



## Welcome to Applied Calculus!!!!

This summer packet is for all students enrolled in Applied Calculus at Herndon High School for Fall 2021.

The exercises will give you the opportunity to self-assess how prepared you are for Applied Calculus this year. Success in the school year will depend how well you understand the topics included, so put your best effort into it! Feel free to use old notes and online resources as needed to ensure that you understand the content.

Please complete the work for this packet on a separate piece of paper. Do as many of the problems as you can

WITHOUT the use of a calculator. It is important to spend time keeping these skills and concepts fresh in your mind – especially your mental math! We will provide you with a key at the start of next year for you to check your work. Be sure to keep track of sticky spots and ask questions when we return. You are also welcome to reach out to us over the summer; our contact information is below.

This summer assignment is not *required*, but it is *strongly recommended*.

FCPS recommend activities for each level of mathematics are also posted on the Herndon High School website. Both resources will help you prepare for next year.

Have a great summer – we are looking forward to meeting you in August!

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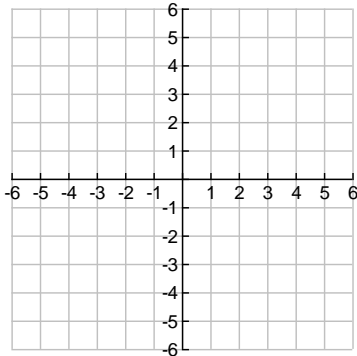
**As you work through the packet, keep track of the following:**

Concepts I remember how to do	Concepts I learned, but forget how to do	Concepts I never learned

### Part 1: Graphing

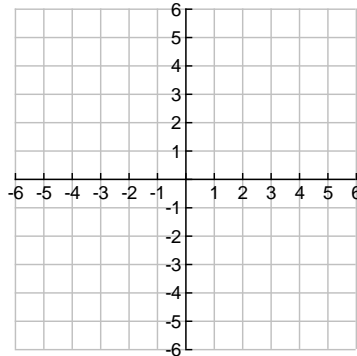
Sketch the following parent functions and then state their domain and range in interval notation.

1)  $f(x) = x$



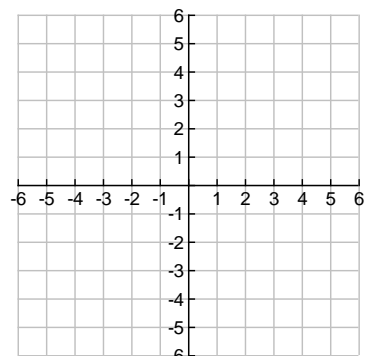
Domain \_\_\_\_\_ Range \_\_\_\_\_

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



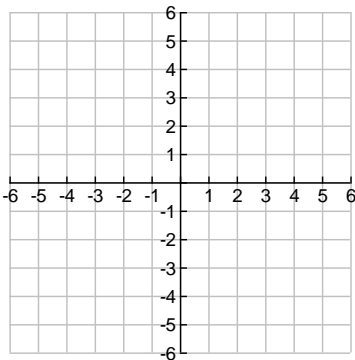
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3)  $f(x) = x^3$



