Math 1314
Prerequisites

Topic 1: Writing equations of lines

Example 1: Suppose the slope of a line is $\frac{1}{3}$ and the line passes through the point (-3, 7). Write the equation of the line.

Example 2: Write on equation of the line that passes through the points (-1, 6) and (3, -4).

Topic 2: Solving an equation for a given variable

Example 3: Solve for y: $5x + 2y = -9$

Example 4: Solve for y: $-2xy = 13$

Example 5: Solve for r: $\frac{S}{1-r} = 6$

Topic 3: Using interval notation

Example 6: Write using interval notation: $x < -7$

Example 7: Write using interval notation: $x \geq 2.7$

Example 8: Write using interval notation: $3 \leq x < 17$

Topic 4: Finding the domain of a function

Example 9: Find the domain: $f(x) = \frac{2x-7}{3x-2}$

Example 10: Find the domain: $f(x)=\sqrt{x-3}$

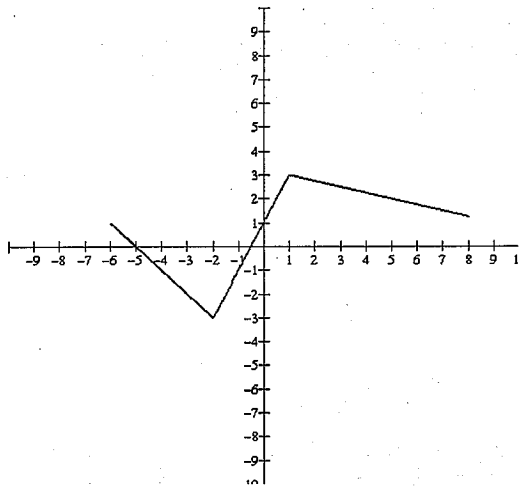
Example 11: Find the domain: $f(x)=\dfrac{\sqrt{x-2}}{x-6}$

Example 12: Find the domain: $f(x)=\sqrt{x^2-4}$

Example 13: Find the domain: $f(x)=\ln(6-x)$

Topic 5: Finding information from a graph

Example 14: Use the graph to find domain, range, $f(5)$ and $f(-4)$.



Topic 6: Multiplying polynomials

Example 15: Simplify: $(4x-3)(2x+5)$

Example 16: Simplify: $\left(x^2-3\right)\left(x^2+5x-2\right)$

Topic 7: Function notation

Suppose $f(x)=3x^2-4x+2$, $g(x)=-2x+3$, $h(x)=-2e^{-5x}$ and $C(x)=-.0001x^3+.005x^2+11.3x+12{,}000$

Example 17: Find $f(-4)$, $(g\circ f)(-1)$, $(f\circ g)(-1)$, $h(.2)$, $C(13{,}500)$, $f(x+h)$, $g(-b)$, and $(f-g)(x)$.

Example 18: Suppose $f(x)=\begin{cases}3x^2+4x-2, & x<-1\\ x+5, & x\geq -1\end{cases}$.

Find $f(-5)$, $f(-1)$ and $f(6)$.

Topic 8: Factoring

Example 19: Factor completely: $ax^3+a^2bx^2+acx^4$

Example 20: Factor completely: $25x^2 - 64y^2$

Example 21: Factor completely: $15x^2 - 14x - 8$

Example 22: Factor completely: $2x^3 + 6x^2 - 56x$

Example 23: Factor completely: $x^3 - 64$

Topic 9: Using the rules of exponents

Example 24: Simplify: $\left(3x^2y^4\right)^3$

Example 25: Simplify: $3e^{3x}(2-5e^{-2x})$

Example 26: Simplify: $\dfrac{4x^2y^{-4}}{(2x^{-3}y^2)^2}$

Example 28: Simplify: $(-8x)^0$

Example 29: Simplify: -12^2

Example 30: Simplify: $\left(\dfrac{125}{64}\right)^{\frac{-2}{3}}$

Example 31: Rewrite using rational exponents: $\sqrt[3]{x^5}$

Example 32: Rewrite using radical notation: $x^{\frac{-7}{3}}$

Topic 10: Simplifying radicals

Example 33: Simplify $\sqrt{50}$.

Example 34: Simplify $\sqrt{45x^3y^4}$.

