

Math 1220 Final Review In Class Worksheet

Graphing

Basic Curves and Transformations

Graph each function

$$f(x) = x^3$$

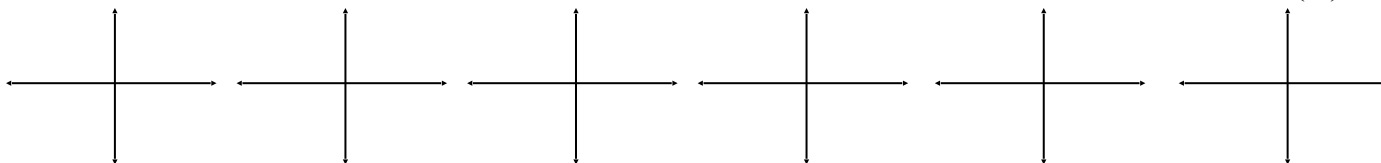
$$f(x) = \sqrt{x}$$

$$f(x) = \frac{1}{x}$$

$$f(x) = e^x$$

$$f(x) = \ln x$$

$$f(x) = \left(\frac{1}{2}\right)^x$$



Graph. Find the domain and all intercepts and asymptotes that exist.

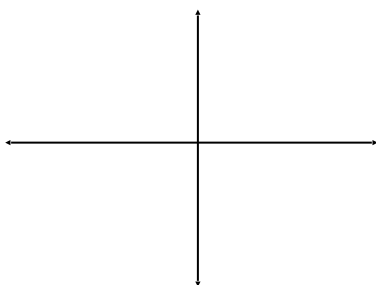
$$f(x) = 1 - \frac{2}{x+3}$$

D: _____

x-int(s): _____

y-int(s): _____

asy(s): _____



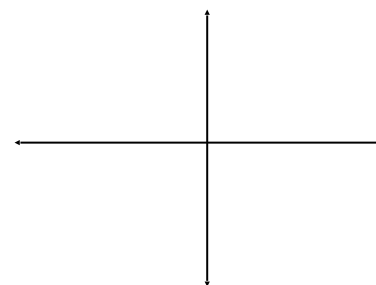
$$f(x) = \sqrt{x+1} - 3$$

D: _____

x-int(s): _____

y-int(s): _____

asy(s): _____



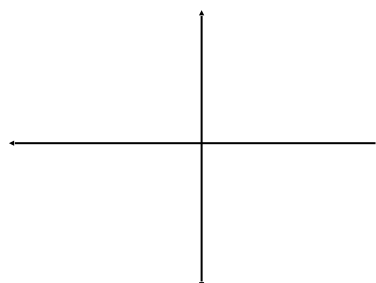
$$f(x) = 1 + \log_2(x+4)$$

D: _____

x-int(s): _____

y-int(s): _____

asy(s): _____



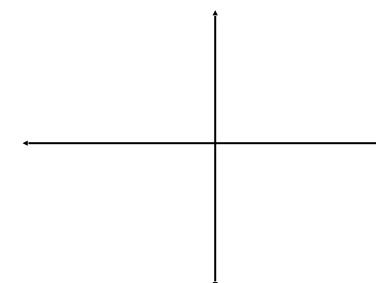
$$f(x) = 3^{x-2} - 1$$

D: _____

x-int(s): _____

y-int(s): _____

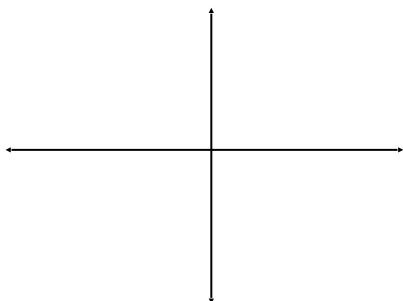
asy(s): _____



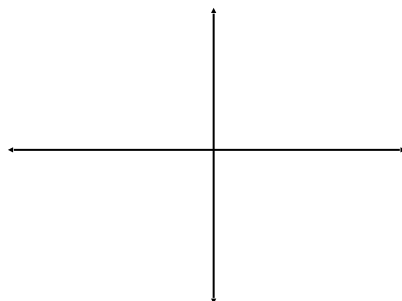
Quadratics and Polynomials

Graph each. Final all intercepts.