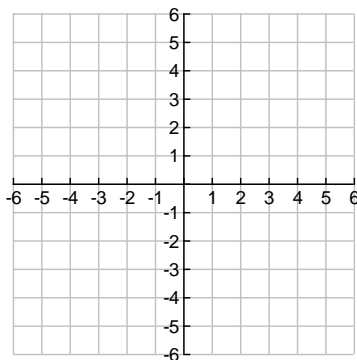
Domain \_\_\_\_\_ Range \_\_\_\_\_

4)  $f(x) = |x|$



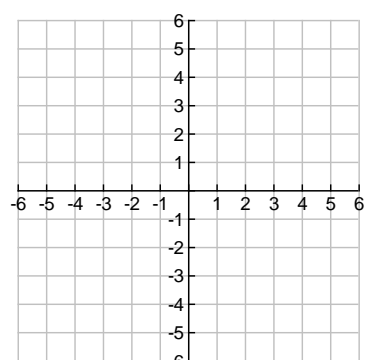
Domain \_\_\_\_\_ Range \_\_\_\_\_

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



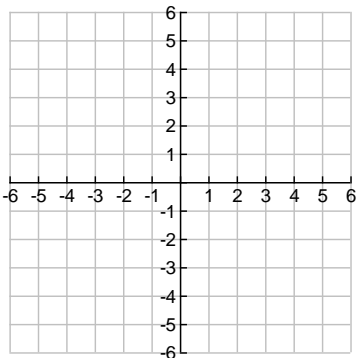
Domain \_\_\_\_\_ Range \_\_\_\_\_

6)  $f(x) = \sqrt[3]{x}$



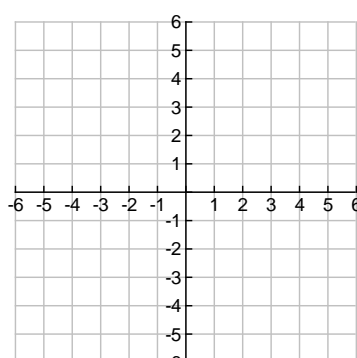
Domain \_\_\_\_\_ Range \_\_\_\_\_

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



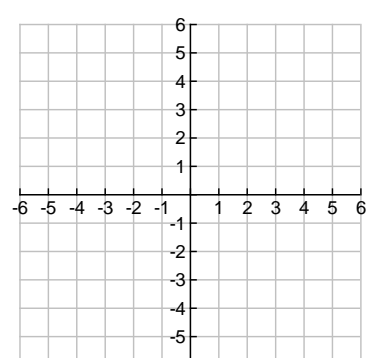
Domain \_\_\_\_\_ Range \_\_\_\_\_

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



Domain \_\_\_\_\_ Range \_\_\_\_\_

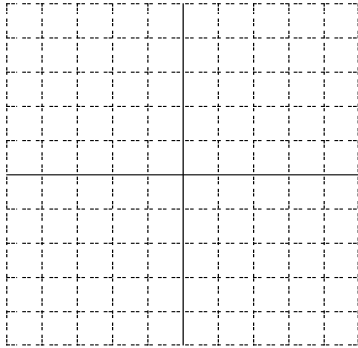
9)  $f(x) = \frac{1}{x}$



Domain \_\_\_\_\_ Range \_\_\_\_\_

Sketch the graph and then state their domain and range in interval notation.

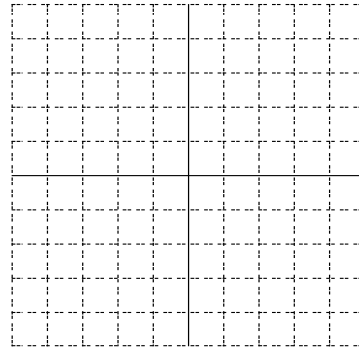
10)  $g(x) = -|x-2|+1$



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

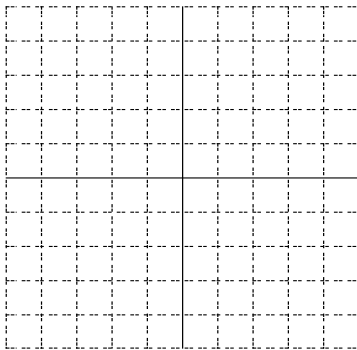
11)  $h(x) = (x+3)^2 - 1$



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

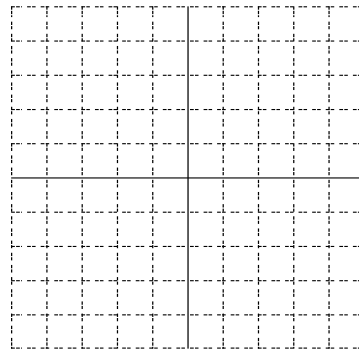
12)  $j(x) = \sqrt{5x-10}$



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

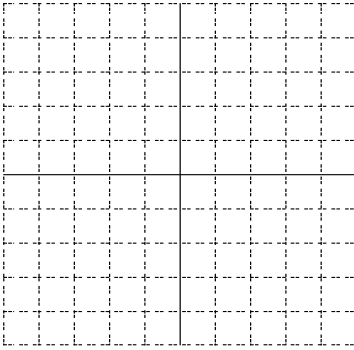
13)  $k(x) = -\sqrt[3]{x} - 2$



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

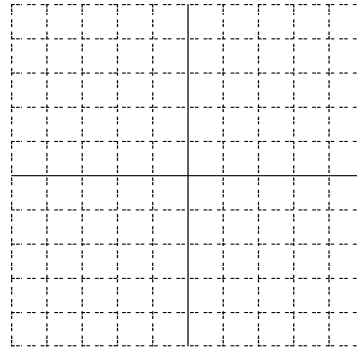
14)  $m(x) = \frac{2}{3}x + 1$



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

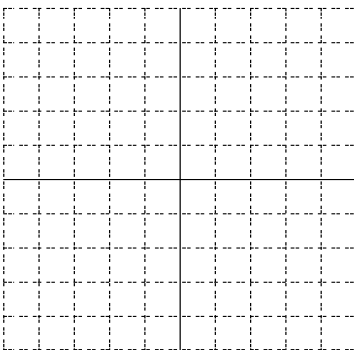
15)  $n(x) = 2 + (x-1)^3$



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

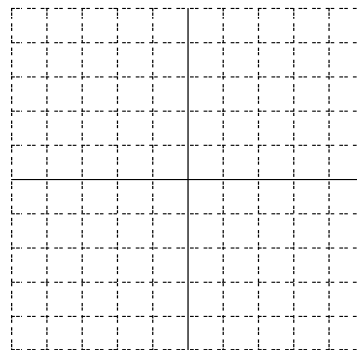
16)  $p(x) = -\log_3(x-2)$



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

17)  $q(x) = 2^{x+3} - 1$



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

**Part 2: Factoring**

Factor completely.

