Summer Packet for Students Entering
11th Grade Analysis and Approaches SL

Directions:
1. Please complete all questions in the work space provided or on a separate sheet of paper that is clearly and neatly numbered.
2. You must show all of your work for each question. If you are stuck, please use the resource links provided in the section.
3. Your teacher will check this assignment on the FIRST day of school at the beginning of class. This will be your first completion grade so make sure you have attempted each problem.
4. If there are questions that you had a difficult time with, please list them in the box below (or highlight them on a separate sheet of paper). We expect you to use the resources provided if you are stuck, but understand there may be additional support needed for some questions.

Assessment:
1. On the second day of math, you will have a summative quiz based on the skills on this summer packet.
2. You will get 5 points for bringing your TI-84 CE Plus to class with you on the day of the test. This is a required tool that you will use throughout high school.

Extra Support:
1. The math department will have extra help days for the summer packet close to the return of school. Please check the school's website during the summer for the dates.
2. On the first day back to school, we will dedicate time in class to go over the answers and for you to ask your teacher questions.

Analysis & Approaches SL Year 1 Summer Packet

This packet is to be completed by students entering 11th Grade Analysis and Approaches SL for the 2023-24 school year. There are resources linked for each section if you get stuck.

SKILL 1: FACTORING

Need Help? Click Here!

Factor the following completely.

1. $28a^2b - 63b$

2. $3m^2 + 9m - 30$

3. $x^3 + 2x^2y - 4x - 8y$

4. $4y^2 + 7y - 2$

5. $64x^2 - 4y^2$

6. $8x^4 - 4x^3 - 24x^2$

7. $x^3 + 3x^2 - 5x - 15$

8. $x^4 - 16$

9. $2w^2 + 38w + 140$

10. $4x^2y - 24xy + 36y$

11. $75x^2 - 30x + 3$

12. $6y^3 - 150y$

13. $9x^3 + 9x^2y - x - y$

14. $x^2 - 7x - 78$

15. $8m^2 + 2m - 3$

SKILL 2: OPERATIONS WITH RATIONAL FUNCTIONS

Need Help? [Click Here for Simplifying](#), [Here for Multiplying/Dividing](#), and [Here for Adding and Subtracting!](#)

Simplify the following:

1. $\dfrac{15x^2+9x}{9x^2-30x}$

2. $\dfrac{5n^3+5n^2}{n^2-4x-5} \cdot \dfrac{3n}{5n^2}$

3. $\dfrac{x^2-7x+6}{42x^2-7x^3} \div \dfrac{1-n}{3}$

4. $\dfrac{m-3}{m^2+6m-16} \cdot \dfrac{m^2-10m+16}{m-8}$

5. $\dfrac{\frac{10b^2+42b+36}{6b^2-2b-60}}{\frac{40b+48}{3b^2-13b+10}}$

6. $\dfrac{7}{3x^2-6x} + \dfrac{x^2}{x^2-4x+4}$

7. $\dfrac{5}{4x^2y} + \dfrac{3}{14xy^3}$

8. $\dfrac{5}{x^2-5x} - \dfrac{x}{5x-25}$

9. $-\dfrac{x-2}{x^2-2x-8} - \dfrac{x-1}{x^2-4}$

10. $\dfrac{2}{x+3} - \dfrac{x}{x-1} + \dfrac{x^2+2}{x^2-x-2}$

SKILL 3: LOG EXPRESSIONS

Need Help? Click Here for 1-5, Here for 6-8, and Here for 10-15!

Evaluate the following without a calculator:

1. $\log_2 16$
2. $\log_4 \frac{1}{2}$
3. $\log_{12} 144$
4. $\log_3 \frac{1}{27}$
5. $\ln 1$

Rewrite the following as a single logarithmic expression:

6. $\log_2 x + 3\log_2 y$

7. $\frac{1}{3}\log 6 + \frac{1}{3}\log x + \frac{2}{3}\log y$

8. $\log_3(x + 2) + \log_3(x - 2) - \log_3(x + 4)$

9. $3\log_5 x + 2\log_5 y + \log_5 z + 2$

Expand the following logarithmic expressions.

