

CP Pre-Calculus Chapter 1 Prerequisite Skills Review

The following problems are aligned to concepts that you should have mastered in MATH I, MATH II and MATH III. Please practice the sections that you need to review, because these skills are needed to be successful in Chapter 1 of Pre-calculus.

I. ORDER OF OPERATIONS--Use order of operations to simplify each expression. DO NOT USE A CALCULATOR

1. $6^3 \div [5^2 - 3^2 - (-2)^2]$

2. $(6^2 - 3 \cdot 2^2 + 1) \div [(0 + (-5)^2)]$

3. $6(3^2 - 2^2) \div 3 + 4 \div (-4)$

4. $7(3^2 - 1) + 2^4 \cdot 3 \div (-3)2^2$

5. $\frac{[\frac{3}{4} - -\frac{1}{2}](-8)}{\frac{8}{9} \div -4}$

6. $\frac{-20[-12 \div (-\frac{2}{3})]}{-12(-\frac{2}{3})}$

II. SIMPLIFYING EXPRESSIONS--Use distributive property to simplify. DO NOT USE A CALCULATOR

7. $3.4t + 1.6s - (-1.9t - 4.2s)$

8. $2[-7(x + 2y) - x] - 3(x + 2y)5$

9. $-50 - 2[3(1 - f) - 3(-2 + f)]$

10. $5x(3x - 5) + 7x(1 - 5x)$

11. $\frac{1}{3}xy^2(9x^2 - 6xy + y^2)$

12. $2[-7(r + 2s) - r] - 3(s + 2r)$

13. $4[2(-5x + y) - y] - 10(y - 4x)$

14. $-15 - 3[2(g - 7) - 2(1 - g)]$

III. ABSOLUTE VALUE EQUATIONS

15. $|2x + 9| = 30$

16. $8|4x - 3| = 64$

17. $7 + \frac{3}{4}|x - 2| = 9$

18. $\frac{2}{3}\left|\frac{1}{4}x + 7\right| + 9 = 7$

IV. SOLVING INEQUALITIES--Graph to find the solution and write your answer in interval notation.

19. $2(x - 5) - 3(2x - 5) < 5x + 1$

20. $20\left(\frac{1}{5} - \frac{x}{4}\right) \geq -2x$

21. $-\frac{4x + 2}{5} \geq 0.04$

22. $\frac{3x - 3}{5} < \frac{6(x - 1)}{10}$

23. $4m - 5 > 7$ or $4m - 5 < -9$

24. $10 - 2p > 12$ and $7p < 4p + 9$

25. $2 - 5(2y - 3) > 2$ or $3y < 2(y - 8)$

26. $\frac{5}{7}(-1 + x) \leq \frac{45}{21}$ or $-x + \frac{2}{3} \leq -\frac{10}{3}$

27. $14 < 3h + 2 < 2$

28. $\frac{4 - y}{5} - \frac{7 + 3y}{2} \leq -2 - \frac{1 + 11y}{4}$

29. $7 \leq 5 - 2y \leq 13$ and $1 \leq 9 - 4y \leq 13$

30. $-2 < 4 - 3n \leq 6$ or $17 > 5n + 12 > 7$

31. $4 + \frac{t}{3} < 3$ and $\frac{9 + 4t}{3} > -5$

32. $6 \leq 9 - \frac{1}{2}t \leq 10$

33. $5x + 7 > 2x + 4$ or $3x + 3 < 24 - 4x$

34. $x - 7 < 3x - 5 < x + 11$

35. $-11 < 4v - 3 < 5$ or $v - 5 < 7 - 2v \leq 3$

36. $7 - \frac{4d}{5} < \frac{3}{5}$ or $1 - \frac{d}{2} > 4$

V. SOLVING ABSOLUTE INEQUALITIES

37. $-\frac{1}{3}|6 - 4x| + 2 \leq 1$

38. $1 - \left| \frac{1}{4}y + 8 \right| > \frac{3}{4}$

39. $6 + 5|2r - 3| \geq 4$

40. $2 \leq |x - 1| \leq 5$

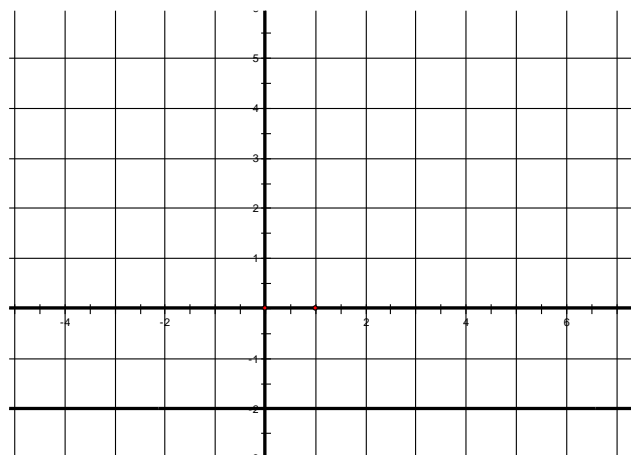
VI. EQUATIONS OF LINES

Find the slope of each line.

