

SUMMER WORK: Calculus AB

Name: _____

Preparation for Calculus AB

Due on the first day of class for homework credit.

1. Read the following lessons from the Calculus AB textbook, then complete the problems listed. Check your solutions to odd problems in the back of the text.

Calculus

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Author: Larson

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Year: 2006

Lesson	Number
P.1	#1-4,9-12,15,19,29,55,57,69,81,83
P.2	#13,19,21b,23,31,35,43,53,57,59,65,69,77
P.3	#1,7,9,17,19,21,25,31,33,35-37,39,41,43,47-52all, 55,57,61,63,65,67,69,71,73,77,78,84,93
P.4	None
Problem Solving, p.39	#3,5,7

2. Complete the attached worksheets and review the topics as needed.

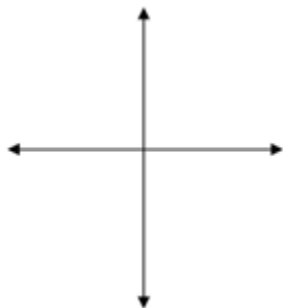
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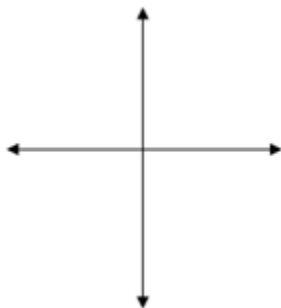
Functions

Sketch each of the following functions and state their domain and range. Sketch any asymptotes. You should have these functions and their characteristics memorized.

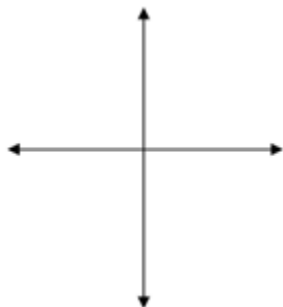
$$y = x$$



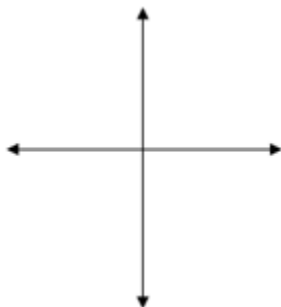
$$y = |x|$$



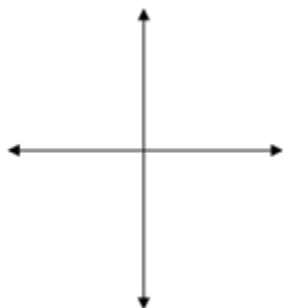
$$y = x^2$$



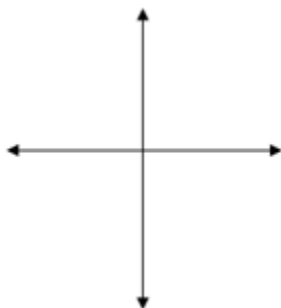
$$y = \sqrt{x}$$



$$y = x^3$$



$$y = \sqrt[3]{x}$$

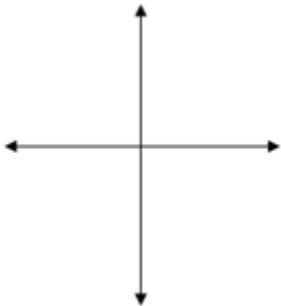
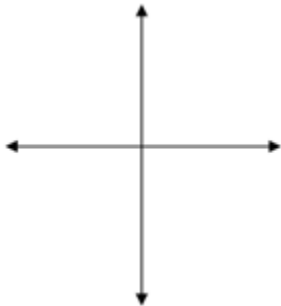


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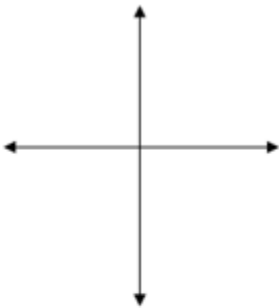
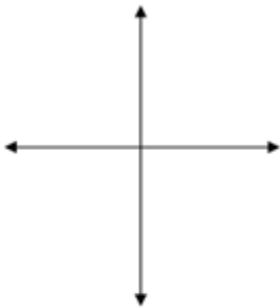
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$y = \frac{1}{x}$

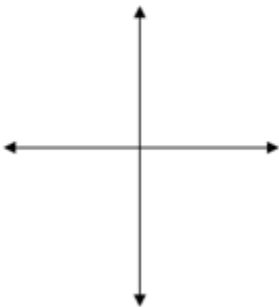
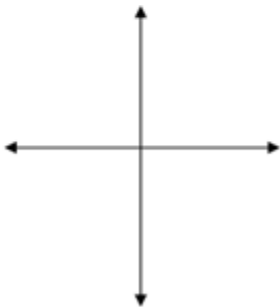
$y = \frac{1}{x^2}$