10. $\log_2 \frac{3x^3y^2}{z^5}$

11. $\log_3 5\left(\sqrt[3]{xy^2}\right)$

12. $\log_{12} \frac{x-7}{x+2}$

13. $\ln \sqrt{x^3(x + 4)}$

14. $\ln \sqrt{\frac{x^3y}{z^5}}$

15. $\log_a 12x^3\sqrt{y}$

SKILL 4: PARENT FUNCTIONS AND GRAPHING

Need Help? [Click Here!](#)

For the following, sketch the parent function. List the coordinates of any intercepts and write the equation of any asymptotes. State the domain and range. (You should have these memorized)
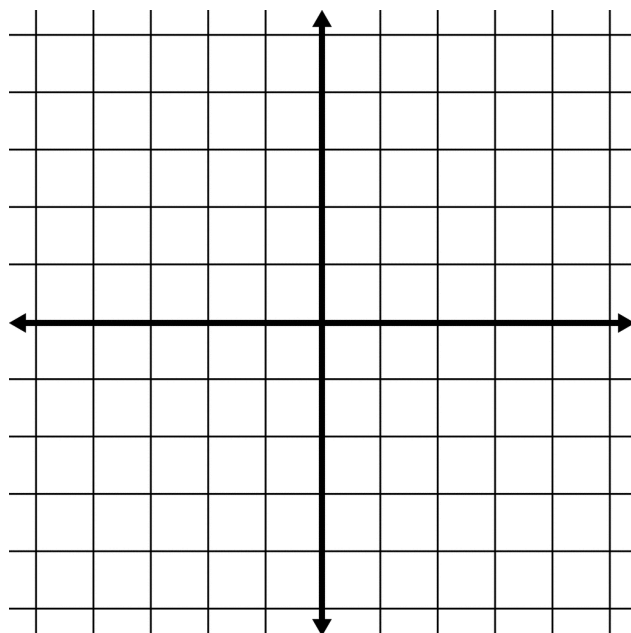
1. $f(x) = x^2$
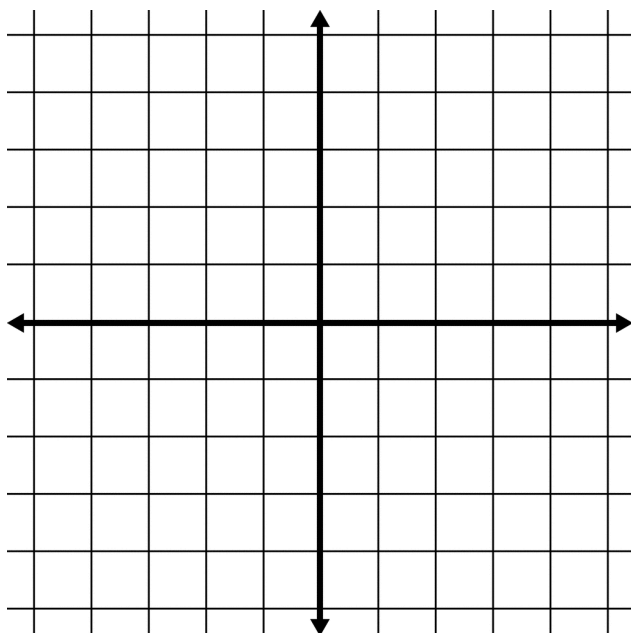
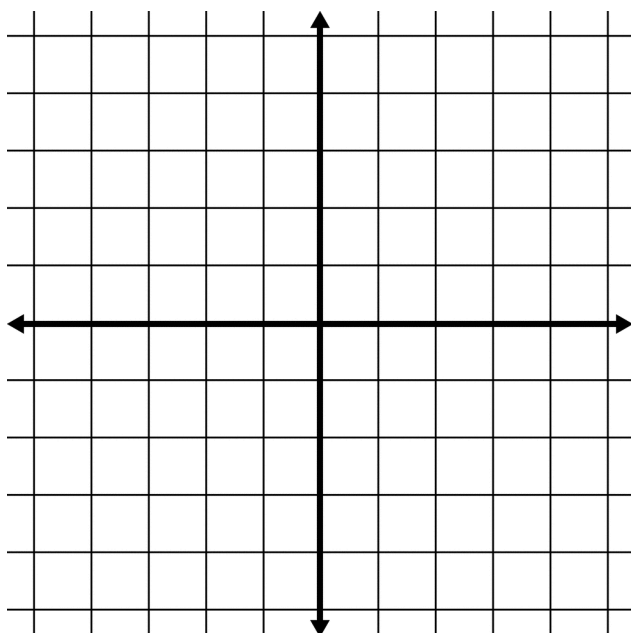2. $f(x) = x^3$

