



NORTH HAVEN HIGH SCHOOL
221 ELM STREET
NORTH HAVEN, CT 06473

PreCalculus Level 2 Summer Assignment 2017

June 2017

Dear Parents, Guardians, and Students:

This packet of material reviews all of the topics that were learned in Algebra 2 that are essential for success in level 2 PreCalculus. This packet will be collected on the first day of class. It is expected that students will complete all of the problems with all work shown (use separate paper if necessary).

A Note About Graphing Calculators

Students will be using graphing calculators in mathematics courses such as Algebra I, Algebra II, Pre-calculus, Calculus, and Statistics. Each teacher has enough graphing calculators for every student to use in class, so students are not required to purchase graphing calculators. However, if a student would like to make the investment to use throughout high school and most likely college, we recommend the TI-84 Plus, which is the calculator used in class. (Please note that the TI-84 Plus CE is not necessary.) There are many sales over the summer so if you wish to purchase one it is a good time to do so. These calculators can be found at Amazon, Walmart, Staples, Target, and other stores that sell school supplies.

The mathematics department thanks you for your support and wishes you and your family a happy and restful summer!

Sincerely,

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PreCalculus Teachers

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Properties of Functions

1) Sketch the graph of the function $f(x) = x^3 + 7x^2 + 3x - 27$.

Identify the following properties: domain, range, intercepts, extrema, increasing, decreasing, Left End Behavior (LEB) and Right End Behavior (REB). Use a graphing calculator or www.desmos.com to help you. Round all answers to the nearest hundredth (if necessary).

Domain:

Range:

y-intercept:

x-intercept(s):

Minimum(s):

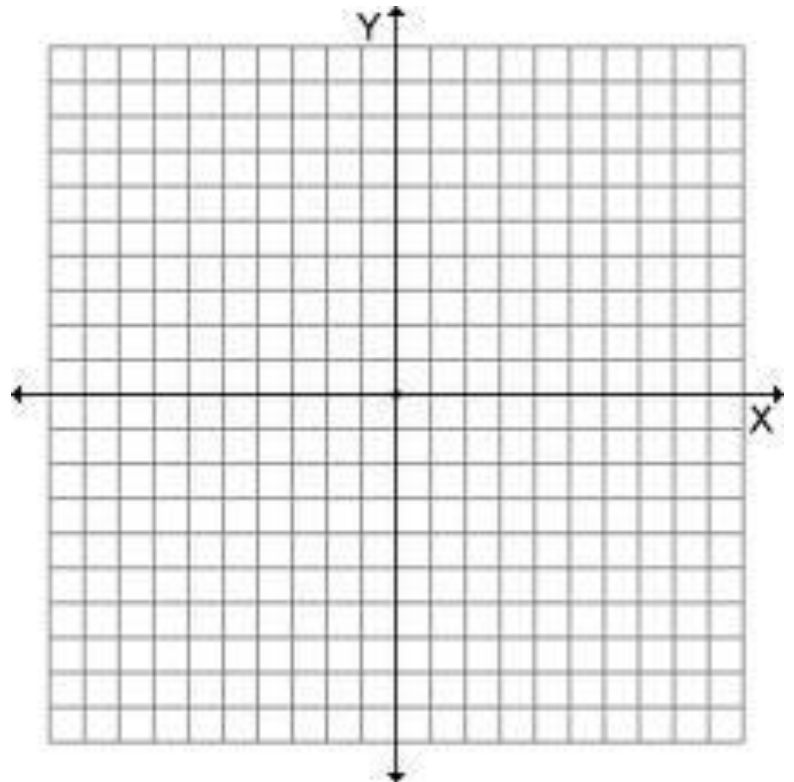
Maximum(s):

Increasing:

Decreasing:

LEB:

REB:



Factoring

2) Factor each polynomial

a) $x^2 + 5x + 6$

b) $x^2 + 5x - 14$

c) $x^2 - x - 12$

d) $x^2 - 9$

e) $4x^2 - 25$

f) $3x^2 + 15x$

Solving Polynomial Equations

Solve each polynomial equation using any method of your choice (i.e. factoring and zero product property, square roots, quadratic formula or graphing).

3) $x^2 - 16 = 0$

4) $x^2 - 7x + 12 = 0$

5) $x^2 + 7 = 2x$

6) $x^3 + 8 = -7x(x + 2)$

Modeling

The height of an object, near the earth's surface, is described by the equation

$$h = -16t^2 + vt + s$$

s is the starting height (in feet)

h is the finishing height (in feet)

v is the velocity (in ft/sec) at which the object initially moves either up (+) or down (-)

7) Stuart throws a ball from his deck, 20 feet high, straight **up** with an initial velocity of 32 ft/sec.

a) How long until the ball will fall to the ground?

b) What is the maximum height the ball will reach?

c) When will the ball reach a height of 30 feet?

d) When will the ball reach a height of 40 feet? How do you know?

Transformations $f(x) = a \cdot f(x - h) + k$

Identify the types of transformations occurring to each parent function (vertically stretch or compress, reflect over the x-axis, shift left, shift right, shift up, and/or shift down).

8) $y = \sqrt[3]{x + 3}$

9) $y = \sqrt{x - 8} + 4$

10) $y = -x^2 - 6$

11) $y = 3|x - 4| + 2$

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

13) $y = 2^{x-5} + 3$

Rational Expressions

14) Simplify.

a) $\frac{12x^2y}{5y^2} \cdot \frac{2xy}{3x^2}$

b) $\frac{5x^5}{8} \div \frac{15x^2}{12}$

c) $\frac{x+3}{x^2+5x+6}$

d) $\frac{5x+10}{x^2-4} \cdot \frac{x^2+3x-10}{10}$

e) $\frac{x^2-16}{x-9} \div \frac{x^2+14x+40}{x^2+x-90}$

Solving Nth Root and Rational Exponent Equations

Solve each equation using inverse operations (reverse PEMDAS).

15) $x^3 + 8 = 35$

16) $2(x - 4)^2 = 18$

17) $4\sqrt[3]{x+1} - 3 = 17$

18) $-2x^{\frac{3}{2}} + 5 = -11$