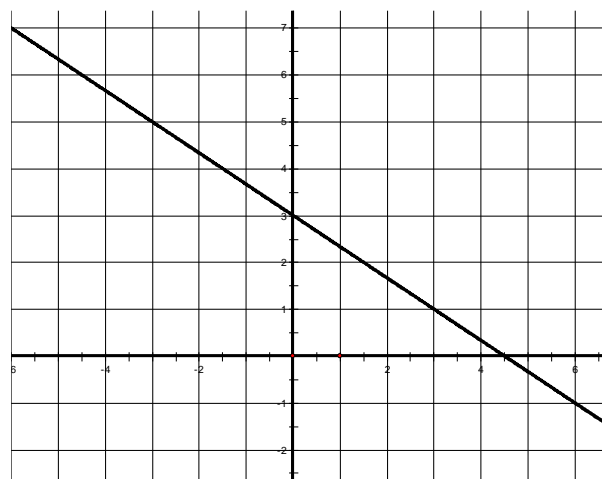
41. $(-3, 6)$ and $(4, -1)$

42. $\left(-\frac{2}{3}, -\frac{5}{4}\right)$ and $\left(-\frac{4}{5}, \frac{1}{2}\right)$

43.



44.



Find the x-intercepts and y-intercepts of each line

45. $4x - 3y = 27$

46. $\frac{3}{2}x - \frac{1}{3}y = 20$

Graph the following lines. Use actual graph paper.

47. $x = -7$

48. $\frac{x-y}{2} = \frac{x+y}{4}$

49. Graph a line through (3, 1.5) that is perpendicular to the graph of $y = 3$.

50. Graph a line through (-4,-2) with an undefined slope.

51. Graph the line perpendicular to the graph of $3x - 2y = 24$ that intersects it at its x-intercept.

52. Graph the line that passes through (-3,-1) and has a slope of .75.

53. Write an equation of a line using point slope given the point $\left(-\frac{1}{2}, \frac{4}{3}\right)$, $m = \frac{1}{5}$ and rewrite in standard form.

54. Write an equation of a line using point slope given the point $(-2, -4)$, $m = 0.4$ and rewrite in standard form.

55. Find an equation in standard form that passes through the points $(-2, 3)$ and $(-2, 6)$.

56. Find an equation in standard form that passes through the origin and has slope 0.

57. Find an equation in standard form that has a y-intercept of 6 and is parallel to the x-axis.

58. Find an equation in standard form that has an x-intercept of -4 and is perpendicular to the x-axis.

59. Find an equation in standard form that passes through (1,2) and perpendicular to $y - 2x = 3$.

VII. QUADRATIC EQUATIONS

Solve the following quadratic equations.

60. $8x^2 - 55x + 56 = 8 + x$

61. $8x^2 + 95x + 280 = -x$

62. $-6k = -9 - k^2$

63. $6a^2 - 66a + 98 = -3a - a^2$

64. $b^2 + 7b - 20 = 0$

65. $-x^2 + 13x = 35$

66. $x^2 + 5xy = 0$

66. $x^2 + 8xy + 12y^2 = 0$

67. $36x^2 - 150x = -126$

68. $10x^4 - 27x^3 + 18x^2 = 0$

69. $6n^2 - 11n - 72 = 0$

70. $21x^2 - 63x = -24 - 9x$

Multiplying Polynomials:

- | | | |
|--------------------------------|-----------------------------|---|
| 1. a. $(3x+5)(3x-5)$ | b. $(3-7n)(3+7n)$ | c. $\left(\frac{2}{3}x-1\right)\left(\frac{2}{3}x+1\right)$ |
| 2. a. $(5m+4)(3m+2)$ | b. $(3y-8)(2y+3)$ | c. $(8x-5y)(3x-4y)$ |
| 3. a. $(3y-4)^2$ | b. $(2x+5y)^2$ | c. $\left(\frac{1}{2}a-\frac{1}{4}\right)^2$ |
| 4. a. $(2c^2+3d^2)(2c^2-3d^2)$ | b. $(2x^2+3y)(4x^2-8y)$ | c. $\left(4n^2-\frac{1}{5}p^3\right)^2$ |
| 5. a. $(3a-2b)(4a+5b+3)$ | b. $(n^2-4)(3n^2+4n-5)$ | |
| c. $(8x-y-4z)(8x-y-4z)$ | d. $(x^4-3x^2+1)(x^2-2x-2)$ | |