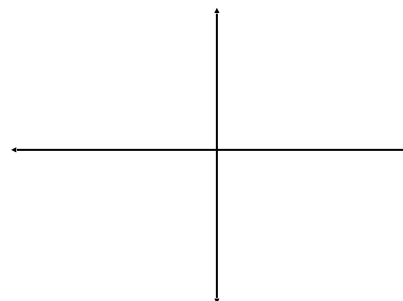
$$f(x) = x^2 + 2x - 8$$



$$f(x) = x^3(x-2)(x+3)^2$$



$$f(x) = x^4 - 2x^3 - 3x^2$$

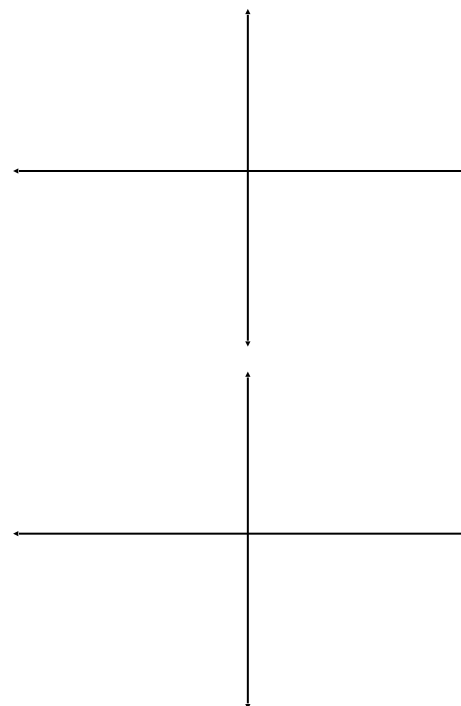


Rationals

Graph each. Final all intercepts and asymptotes that exist.

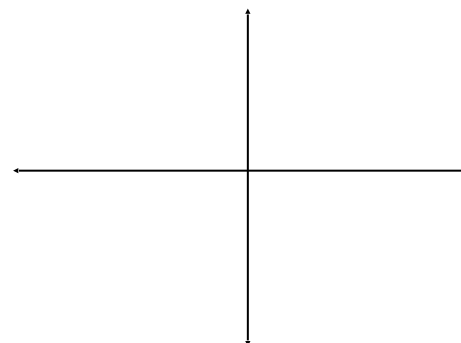
$$f(x) = \frac{3x-1}{3-6x}$$

D: _____	
VA(s) _____	HA(s): _____
x-int(s): _____	y-int(s): _____



$$g(x) = \frac{x-1}{x^2+3x}$$

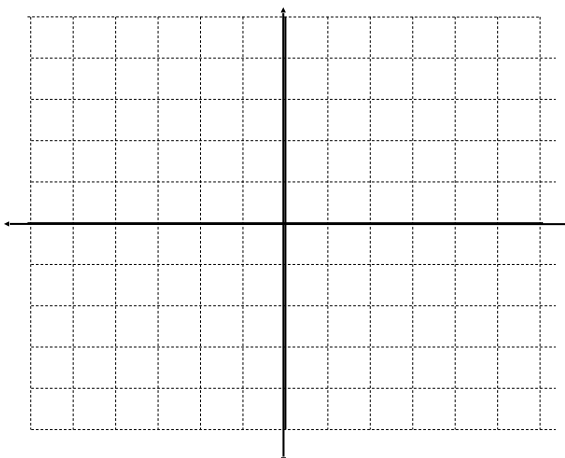
D: _____	
VA(s) _____	HA(s): _____
x-int(s): _____	y-int(s): _____



