Mrs.Volynskaya Dual-Enrollment Pre-Calculus Summer Assignment 2020

Welcome to Pre-Calculus **Dual-Enrollment**!

   While you are enjoying your summer, I would like to ask you to take time to REVIEW the attached assignments. They are designed to help you make the transition into Pre-Calculus course as smooth as possible.

It is very important that you have a **firm understanding of the prerequisite skills**, as we will be building on these concepts throughout the course. This summer packet is intended for you to check your understanding of Algebra II before we begin a year of Pre-Calculus.

Completing this packet will help you to retain/review/relearn important Algebra topics.

You will benefit the most from this packet by starting it towards the end of June. You should try to complete a few problems each day, as if it was a daily journal. Do not do all of it now, and do not wait and do it a week before we start school. You are more likely to retain the information if you spread it out.

   This assignment is ***NOT MANDATORY, however you have to now all material from this packet***. We will spend a few days answering questions and then take a test on the material.

   *There will be a test over the summer packet material on Monday, September 14th

SHOW EVIDENCE OF YOUR UNDERSTANDING for each problem in this packet. This packet will be turned in on the first day of school and then graded. Every problem in this packet is to be completed WITHOUT A CALCULATOR unless indicated with this symbol:
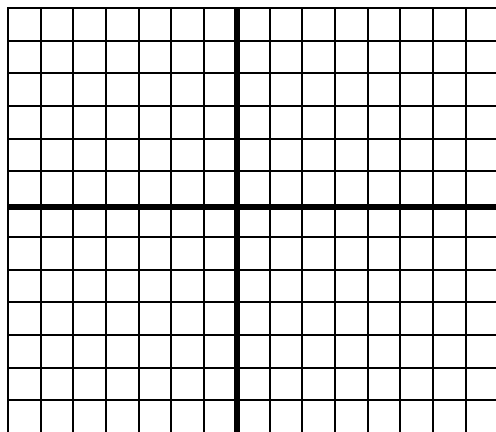
1. Graph the function $f(x) = 3x^2 + 2x - 1$ Find x-intercepts by solving equation $3x^2 + 2x - 1 = 0$
     Label the vertex, y- and x-intercepts

1. Vertex (,)
    X-int :
    Y-int=_____
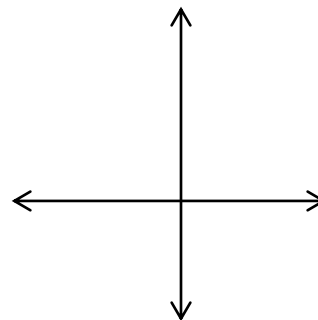
2. Graph $y = x^3$ $y = x^3 - 5$ $y = (x - 5)^3$ on the same XY- axis

3. Find the slope and the *y*-intercept of the line $3x - 6y = -12$.

Slope:__

y-int:_____

4. Tell which of the given equations have parallel line graphs and which have perpendicular line graphs. Show evidence and circle your answer.

a. $y = \dfrac{5}{2}x - 8$ b. $-15x + 6y - 10 = 0$ c. $4x + 10y = 15$

5. Find the value of *k* if the line joining (4, *k*) and (6, 8) and the line joining (– 1, 4) and (0, 8) are

a. parallel

a._____

b. perpendicular

b._____

6. Write an equation of the   segment joining (0, 3) and (– 4, 5).

6_____

2

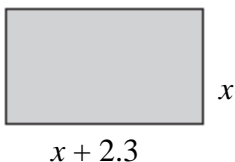7. Write a polynomial to represent the perimeter of a rectangle whose width is 2x + 3 and whose length is 5x - 4. Simplify the expression by combining similar terms.

7._____

8. **Find the value of *x*.**   8._____
   Area of rectangle = 17.6

x

$x + 2.3$

Memorize all these formulas and use them for the following problems
(a +b)² = a² +2ab +b²
(a - b)² = a² - 2ab +b²
(a + b)(a - b) = a² - b²
(a + b)³ = a³ + 3a²b + 3ab² + b³
(a - b)³ = a³ - 3a²b + 3ab² - b³

SIMPLIFY :
9a)   (7x - 2)(7x + 2)   a._____

9b . (y + 3)³   b-_____

9c. (3a - 4b)³   c._____

9d. Factor: $100a^2 - 36b^4$

                                                                d._____
9e   Factor: $9a^4 - 64b^4$ e_____

9f   Factor: $81a^4 - 16b^4$ f_____

 10. Maria's new car costs $350 per month for car payments and insurance. She estimates that gas and maintenance cost $0.10 per mile.
a. Express her total monthly cost as a function of the miles driven   a._____
during the month.

