

Honors Precalculus – MA333H

Summer Homework – 2024

Purpose: The purpose of this assignment is to provide you with practice on the concepts you have learned in previous math classes and are expected to know at the start of this class. If you have trouble with any section, please use your previous textbooks or online materials for explanations and additional practice.

Instructions: You are required to show your work on every problem. You are permitted to seek help from a tutor or collaborate with other students, but you are required to write your own solutions to every problem. It is in your best interest to work on this packet during several sessions throughout the summer.

Grading: This packet is due on the first day of class in September and will count as a quiz grade. Your grade will be based primarily on completion and effort, but a selection of problems may be graded for correctness. Although you will not be given a quiz or test on the material covered in this packet at the beginning of the year, your knowledge of these concepts will be essential to your success in Goal 1 and beyond.

Calculator: Students will need a TI-84+ CE calculator for this course. Students will not be able to use a graphing calculator that can download documents from computers such as the TI-Nspire CX or any graphing calculator that says CAS (computer algebra system).

Exponents and Radicals

Simplify each expression.

1) $(4x^3)^2$

2) $(5x^2z^6)^3(5x^2z^6)^{-3}$

3) $\sqrt[3]{\frac{32a^2}{b^3}}$

4) $2\sqrt{50} + 12\sqrt{8}$

5) $7\sqrt{80x} - 2\sqrt{125x}$

6) $\sqrt[6]{(x+1)^4}$

Rationalize the denominator of each expression.

7) $\frac{1}{\sqrt{3}}$

8) $\frac{3}{\sqrt{5} + \sqrt{6}}$

9) $\frac{5}{\sqrt{14} - 2}$

Polynomials

Factor completely.

10) $4x^3 - 6x^2 + 12x$

11) $4 - 36y^2$

12) $9x^2 - 12x + 4$

13) $27x^3 + 64$

14) $x^3 + 5x^2 - 5x - 25$

15) $3x^2 - 5x + 2$

Solve the equation algebraically.

16) $x^2 - 3x + 4 = 0$

17) $3x^2 - 11 = 2x^2 + 2x$

18) $6x^2 + 11x = 10$

Complex Numbers

Simplify and write the number in standard form.

19) $(2 - 9i)(9 - 6i)$

20) $(3 + 10i)^2$

21) $\frac{-5 - 3i}{4i}$

22) $\frac{-7 + 6i}{9 - 4i}$

Rational Expressions

Simplify completely.

23) $\frac{18y^2}{60y^5}$

24) $\frac{2x^2y}{xy - y}$

25) $\frac{x^3 + 5x^2 + 6x}{x^2 - 4}$

Perform the operation and simplify completely.

$$26) \quad \frac{3}{x-1} + \frac{5x}{3x+4}$$

$$27) \quad \frac{t^2 - t - 6}{t^2 + 6t + 9} \cdot \frac{t+3}{t^2 - 4}$$

$$28) \quad \frac{r}{r-1} \div \frac{r^2}{r^2 - 1}$$

$$29) \quad \frac{\frac{1}{2+x} + \frac{2}{x}}{1 - \frac{x}{x+2}}$$

Rational Equations

Solve the equation.

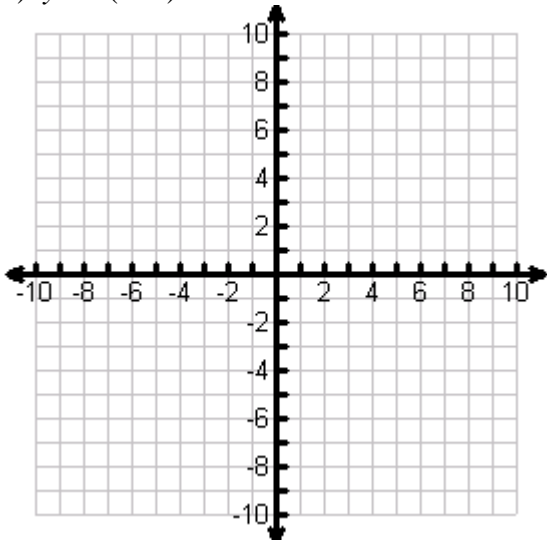
$$30) \quad 3 + \frac{1}{x+2} = 4$$

$$31) \quad \frac{1}{x-2} + \frac{3}{x+3} = \frac{4}{x^2 + x - 6}$$

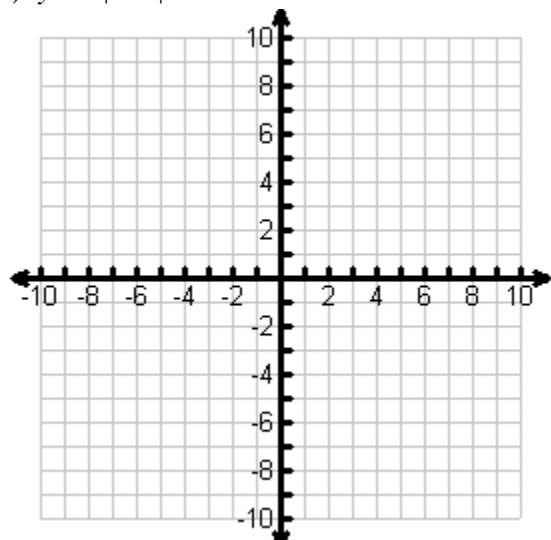
Graphs of Equations

Sketch each graph by hand using transformations. Plot at least three points for each graph. State the domain and range using interval notation.

