

This work will be taken up on the first day of class. This material is prerequisite content for the course and should be a review of earlier work. It is not new material. You should know all of it before class starts.

NO CALCULATOR

Draw a **rough sketch** of each of the following functions and **state the domain and range of the function**:

1. $y = x$ $y = x^2$ $y = x^3$ $y = x^4$ $y = x^5$

2. Can you find a pattern concerning the graphs, domains and ranges of $y = x^{2n}$ and $y = x^{2n+1}$ for n a positive integer.

3. **On the same graph:**

• $y = \log(x)$ $y = \ln(x)$

4. **On the same graph**

• $y = e^x$ $y = 2e^x$ $y = e^{2x}$

5. $y = |x|$

6. $y = \sin(x)$

7. $y = \cos(x)$

8. $y = \tan(x)$

9. $y = \sec(x)$

10. $y = \csc(x)$

11. $y = \cot(x)$

12. $y = (x+1)/(x^2 - 1)$

13. $y = 1/(x^2 - 1)^{.5}$

14. $y = 1/x$

15. Find the equation of a function that is

- increasing at an increasing rate.
- increasing at a decreasing rate.
- decreasing at an increasing rate.
- decreasing at a decreasing rate.

Limit the domain of the following to make the inverse a function.

16. $y = \arcsin(x)$ this can also be written as $Y = \sin^{-1}(x)$

17. $y = \arccos(x)$

18. $y = \arctan(x)$

19. $y = \operatorname{arcsec}(x)$

20. $y = \operatorname{arccsc}(x)$

21. $y = \operatorname{arccot}(x)$

22. Complete the table

Θ (radians)	Sin Θ	Cos Θ	Tan Θ
0			
$\pi/6$			
$\pi/4$			
$\pi/3$			
$\pi/2$			
$2\pi/3$			
$3\pi/4$			
$5\pi/6$			

π			
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Factor the following expressions

23. $x^2 + 5x + 6$

24. $x^2 - 5x + 6$

25. $x^2 + 5x - 6$

26. $x^2 - 5x - 6$

27. $xe^x - x \sin(x) - x$

28. $2xe^x - xe^{2x}$

29. $2x \sin(2x) - x \cos(2x)$

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WITH A CALCULATOR

Using your graphing calculator, you should be able to give a **GOOD** graph (showing all the interesting features) of a graph (e.g., maxima, minima, asymptotes).

Using your calculator, draw a graph (or two) of each of the following equations so that we see everything interesting. Indicate the window(s) you have chosen. Describe the graph in words (increase, maximum, asymptotes, etc.).

1. $y = \sin(1/x)$

2. $y = xe^{-x}$

3. $y = x \cos x$

4. $x^2 + y^2 = 1$

Using your graphing calculator, find all of the roots or points of intersection of the following pairs of functions. Give all answers with a **MINIMUM** of three decimal places.

Find the all roots of

Roots 5. $y = 2 \cos(2x + \pi)$ on $[0, 2\pi]$

Roots 6. $y = x^3 - 2x + 1$

Points of intersection. 7. $y = 2^x$ and $Y = x^2$

Points of intersection 8. $y = \sin(x)$ and $Y = .5X$

Points of intersection 9. $y = \arctan(2x)$ and $\sin(x)$

10. Find the points of intersection of the curves that are the x-axis, $x + y = 1$, and $y = \sin(x^2)$. Sketch this enclosed region and shade it in.