b. What is the slope of the graph of the cost function?   b._____

11.   Factor completely: $16a^4b^8 - b^4a^2$ _____

12. Simplify $\left(5+i\sqrt{5}\right)\left(5-i\sqrt{5}\right)$ _____

Write each expression in the form of $a + bi$
13. $\dfrac{5+i}{5-i}$ _____

3

14. $i^{-35} - i^{100}$

14. _____

15. FACTOR COMPLETELY
a) $24a^4b - 8a^3b^2$

_____

b) $18x^3 + 12x^2 - 24x$

_____

c) $y(a - 2) + 5(a - 2)$

_____

d.) $x^2(y + 5) - 8(y + 5)$

_____

Solve rational equation. Give your answers in simplest radical form.
Give both real and imaginary roots.

16. $\dfrac{4}{v} = \dfrac{v-6}{v-4}$

_____

Solve for x. Be sure not to lose or gain roots.

17. $(4x+7)(x-1)=2(x-1)$

._____

Solve by whichever method seems easiest. Be sure not to lose or gain roots.

18. $\dfrac{x+3}{x-3} + \dfrac{x-3}{x+3} = \dfrac{18-6x}{x^2-9}$

18._____

19 Factor: $8\,x^3 - 64$

19_____

In #20-21 Find an equation of the quadratic function described.
20. Its graph is a parabola with *x*-intercepts 2 and – 1 and *y*-intercept 6.

_____

21. Its graph is a parabola with vertex (4, 8) and passing through the origin.

_____

22.   A baseball player tries to hit a ball over an outfield fence that is 4 m high and 110 m from home plate. The ball is hit 1 m above home plate and reaches its highest point 30 m above a point on the ground that is 60 m from home plate.

a. Make a sketch showing the path of the baseball. If home plate
is at the origin of a coordinate system, find an equation of the
parabolic path of the baseball.

a._____

4
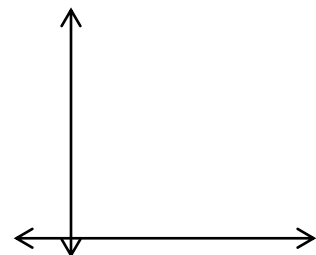
b. Will the ball go over the outfield fence? Explain.

23. Suppose your car contains just one gallon of gas. Driving at 20 mi/h you can go 26 mi. Likewise, you can go 34 mi driving at 40 mi/h and 32 mi driving at 50 mi/h.

a. Find a quadratic function that models this data.   ._____

b. How far could you go if you drove at 65 mi/h?   _____

c. The nearest gas station is 16 mi away. If the speed limit is 55 mi/h,   ._____
at what maximum speed could you drive and still reach it?

24. A stone is thrown with an upward velocity of 14 m/s from a cliff 30 m high.

a. Find its height above the ground t seconds later.   a._____

b. When will the stone reach its highest elevation?   b._____

c. When will the stone hit the ground?   c._____

25 Give the zeros of $w(x) = 2x^4 - x^3 - x^2$ 25._____

26. Find the values of the function $f(x) = x^3 - 9x$. (Remember: $i = \sqrt{-1}$). Provide each answer in simplest exact form and circle your answer.

a. $f\left(-\dfrac{\sqrt{2}}{3}\right)$ =_____   b. $f\left(i\sqrt{3}\right) =$_____

c. $f\left(\dfrac{x}{3}\right) =$_____   d. $f(x-3) =$_____
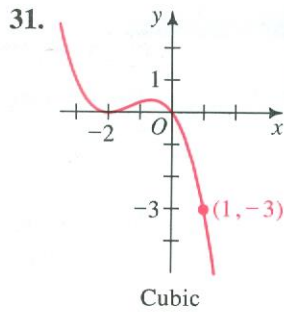
27. If 4 is a zero of $f(x) = 3x^3 + kx - 2$, find the value of k.   27._____

28. Factor $f(x) = x^4 - x^2$ and sketch its graph.   28. _____
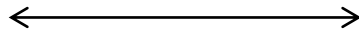
29. Give the equation for the graph shown below.   29. _____
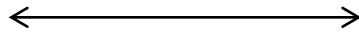
31.

Cubic

Solve the given equation or inequality and graph its solution on the number line. If there is no solution, say so.

