2 < x \leq 9$

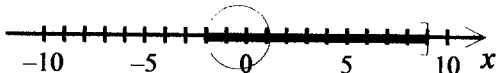
[A]



[B]



[C]



[D]



Solve the inequality.

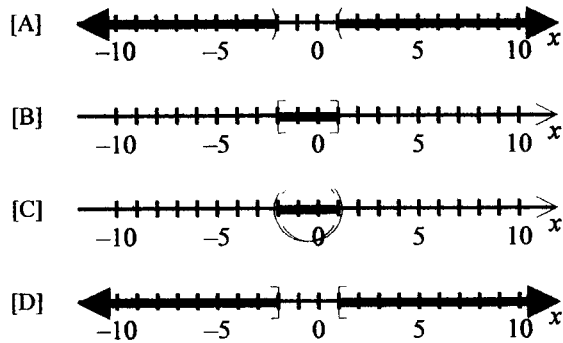
48. $-8 \leq -2x + 6 \leq 6$ [A] $0 \leq x \leq 7$ [B] $7 \leq x \leq 0$ [C] $-2 \leq x \leq 12$ [D] $12 \leq x \leq -2$

49. $-9 < \frac{3-2x}{3} < 5$

50. $2x - 3x + 17 > 4x - (12 - 4x)$

51. Which is the graph of the solution for the inequality?

$$|4x + 2| < 6$$



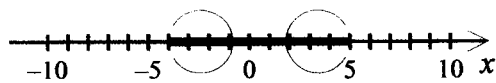
52. Graph the solution for the inequality.

$$|4x - 2| \leq 6$$

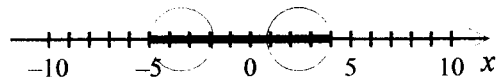
53. Solve the inequality and graph the solution on the real number line.

$$x^2 - x > 20$$

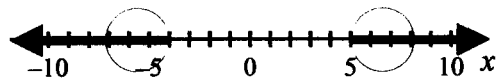
[A] $-4 < x < 5$



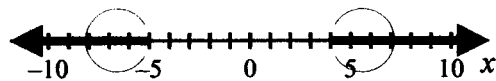
[B] $-5 < x < 4$



[C] $x < -4, x > 5$



[D] $x < -5, x > 4$



54. Solve the inequality.

$$\frac{x+1}{x-4} \leq 0$$

Determine the quadrant in which (x, y) is located so that the conditions are satisfied.

55. $x < 0$ and $y = 8$ [A] Quadrant I [B] Quadrant II [C] Quadrant III [D] Quadrant IV

56. $x = 9$ and $y < 0$ [A] Quadrant I [B] Quadrant II [C] Quadrant III [D] Quadrant IV

57. Find the distance between the points.
 $(-7, -4)$ and $(8, -4)$

58. Verify that the triangle with vertices $A(-4, 0)$, $B(0, 0)$, and $C(-2, -3)$ is an isosceles triangle.

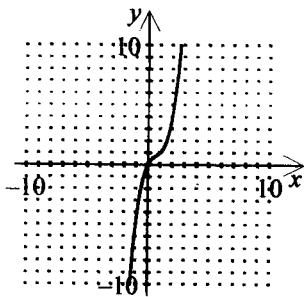
59. $M(5, 5)$ is the midpoint of \overline{RS} . If S has coordinates $(10, 7)$, find the coordinates of R .

60. Kellyn made a sketch of a circular pool on a graph grid. On the graph the diameter of the pool has endpoints at $(-7, -1)$ and $(-1, -6)$. What are the coordinates of the center of the pool?

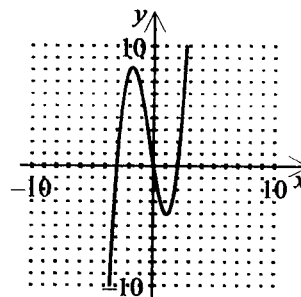
61. Match the equation with its graph.

$$y = x^3 + x^2 - 6x$$

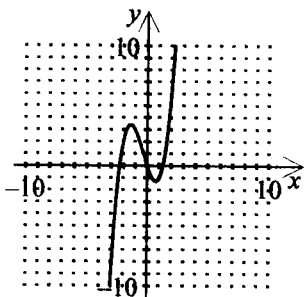
[A]



[B]