Topic 11: Exponential functions, logarithmic functions and the number e

Example 35: Sketch $f(x)=5^x$.

Example 36: Sketch $f(x)=e^{-x}$.

Example 37: Evaluate $\log_5 125$.

Example 38: Sketch $f(x) = \log_5 x$

Example 39: Expand using log properties: $\log_2 \frac{x-7}{x+5}$.

Example 40: Expand using log properties: $\log_5 \frac{x^2(x+2)}{(x-3)^3}$

Example 41: Expand using log properties: $\ln\left(7x^8e^{-5x}\right)$

Example 42: Express as a single logarithm: $4\ln 12 - 4\ln 8$

Example 43: Express as a single logarithm: $\frac{1}{2}\log_3 16 - 2\log_3 6$

Example 44: Evaluate each:

$\ln e$

$\ln 1$

Topic 12: Comparing numbers

Example 45: Which is larger, $5e^{-3}$ or $\frac{1}{5e^2}$?

Topic 13: Solving equations

Example 46: Solve for x: $3x-7=-9$

Example 47: Solve for x: $4x^2-9=0$

Example 48: Solve for x: $4xe^{2x}-x^2e^{2x}=0$

Example 49: Solve for x: $x^2 - 5x - 14 = 0$

Example 50: Solve for x: $3x^2 - 10x + 5 = 0$

Example 51: Solve for x: $16^{2x} = \left(\frac{1}{8}\right)^{x-1}$

Example 52: Solve for x: $3^{2x} = 7$

Example 53: Solve for x: $\frac{45}{2 + e^{\sqrt{x}}} = 10$

Example 54: Solve for x: $\log_4(3-5x)=2$

Example 55: Solve for x: $2\ln(x+6)=4\ln 3$

Example 56: Solve for x: $-3\ln x=-5$

Topic 14: Graphing

Example 57: Suppose $f(x)=\dfrac{x^2-6x-16}{x^2-4}$. State domain; find x intercept(s), y intercept, vertical asymptote(s) and horizontal asymptote(s).

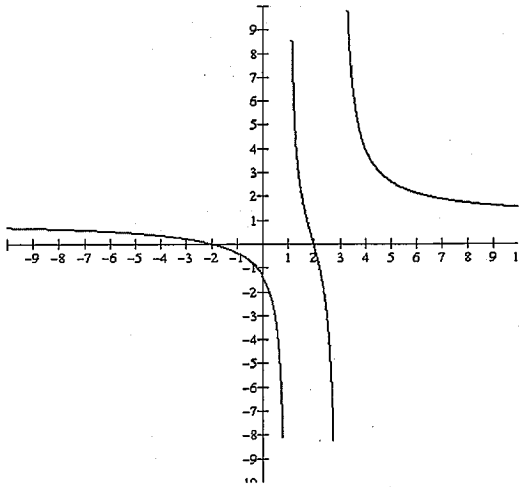
Example 58: What do you know about the graph of $f(x)=x^4-16x^2$?

Example 59: Graph $y=-4x+1$

Example 60: Graph $f(x)=|x|$

Example 61: Graph $f(x)=|x+1|$, $f(x)=|x|-2$, $f(x)=3|x|$, $f(x)=\frac{1}{10}|x|$

Example 62: What do you know about the function whose graph is given? Write a possible function for this graph.



Topic 15: Solving systems of equations

Example 63: Solve the system: $\begin{cases} 3x-2y=11 \\ x+4y=13 \end{cases}$

Example 64: Solve the system: $\begin{cases} 6x = -42 \\ y^2 - y = 20 \end{cases}$

Example 65: Solve the system: $\begin{cases} 4x^2 - 5y = 0 \\ -8x + 5y = 12 \end{cases}$

Topic 16: Simplifying expressions

Example 66: Simplify: $\dfrac{12x^5 - 6x^3 + 8x - 10}{2x}$

Example 67: Simplify: $\dfrac{3e^{2x}(x^2-3)^4-6e^x(x^2-3)^3}{e^x\left(x^2-3\right)^3}$

Example 68: Simplify: $\dfrac{x^{\frac{-3}{2}}(x+2)^2-x^{\frac{1}{2}}(x+2)^3}{x(x+2)}$