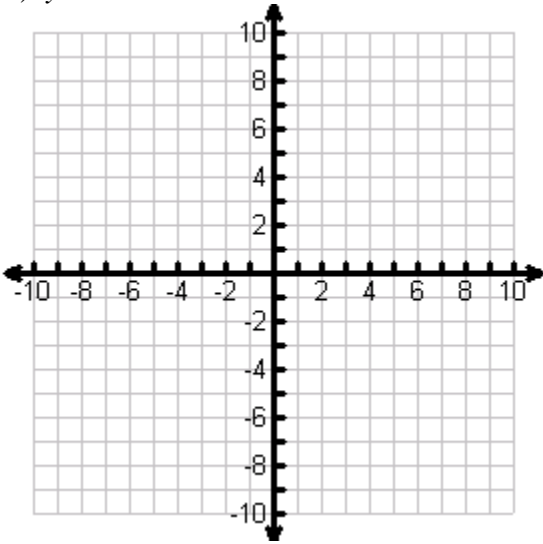
$$32) \quad y = 2(x+1)^2$$



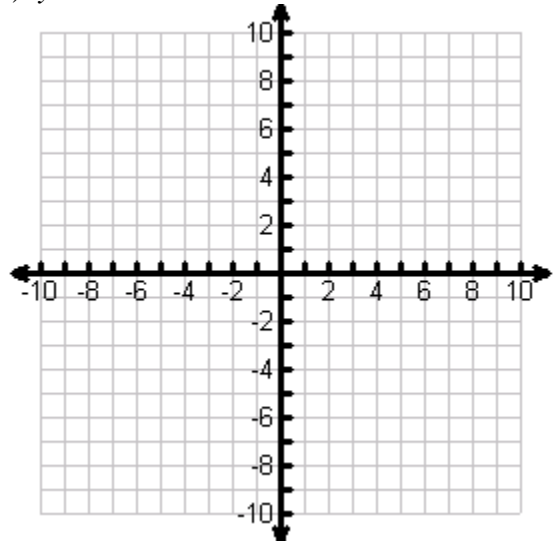
$$33) \quad y = -|x+2| - 1$$



34) $y = 2\sqrt{x+4}$



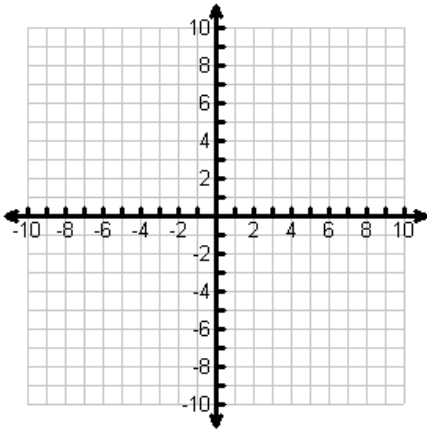
35) $y = -3 \cdot 2^x + 5$



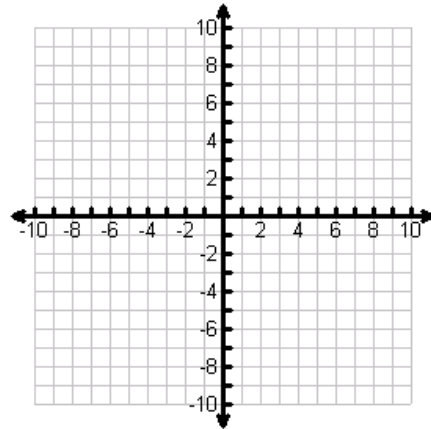
Lines in the Plane

Find the slope and y-intercept of the equation algebraically. Sketch the line by hand.

36) $2x + 3y - 9 = 0$



37) $y - 3 = \frac{2}{5}(x + 4)$



Find the equation of the line in slope-intercept form that passes through the given point and has the indicated slope.

38) $(-3, 6) \quad m = -2$

39) $(2.3, -8.5) \quad m = 0$

Write the equations in slope-intercept form of the lines that pass through the given point and are:
a) parallel to the given line; b) perpendicular to the given line.

40) $(2, 1) \quad 4x - 2y = 3$

a) _____

b) _____

Functions

Evaluate the function at each specified value of x . Simplify.

41) $f(x) = x^2 - 2x$

a) $f(2)$

b) $f(1.5)$

c) $f(x+2)$

State the domain of the function in interval notation.

42) $f(x) = 5x^2 + 2x - 1$

43) $f(x) = \frac{3}{x+4}$

44) $f(x) = \sqrt{2x+5}$

Exponential and Logarithmic Functions

Expand the expression using properties of logarithms.

45) $\log_3 9x$

46) $\log \sqrt{\frac{x+3}{x^5}}$

Solve the equation algebraically.

47) $10^{2x-3} + 4 = 21$

48) $\log_5 (3x+1) = 2$

49) $8^{5x} = 16^{3x+4}$

50) $\log 5x + \log (x-1) = 2$

The Unit Circle

Evaluate without a calculator.

51) $\sin 330^\circ$

52) $\cot \frac{-3\pi}{2}$

53) $\sec 480^\circ$

54) $\cos 180^\circ$

55) $\tan \frac{7\pi}{4}$

56) $\csc \frac{5\pi}{6}$

57) $\cos -3\pi$

58) $\csc 225^\circ$