Domain:
Range:
Intercepts
Asymptote(s):

Domain:
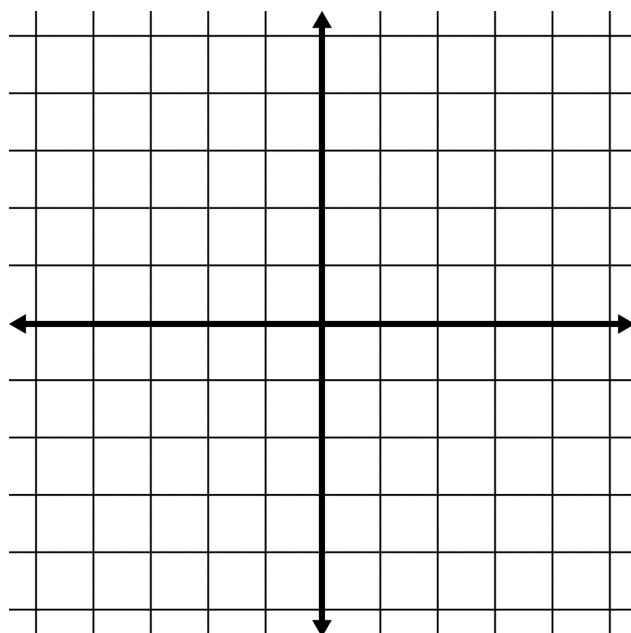Range:
Intercepts:
Asymptote(s):

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

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

Domain:
Range:
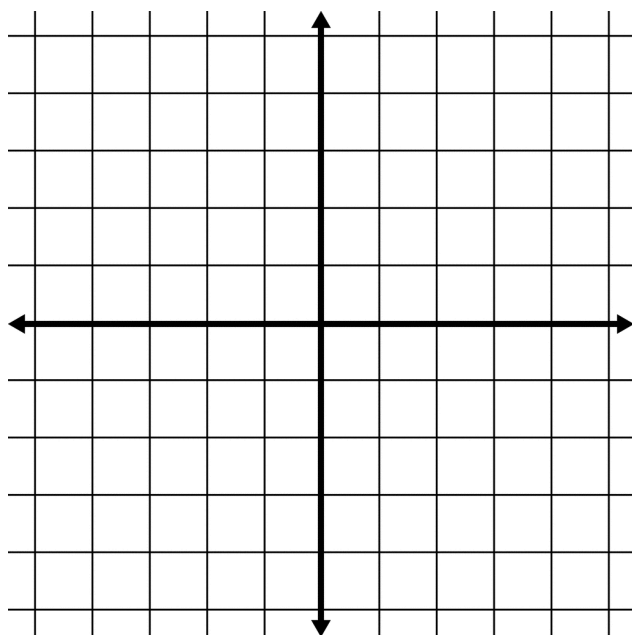Intercepts:
Asymptote(s):

Domain:
Range:
Intercepts:
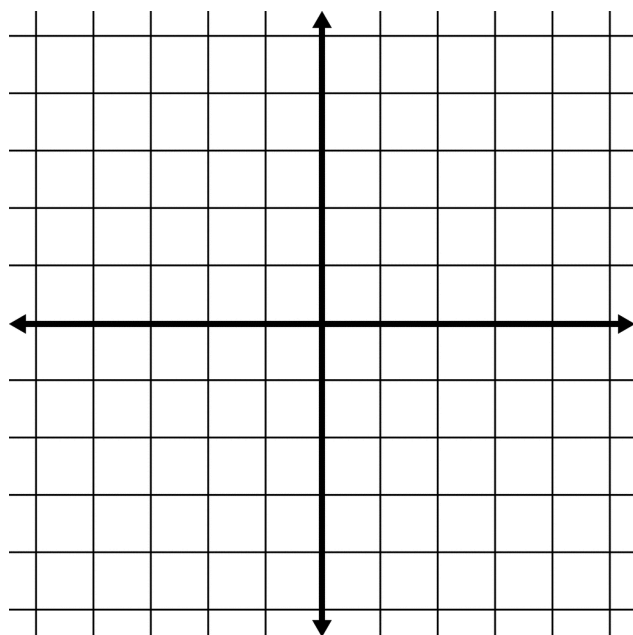Asymptote(s):