Factoring:

- | | | |
|--------------------------|---------------------------|----------------------|
| 6. $7x^2-12x+5$ | 7. $10a^2+23a+12$ | 8. $125c^3-1$ |
| 9. $9n^2-24n+16$ | 10. $5x^2-28x+5$ | 11. $49-d^2$ |
| 12. $y^4-18y+81$ | 13. $100x^4+30x^2w-10w^2$ | 14. $8a^3-4a^2-40a$ |
| 15. $3y^2+11y+6$ | 16. x^4-3x^2-18 | 17. $5x^2+4xy-12y^2$ |
| 18. $16c^6-40c^2d+25d^2$ | 19. $27+y^3$ | 20. $z^2+6z+9-y^y$ |
| 21. $12n^2-15n-3$ | 22. $2x^2-11x+14$ | 23. $16n^4-81$ |
| 24. $8xy+20x+6y+15$ | 25. $-4ac^2-4ac-a$ | 26. $24a^2b-81a$ |
| 27. $6a^3+20a^2-21a-70$ | 28. $x^2+13xy+36y^2$ | 29. $9x^4-7x^2-16$ |

Solve by factoring:

- | | | |
|----------------------|-------------------|-------------------------|
| 30. $2x^2-10x=0$ | 31. $2c^2-9c+4=0$ | 32. $a^4-29a^2+100=0$ |
| 33. $2b^3-7b^2+6b=0$ | 34. $3y^2=15-4y$ | 35. $(8-n)^2=2(24-n^2)$ |

Solve by completing the square:

- | | | |
|-------------------|------------------|--------------------------------------|
| 36. $b^2+10b+5=0$ | 37. $t^2-5t+2=0$ | 38. $4n^2+7=12n$ |
| 39. $2x^2=5-5x$ | 40. $7x^2=8x-3$ | 41. $\frac{1}{8}y^2-y-\frac{1}{2}=0$ |

Solve by using the quadratic formula:

42. $4x^2 + 7x = 0$

43. $3y^2 + 7y + 3 = 0$

44. $5n^2 = 1 - 2n$

45. $4x^2 = 11 + 4x$

46. $2n^2 = 1 - 5n$

47. $\frac{1}{4}y^2 - \frac{1}{2}y = \frac{3}{8}$

Divide:

48. $\frac{6x^3 - 2x^2 - 2x + 30}{3x + 5}$

49. $\frac{10x^3 - 34x + 4}{2x - 4}$

50. $\frac{2n^4 - 4n^3 + 7n^2 - 12n + 3 + 30}{n^2 + 3}$

51. $\frac{4x^4 + 3x^3 + 13x^2 - 15x + 35}{x^2 - 5}$

52. $\frac{9y^4 + 5y^2 - 12}{3y - 2}$



PreCalculus Chapter 3 Pre-requisite Skills Review

Simplify using exponent rules

1. $-x^{-3}y^2(-x^2y^3)^5$

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

3. $\frac{(m^{-3}n^5)(m^5n)}{mn^2(m^2n^2)^3}$

4. $\frac{\left(x^{\frac{7}{4}}y^{\frac{1}{4}}\right)^{\frac{1}{4}}}{x^{\frac{1}{2}}y^{\frac{1}{2}} \bullet x^{-2}y}$

5. $a^{\frac{1}{2}} \bullet a^{-\frac{3}{2}} \bullet b^3$

Simplify

6. $-7\sqrt{200xy^5}$

7. $\sqrt[5]{-64k^4}$

8. $\sqrt[3]{40x^7}$

9. $(64n^4)^{\frac{3}{2}}$

10. $(1000x^3)^{\frac{1}{3}}$

11. $(x^8)^{\frac{1}{2}}$

12. $(81x^8)^{\frac{3}{4}}$

Solve the radical equations

13. $x-5=\sqrt{3x-5}$

14. $\sqrt{8-x}=\sqrt{3x-8}$

15. $2+\sqrt{3x-5}=\sqrt{3x+3}$

Solve each equation

16. $57=4n^{\frac{2}{3}}-7$

17. $-4\sqrt[3]{b}+2=-10$

18. $(40-x)^{\frac{3}{2}}=64$

Factor

19. $x^2+8xy+12y^2$

20. $3x^2+11x+6$

21. $x^2+6x+9-y^2$

22. $6x^3+20x^2-21x-70$

23. x^4-5x^2-36

24. $(x+2)^2-5(x+2)-36$

You may use a calculator however make sure to show work for every problem.