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

19)  $2x^2 + 22x - 24$

20)  $x^2 + 49$

21)  $x^3 + 125$

22)  $x^2 - 2x + 1$

23)  $3x^3 - 24$

24)  $3x^2 + 11x + 6$

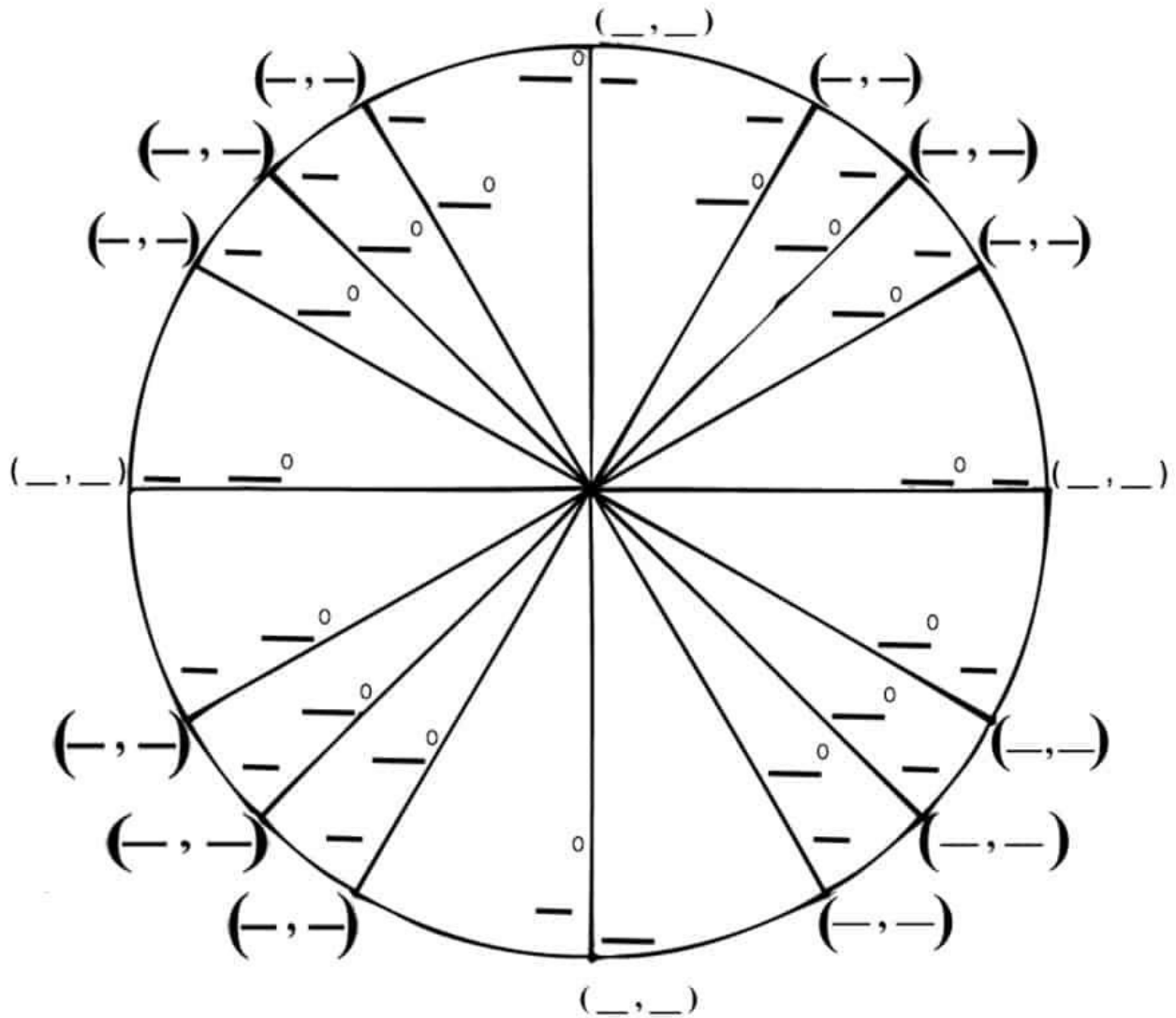
25)  $x^2 - 100$

26)  $4x^3 - 4x^2 - 9x + 9$

27)  $x^4 + 6x^2 + 8$

Part 3: Trigonometry Review

# Unit Circle, Fill in the blank



Find the exact value.

28)  $\cos \frac{5\pi}{3}$

29)  $\sin \frac{11\pi}{6}$

30)  $\cot \frac{3\pi}{2}$

31)  $\tan \frac{3\pi}{4}$

32)  $\csc \frac{2\pi}{3}$

33)  $\sec 5\pi$

34)  $\cos \frac{17\pi}{6}$

35)  $\sin \frac{7\pi}{4}$

36)  $\sec \frac{4\pi}{3}$

37)  $\cot \frac{5\pi}{6}$

Solve the following trigonometric equations in the given interval.

38)  $2\cos\theta + 1 = 0$  for all values.

39)  $2\sin^2\theta - 3\sin\theta + 1 = 0$  for  $-2\pi \leq \theta \leq 2\pi$ .

40)  $\sin(2\theta) + \sqrt{3}\cos\theta = 0$  for  $0 \leq \theta \leq 2\pi$