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

Domain:
Range:
Intercepts:
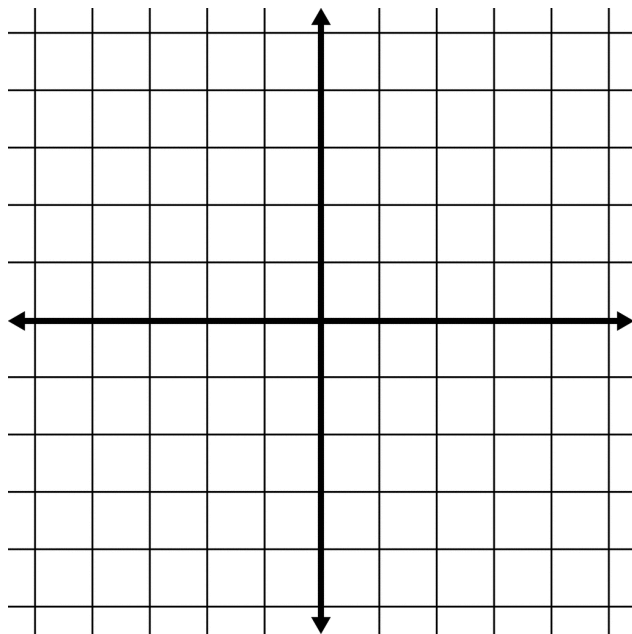Asymptote(s):

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

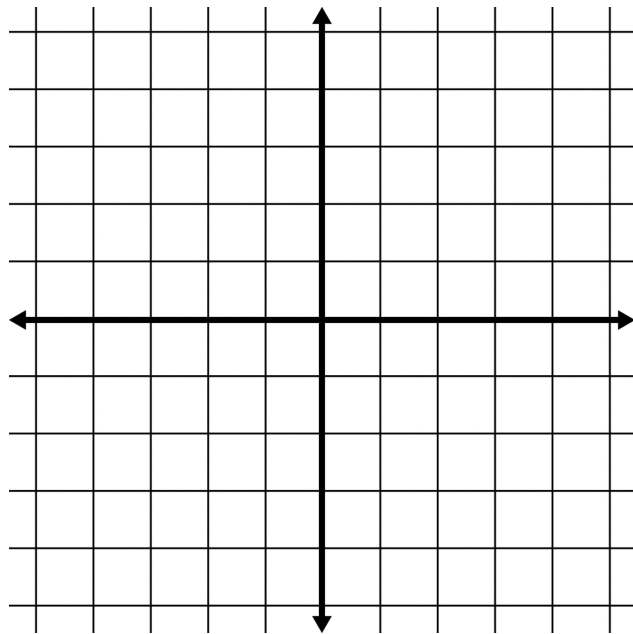Domain:
Range:
Intercepts:
Asymptote(s):

7. $f(x) = |x|$

Domain:
Range:
Intercepts:
Asymptote(s):

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

Domain:
Range:
Intercepts:
Asymptote(s):

SKILL 5: OPERATIONS WITH FUNCTIONS

Need Help? <u>Click Here for Operations</u>, <u>Here for Composite</u>, and <u>Here for Inverse</u>

For 1-6, let $f(x) = 3x - 1$ and $g(x) = x^2 + 4$. Find the following:

1. $(f + g)(x)$

2. $(f - g)(x)$

3. $(f \cdot g)(x)$

4. $\left(\dfrac{f}{g}\right)(x)$

5. $(f \circ g)(x)$

6. $f^{-1}(x)$

For 7-12, let $f(x) = \dfrac{x-3}{4}$, $g(x) = \dfrac{x^2-9}{x+1}$ and $h(x) = x^2 + 4x + 3$. Find the following:

7. $(f + g)(x)$

8. $(h - g)(x)$

9. $(g \cdot h)(x)$

10. $\left(\dfrac{f}{g}\right)(x)$

11. $\left(\dfrac{g}{h}\right)(x)$

12. $f^{-1}(x)$