Piecewise

Graph

$$f(x) = \begin{cases} 4 & x < -1 \\ x^2 & -1 \leq x < 2 \\ 1-x & 2 \leq x \leq 5 \end{cases}$$



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Functions

Domain

(a) $f(x) = 7 \ln(2x - 5) + 3$ (b) $f(x) = \frac{\sqrt{3x-5}}{x-3}$ (c) $f(x) = \frac{x-3}{\sqrt{3x-5}}$ (d) $f(x) = \sqrt{\frac{x+5}{x-3}}$

Difference Quotient and Average Rate of Change

Let $f(x) = \frac{2}{x}$ and $g(x) = x^2 - x + 1$

Find (a) $\frac{f(1+h) - f(1)}{h}$

(b) $\frac{g(2+h) - g(2)}{h}$

Find the Average Rate of Change of the function $f(x) = 1 + 3x^2$ from $x = -3$ to $x = 1$.

Compositions and Inverses

Let $f(x) = \frac{x+1}{x-3}$, $g(x) = \frac{1}{x}$, $h(x) = \log_3(x+1)$. Find

- (a) $(f \circ g)(x)$ and its domain. (b) $f^{-1}(x)$ and its range (c) $h^{-1}(x)$ and its range

Exponentials and Logarithms

Evaluate

- (a) $\log_2 16 =$ _____ (b) $\log_2(10^{3\log 2}) =$ _____ (c) $2e^{3\ln x + \ln 5x} =$ _____
- (b) $2\log_\pi \pi =$ _____ (b) $\log(100^{-1}) =$ _____

Circles and Quadratics

Write the circle $2x^2 + 2y^2 + 16x - 12y + 16 = 0$ in standard form.

Write the quadratic $f(x) = 2x^2 + 16x + 16$ in vertex form.

Find the equation of a parabola with vertex $(-1, 2)$ whose graph goes through the point $P(5, -3)$

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Equations, Inequalities, and Applications

Solving Equations

Solve

(a) $2x^2 + 7x = 4$

(b) $2x^2 + 3x = 4$

(c) $2(x-3)^2 - 6 = 2$

(d) $\frac{2}{x-3} - 1 = 0$

(e) $\sqrt{x-3} + 5 = x$

(g) $4^{x-2} = 8^{3-x}$

(h) $10^{1-x} = 6^x$

(i) $2\ln x + \ln 9 = 4$

(g) $\ln(-x) + \ln(1-x) = \ln(4-x)$

Solving Inequalities

(a) Solve $x^2 < 9x$

Answer using interval notation

(b) Solve $\frac{(x-6)^2}{(x-1)(x+3)} \geq 0$

Answer using set builder notation

(c) Solve for the cat. In words, say where the cat is and draw a picture that represents your words

$$|cat| \leq 5$$

$$|cat| > 15$$

(d) Solve for x

$$|2x - 3| \leq 5$$

$$|2x - 3| > 15$$

Applications

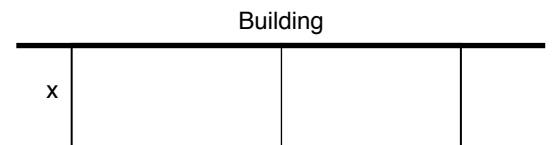
1. A car rental service charges \$100 to rent a car plus 50 cents per mile.

(a) Express the cost $C(x)$ of renting a car from this service as a linear function of x , the number of miles driven.

(b) If the car is driven 200 miles, how much did the rental car cost?

2. A gardener has 120 meters of fencing to enclose two adjacent rectangular growing plots. One side is to be against a building, as shown, and so requires no fencing.

(a) If x represents the width of the plot, express its area $A(x)$ in terms of x .



(b) Determine the dimensions of the rectangle that will make the area a maximum. What is the maximum growing area?