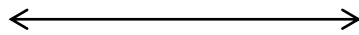30. $\dfrac{x+2}{4} - \dfrac{2-x}{3} + \dfrac{4x-5}{6} < 4$ 30. _____

⟵———————————⟶

31. $|2x-4| \le 5$ ⟵———————————⟶   31. _____

32. $1 \le |x-4| \le 3$ and   32. _____

⟵———————————⟶

33. Solve the inequality $x^4 - 3x^2 - 10 > 0$ 33. _____

34. Solve the inequality $a^3 + 2a^2 - 4a - 8 > 0$ 34. _____

Simplify each expression and circle your answer.

35a. $\left(a^{-1} - b^{-1}\right)^{-1} =$ _____   35b. $\left(a^{-1} b^{-1}\right)^{-1} =$ _____

6

Simplify the expression.

36. $\dfrac{6a^{-2}+9a^{2}}{3a^{-2}}$

36._____

37 Simplify by using powers of the same base.

$\dfrac{3^{5}\cdot 9^{4}}{27^{4}}$

37._____

38. Simplify and circle your answers.(*Hint*: In exercise 38a, multiply the numerator and the denominator by 2^{3})

38a. $\dfrac{2^{-1}}{2^{-2}+2^{-3}}$

38b. $\dfrac{4^{-5}}{4^{-2}+4^{-3}}$

Simplify

39. $\left(16^{-3/5}\right)^{5/4}$

39._____

40. Simplify: $\dfrac{2n^{1/3}-4n^{-2/3}}{2n^{-2/3}}$

40._____

Solve for x:

41a. $(8x)^{-3}=64$

41a._____

41b. $8x^{-3}=64$

41b._____

41c. $(8+x)^{-3}=64$

41c._____

42. Find the domain and range of the function. Then graph the function.

$y=-\dfrac{1}{3}\sqrt{36-x^{2}}$

Domain:_____
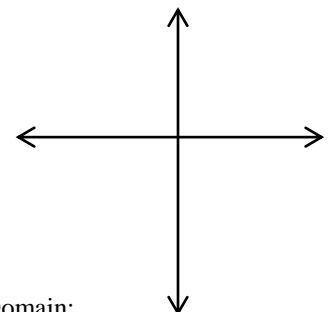
Range:_____
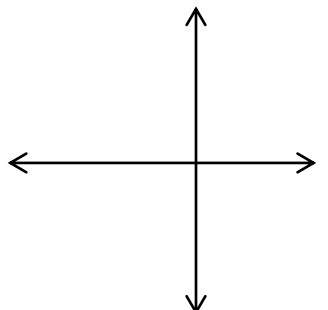
43. Give the domain and the range of the function. Then graph the function.

$y=\sqrt{x^{2}-4}$

Domain:_____

Range:_____
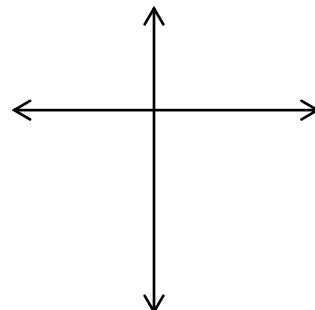
7

Sketch each graph and label the vertex as well as two other points.
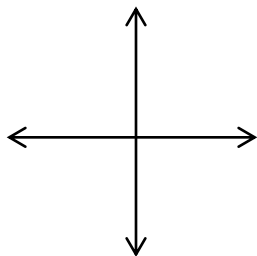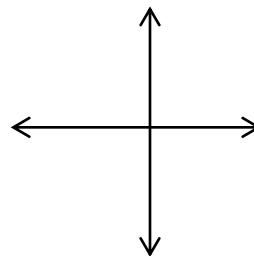
44a. $y = \dfrac{1}{8}x^2$
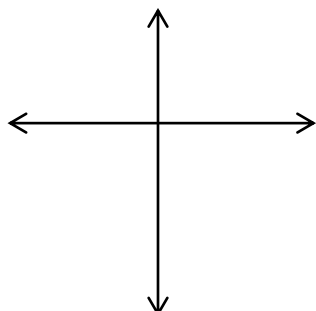
b. $y = 8x^2$
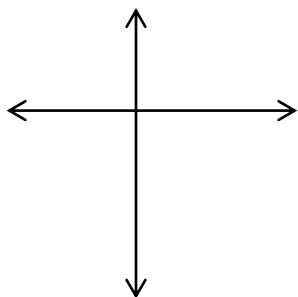
Sketch each graph and label two important points.

45a. $y = \sqrt{x}$

b. $y = -\sqrt{x}$

c. $y = -\sqrt{x-3} + 2$

d. $y = \sqrt{x+2} - 1$