$y = e^x$



$y = \ln(x)$



$y = \sin(x)$

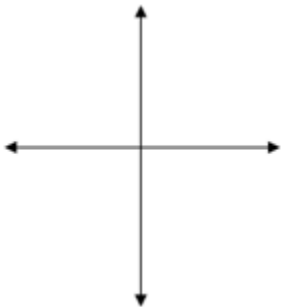
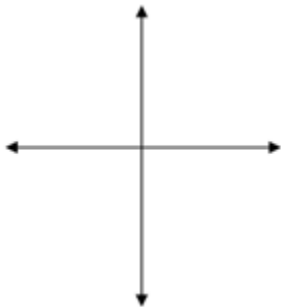
$y = \arcsin(x)$

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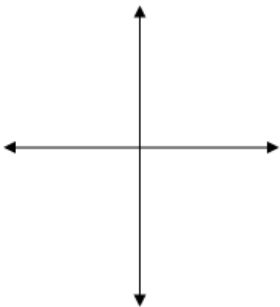
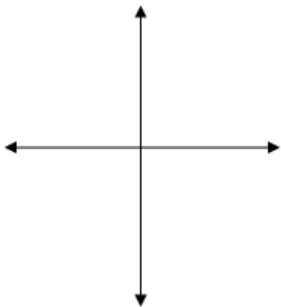
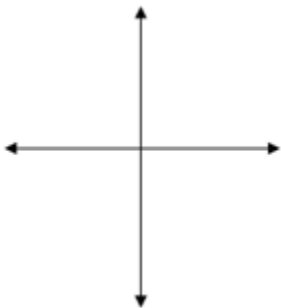
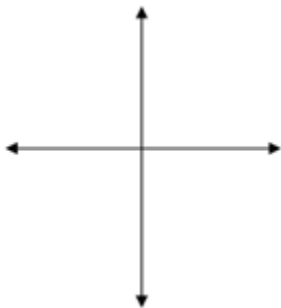
$y = \cos(x)$

$y = \arccos(x)$



$y = \tan(x)$

$x^2 + y^2 = r^2$



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Trig Ratios for Special Angles

1. Fill in **and memorize** the values in the following table. You should be able to come up with these values without having to draw the unit circle each time.

Angle (degree)	Angle (radians)	$\sin(x)$	$\cos(x)$	$\tan(x)$
0				
30				
45				
60				
90				

2. Find exact values for the following trig ratios:

1) Give an exact value for $\cos\left(\frac{11\pi}{6}\right)$.

2) Give an exact value for $\sin\left(\frac{7\pi}{6}\right)$.

3) Give an exact value for $\tan\left(\frac{3\pi}{4}\right)$.

4) Give an exact value for $\sin\left(-\frac{3\pi}{4}\right)$.

5) Give an exact value for $\sin\left(\frac{5\pi}{3}\right)$.

6) Give an exact value for $\cos\left(\frac{7\pi}{3}\right)$.

7) Give an exact value for $\sin\left(\frac{17\pi}{6}\right)$.

8) Give an exact value for $\tan\left(\frac{18\pi}{6}\right)$.

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Trigonometric Identities

Pythagorean Identities

$$\sin^2 x + \cos^2 x = 1$$

$$\tan^2 x + 1 = \sec^2 x$$

$$1 + \cot^2 x = \csc^2 x$$

Examples:

1. Simplify the expression.

$$\cos t + \tan t \sin t$$

2. Simplify the expression.

$$\frac{\sin x}{\cos x} + \frac{\cos x}{1 + \sin x}$$

3. Simplify the expression.

$$\frac{\sec^2 x - 1}{\sec^2 x}$$

Properties of Logarithms

$$\log_b(xy) = \log_b x + \log_b y$$

$$\log_b\left(\frac{x}{y}\right) = \log_b x - \log_b y$$

$$\log_b x^n = n \log_b x$$

Examples:

1. Expand the expression.

$$\log\left(\frac{x^2(x-1)^3}{2-x}\right)$$

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2. Condense the expression: $\frac{1}{2}(3 \ln(x+1) + \ln 5 - 2 \ln x)$.

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Simplifying Rational Expressions- Perform the operation and simplify the following.

a.) $(2x)^4$

b.) $\frac{t}{t^{1/3}}$

c.) $\frac{3}{x-1} + \frac{x}{x+2}$ (need a common denominator)

d.) $\frac{1}{x^2-1} - \frac{2}{(x+1)^2}$ (find least common denominator)

e.) $\frac{\frac{1}{a-h} - \frac{1}{a}}{h}$ (first, simplify the numerator into one fraction)

f.) $\frac{\frac{x}{y} - \frac{y}{x}}{\frac{1}{x^2} - \frac{1}{y^2}}$

g.) $\frac{(1+x^2)^{1/2} - x^2(1+x^2)^{-1/2}}{1+x^2}$ (factor out the common factor)

h.) $\frac{(x-h)^3 - 7(x+h) - (x^3 - 7x)}{h}$

i.) $\frac{1}{\sqrt{x}+1}$ (rationalize the denominator)

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j.) $\frac{\sqrt{r} + \sqrt{2}}{5}$ (rationalize the numerator)