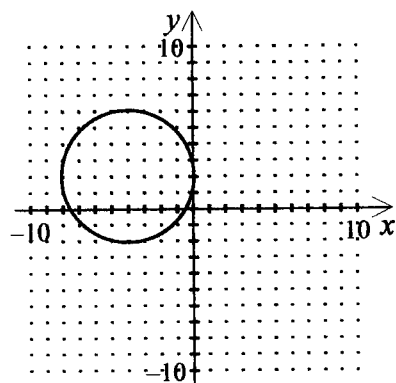
[C]



[D] None of these

62. Sketch the graph of $y = |x| - 3$

63. Which equation does this graph represent?



[A] $(x+4)^2 + (y-2)^2 = 16$

[B] $(x-4)^2 + (y+2)^2 = 4$

[C] $(x+2)^2 + (y+4)^2 = 4$

[D] $(x+4)^2 + (y+2)^2 = 16$

64. Find the center and radius of the circle with the given equation.

$$(x-8)^2 + (y-9)^2 = 4$$

[A] $(9, -8); 2$

[B] $(9, 8); 4$

[C] $(8, 9); 2$

[D] $(-8, -9); 2$

65. Find the equation in standard form of the circle where $C(2, 6)$ and $D(-8, 6)$ are endpoints of a diameter.

66. Find the slope of the line passing through the pair of points.

$$(7, 3), (-2, 1)$$

67. Find the slope-intercept form of the equation of the line that passes through the point $(9, 3)$ and is perpendicular to the line $-7x + 4y = 2$.

68. Determine whether the lines L_1 and L_2 passing through the pair of points are parallel, perpendicular, or neither.

$$L_1: (2, 7), (3, 10)$$

$$L_2: (-8, 10), (-11, 11)$$

69. Determine which set of ordered pairs (x, y) represents y as a function of x .

[A] $\{(-6, -9), (-9, -6), (6, 6)\}$

[B] $\{(-6, -9), (-3, 6), (-3, -6), (6, -3)\}$

[C] $\{(-6, -9), (-9, -3), (-6, 6)\}$

[D] $\{-6, -9, -3, 6\}$

70. Solve the system by elimination.

$$\begin{cases} 4x - y = -5 \\ 3x + 4y = 4 \end{cases}$$

71. Determine the dimensions of the matrix.

$$\begin{bmatrix} -16 & 12 & 5 & 13 \\ -19 & 4 & -9 & 8 \\ 15 & -6 & -1 & -7 \end{bmatrix}$$

72. Find x and y .

$$\begin{bmatrix} 9 & -4 \\ 4 & x \end{bmatrix} = \begin{bmatrix} 9 & -4 \\ y & 8 \end{bmatrix}$$

Evaluate the expression.

73. $A - B$

$$A = \begin{bmatrix} -3 & -6 & 9 \\ -4 & 6 & 4 \\ 3 & 8 & -8 \end{bmatrix}, \quad B = \begin{bmatrix} 5 & 0 & 1 \\ 7 & 8 & -8 \\ 9 & -1 & 6 \end{bmatrix}$$

74. $2A$

$$A = \begin{bmatrix} -1 & 6 & 4 \\ 1 & 3 & -5 \\ 9 & -6 & 2 \end{bmatrix}$$

Find the product, if possible.

75. BA , if $A = \begin{bmatrix} 9 & 0 & 7 \\ 3 & 5 & -6 \end{bmatrix}$, $B = \begin{bmatrix} -3 \\ 6 \\ 5 \end{bmatrix}$ [A] $\begin{bmatrix} 8 & -9 \end{bmatrix}$ [B] $\begin{bmatrix} 8 \\ -9 \end{bmatrix}$ [C] $\begin{bmatrix} -9 \\ 8 \end{bmatrix}$ [D] Not possible

76. BA , if $A = \begin{bmatrix} 4 & 2 \\ 10 & -4 \end{bmatrix}$, $B = \begin{bmatrix} 6 & 4 \\ 2 & -4 \end{bmatrix}$

77. Find the standard form of the equation of the specified ellipse.
Center: $(-4, 9)$; Vertex: $(2, 9)$; Minor axis of length 6

78. Find the length of the major axis of the ellipse.

$$\frac{x^2}{64} + \frac{y^2}{16} = 1$$

79. Find the center and the length of the minor axis of the ellipse.

$$\frac{(x+6)^2}{64} + \frac{(y+1)^2}{16} = 1$$

80. Find the standard form of the equation of the specified hyperbola.

$$16x^2 + 192x - 81y^2 + 324y - 1044 = 0$$