

Math 20: College Algebra Prerequisite Algebra Skills

Section	Topic	Example
1.1	Type of number	Classify the number with as many as apply - natural, integer, rational, or real: $\frac{23}{30}$
	Scientific notation	Write the number in scientific notation: $(9.87 \cdot 10^6)$ $(3.36 \cdot 10^{-19})$
1.2	Arrange numbers numerically	Arrange the numbers from smallest to largest: $\sqrt{15}, 2^{2.3}, \sqrt[3]{69}, \pi^2, 2^\pi, 4.1$
	Plot data set on a number line	Plot the set of data on a number line: $\{840, 87.8, 227, 280, 8402, 196, 306, 165\}$
	Make a scatterplot	Make a scatterplot with the set of data using correctly labeled axes: $\{(10,50), (-35,45), (20,-55), (75,25), (-40,60), (-25,-25)\}$
1.3	Graph a function by hand	Graph the function f by hand then check using a graphing calculator: $f(x) = \frac{1}{2}x^2$
	Express a verbal representation	Express a verbal representation for “to convert g gallons to l liters, multiply g by 3.785”
	Evaluate a function graphically	Use the graph of $f(x) = \sqrt{x+2}$ to estimate $f(2)$.
	Determine the domain and range	Determine the domain and range of $f(x) = \sqrt{x+2}$
1.4	Determine the slope using 2 points	Determine the slope of the line that passes through the points $(-0.5, .9.2)$ and $(-0.3, -7.6)$
1.5	Approximate value of function	Approximate $f(1.9)$ for $f(x) = 1 - \frac{1}{3}x + \frac{1}{6}x^2$
	Determine the vertex of a parabola	Determine the coordinates of the vertex of $f(x) = 1 - \frac{1}{3}x + \frac{1}{6}x^2$
2.1	Solve a linear equation graphically	Use the graph of the function $f(x) = 2x - 5$ to solve for $f(x) = 0$
	Solve an equation graphically using the input-intercept method	Use the input-intercept method to solve the equation graphically: $\frac{6-x}{7} = \frac{2x-3}{3}$
	Solve an equation graphically using the intersection of graphs method	Solve the equation $\frac{6-x}{7} = \frac{2x-3}{3}$ using the graphical method of intersection of graphs.
	Use a table to solve an equation numerically	Create a table of input and output values for the function and solve the function to the nearest tenth: $6x + \frac{3}{4} = \frac{x-5}{9}$
	Solve an equation symbolically	Use a symbolic method to solve the equation $6x + \frac{3}{4} = \frac{x-5}{9}$
2.2	Solve a linear inequality graphically using the input-intercept method	Solve the inequality $\sqrt{2}x > 10.5 - 13.7x$ using the input-intercept method.
	Solve a linear inequality graphically using the intersection of graphs method	Solve the inequality $\sqrt{2}x > 10.5 - 13.7x$ using the intersection of graphs method.
	Solve a linear inequality numerically	Solve the inequality numerically $\sqrt{2}x > 10.5 - 13.7x$
	Express inequality in interval notation	Write the inequality in interval notation: $17 > x \geq -3$
	Solve a linear inequality symbolically	Solve the inequality symbolically: $3x - 1 < 2(x - 3) + 1$
2.3	Write linear equation in point-slope form given two points	Write the linear equation for the line that passes through the points $(4, 5)$ and $(-2, -3)$
	Write a linear equation in point-slope form given a point and the slope	Write the linear equation for the line that passes through the point $(4,5)$ and has slope of -2.4
	Write a linear equation for a line parallel to a given line	Write the equation of the line that is parallel to the line $y = -3x + 7$ and passes through the point $(1, 5)$
	Write a linear equation for a line that is perpendicular to a given line	Write the equation of the line that is perpendicular to the line $y = -3x + 7$ and passes through the point $(1, 5)$