Factor:

1. $x^3 - x^2$

2. $9x^2 - 1$

3. $x^3 + 1$

4. $5x^2 - 13x - 6$

5. Determine the quadrant(s) in which (x,y) is located so that $(x, -y)$ is in the second quadrant. Explain.

6. Determine the quadrant(s) in which (x, y) is located so that $x < 0$ and $y > 0$. Explain.

7-9 Write an equation of the line that passes through the given point and has the specified slope.

7.	Point (-3, 5)	Slope $m = \frac{1}{4}$	_____
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8.	(10, -6)	$m = \text{undefined}$	_____
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9.	(-2, 6)	$m = 0$	_____
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10. Write an equation of the line that passes through the points $(-2, 2)$ and $(3, -10)$.

11. Write an equation of the line through the point $(3, -2)$ that is....

a) parallel to the line $5x - 4y = 8$

b) perpendicular to the line $5x - 4y = 8$

12. Find the length of each side of the right triangle that has vertices at the points $(4, 5)$, $(0, 2)$, and $(4, 2)$.

Show the work that determines if these lengths satisfy the Pythagorean theorem.

13. Given the points $(-3, -1)$ and $(2, -1)$, find....

a) the distance between the two points

b) the midpoint of the line segment joining the points

Solve the following equations:

14. $\frac{1}{x} + \frac{1}{x+1} = -2$

15. $x^2 - 2x - 1 = 0$

16. $\frac{1}{3}(x-6) = -\frac{2}{5}x + \frac{14}{15}$

17. $\left|2x - \frac{4}{3}\right| = \frac{6}{7}$

18. $\sqrt[3]{x+14} = 2\sqrt[3]{x}$

19. $\frac{2}{t-3} + \frac{2}{t-2} = \frac{10}{t^2 - 5t + 6}$

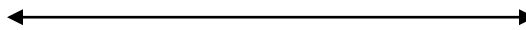
20. $4x^3 + 8x = 12x^2$

Solve each inequality and sketch the solution on the real number line:

21. $x^2 - 2x \geq 3$



22. $-3 < 2(x+4) < 14$



23. $7 - 5x > 24$



24. Find all zeros, real and imaginary by factoring: $f(x) = x^3 - 2x^2 + 4x - 8$

25 – 27. Solve the systems of equation by the method indicated and write your answer as an ordered pair.

25. (by substitution):
$$\begin{aligned} 3x + y &= 1 \\ -2x + y &= -5 \end{aligned}$$

26. (by elimination):
$$\begin{aligned} 5x + y &= 5 \\ 9x - 4y &= -20 \end{aligned}$$

27. (by matrices, show the matrix equation):
$$\begin{aligned} 4x + 5y &= -7 \\ y &= 3 - \frac{1}{3}x \end{aligned}$$

28. Solve by factoring: $24x^2 + 32x - 6 = 0$

29. Solve by the quadratic formula: $0 = 2x^2 + 3x - 1$

30. Solve by completing the square: $x^2 + 6x = 5$

31. Find the rational zeros: $f(x) = x^3 + 3x^2 - 5x - 15$

32. Find the rational zeros: $f(x) = x^4 - \frac{3}{2}x^3 - 7x^2 + 9x + 6$

33. Write the function given the zeros: $-1, 2, 3i$

34-39 Simplify:

34. $\left(\frac{x^{-3}y^2}{z}\right)^{-4}$

35. $\left(\frac{3x^2y^3}{xw^{-2}}\right)^3$

36. $3x^2(2x)^3(5x^{-1})$

37. $(3x^2y^3z)^{-2}(xy^4)$

38. $x^2 \cdot x^3 \cdot x^4$

39. $\left[(a^2)^3\right]^2$

40. Be able to evaluate without a calculator: $\frac{1}{27^{\frac{-1}{3}}}$

41. Be able to evaluate without a calculator: $\left(\frac{1}{64}\right)^{\frac{3}{2}}$

42-45 Simplify the expressions:

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

43. $\frac{x^3+3x^2}{2x} \cdot \frac{5x^3}{x^2+5x+6}$

44. $\frac{3x^3+6x^2}{x+2} \div \frac{x^3+8}{x^2-8x-20}$

45. $\frac{\frac{4}{x}-4}{2+\frac{1}{x}}$