2.4	Evaluate a piece-wise defined function	Evaluate the function at $x = -3$ and at $x = 2$ $f(x) = \begin{cases} 3x - 1 & \text{if } -5 \leq x < 1 \\ 6 - x & \text{if } 1 \leq x < 3 \end{cases}$
	Graph an absolute value function	Graph the function $f(x) = 2x - 4 $
	Solve an absolute value function symbolically.	Solve the function symbolically: $0 = 2x - 4 $. Write the solution in interval notation.
	Solve an absolute value function graphically and write the solution in interval notation	Solve the function graphically and write the solution in interval notation: $ -3x + 8 \geq 3$
2.5	Determine the midpoint of a line segment	Determine the midpoint of the line segment connecting the points (1.5, 2.9) and (-5.7, -3.6)
	Determine the distance between two points in a coordinate plane	Determine the length of the line segment connecting the points (1.5, 2.9) and (-5.7, -3.6)
3.1	Graph a quadratic equation	Graph the equation in a coordinate plane with correctly labeled axes: $f(x) = x^2 - 3x + 4$
	Solve a quadratic equation graphically using the input-intercept method	Solve the equation $x^2 - 3x = 4$ using the input-intercept method
	Solve a quadratic equation graphically using the intersection of graphs method	Solve the equation $2.5x^2 = 4.75x - 2.1$
	Determine the nature of the solutions using the discriminant of a quadratic equation	Determine the nature of the solutions of $2.5x^2 = 4.75x - 2.1$ using the discriminant
	Solve a quadratic equation by completing the square	Solve the equation $2.5x^2 = 4.75x - 2.1$ by completing the square
	Solve a quadratic equation using the quadratic formula	Solve the equation $9x(x - 4) = -36$
	Solve a quadratic inequality	Solve the quadratic inequality using a symbolic method: $2x^2 + 5x \leq -2$
3.4	Divide two polynomials using the division algorithm	Divide the first polynomial by the second using the division algorithm: $(3x^3 - 7x - 10)$ by $(x - 1)$
	Divide two polynomials using synthetic division	Divide the first polynomial by the second using synthetic division: $(3x^3 - 7x - 10)$ by $(x - 1)$
	Write the complete factored form of a quadratic equation given the solutions	Write the complete factored form of the quadratic equation given that its solutions are -2 and 3
3.5	Simplify an expression using the imaginary unit	Simplify the expression $\sqrt{-32}$
	Write an expression in standard complex-number form	Write the expression $(-3 + 2i)(-2 + i)$ in standard complex-number form.
	Divide two complex numbers	Divide as indicated and express answer in standard complex-number form then given an approximate value rounded to four significant digits: $\frac{17 - 135i}{18 + 142i}$
4.1	Combine two functions using arithmetic operations	Combine the two functions f and g as indicated: $f + g$, $f - g$, $f * g$, and f/g : $f(x) = 2x - 3$, $g(x) = x^2 - 4$
	Combine two functions using the composition of functions	Combine the two functions f and g as indicated: $f(g(x))$ and $g(f(x))$ $f(x) = 2x - 3$, $g(x) = x^2 - 4$
	Determine the domain and range of combined functions	Determine the domain and range of f and g for $f + g$: $f(x) = x - \sqrt{1 - x}$ and $g(x) = x^3$
4.2	State the inverse of an action	State the inverse action of "subtract 2 from x and multiply the result by 3".
4.3	Simplify an exponential expression	Simplify the expression without a calculator: $4^{1/6} * 4^{1/3}$
	Solve compound interest problems	Determine the final value of \$600 invested in an account that pays 7% compounded annually for 5 years.

4.4	Write logarithmic expression as an exponential expression	Write as an exponential expression: $\log_3 32$
	Write exponential expression as a logarithm expression	Write as a logarithmic expression: $5^{2x} = 9$
	Solve a logarithmic equation using a graphical method	Solve the equation $4^x = 11$ using a graphical method
	Write a logarithmic expression as one term	Write the expression as one term: $\log \sqrt{2} + \log \sqrt[3]{2}$
4.5	Solve an exponential equation using a logarithmic equation	Solve the equation using a logarithmic equation: $4(1.1^{x-1}) = 16$
	Solve a logarithmic equation using an exponential equation	Solve the equation using an exponential equation: $\log x^5 = 4 + 3 \log x$
5.1	Sketch an angle in standard position	Sketch the angle $-\frac{3\pi}{4}$ in standard position
	Find a complimentary and a supplementary angle	Find a complimentary and a supplementary angle for $\theta = 85^\circ 23' 45''$
	Convert an angle of degrees to radians using proportions	Convert the angle of 23° to radians using proportions
	Convert an angle of radians to degrees using proportions	Convert the angle of 7 radians to degrees using proportions
	Determine the length of an arc using proportions	Determine the length of the arc on an unit circle cut by the angle 151° using proportions
	Determine the area of a sector using proportions	Determine the area of a sector of an unit circle cut by the angle 151° using proportions