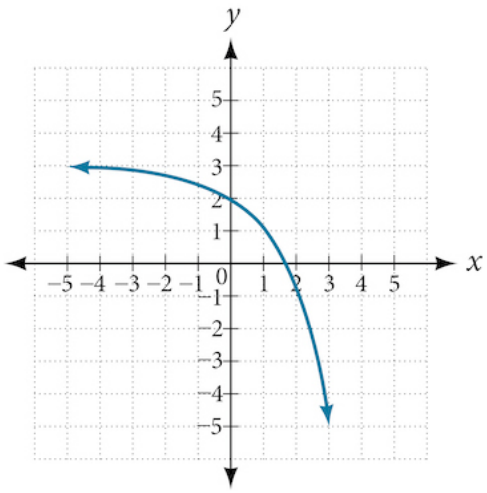
Exam 2 Study Guide

Overview: Exam 2 will be based on the following sections of the textbook: 3.5-3.7, 4.1-4.6, 5.1-5.4. Anything covered in these sections is fair game for the exam.

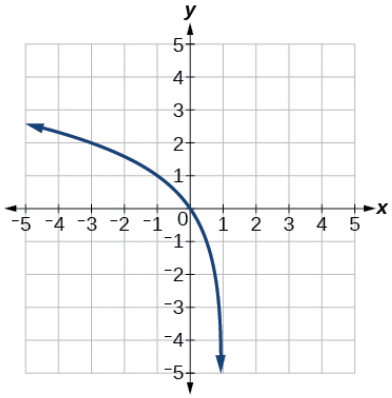
Practice Problems: The following problems are meant to help you review the things we learned in class. The skills required to solve these problems will be useful on the exam. However, this is not a practice exam - the problems you encounter on the exam may be new. Problems from the textbook have the answers linked.

- (3.5.13) Use long division to divide $2x^3+3x^2-4x+15$ by $x+3$. Specify the quotient and the remainder.
- (3.5.35) Use synthetic division to divide $x^4-12x^3+54x^2-108x+81$ by $x-3$.
- (3.6.37) Find all rational zeros for the polynomial $x^4+2x^3-4x^2-10x-5$.
- Factor the polynomial $x^3-7x^2+11x-5$. Hint: find a zero using the rational zero theorem, then divide. Rinse and repeat.
- (3.7.41) Find the horizontal intercepts, the vertical intercept, the vertical asymptotes, and the horizontal or slant asymptote of the rational function: $f(x)=\frac{4}{(x-2)^2}$. Use that information to sketch a graph.
- (3.7.49) Find the horizontal intercepts, the vertical intercept, the vertical asymptotes, and the horizontal or slant asymptote of the rational function: $f(x)=\frac{(x-1)(x+3)(x-5)}{(x+2)^2(x-4)}$. Use that information to sketch a graph.
- (4.2.11) Graph the following functions: $f(x)=3(1/4)^x$, $g(x)=3(2)^2$, and $h(x)=3(4)^x$.
- (4.2.39) Find the equation of the exponential function in the graph:

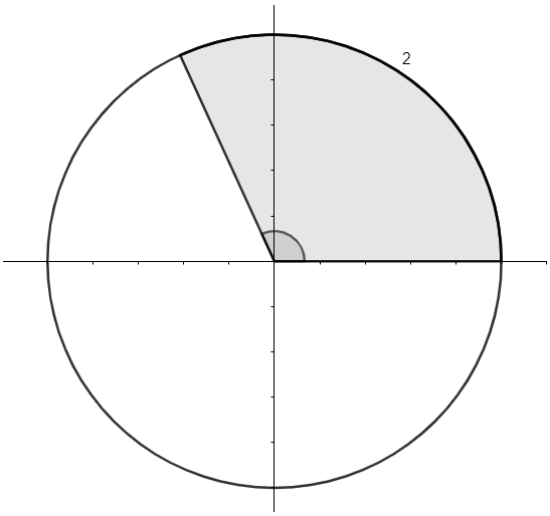


- (4.3.11) Write the equation $\log_{15}(a)=b$ in exponential form.
- (4.3.21) Write the equation $n^4=103$ in logarithmic form.
- (4.3.31) Solve for x: $\log_9(x)=1/2$.

- (4.4.23) Find the domain, range, asymptotes, and intercepts of the function $g(x) = \ln(-x) - 2$.
- (4.4.45) Find the domain, range, asymptotes, and intercepts of the function $g(x) = \log(6 - 3x) + 1$. Then graph the function.
- (4.4.47) The following graph is a transformation of $f(x) = \log_2(x)$. Find the equation of the function.



- (4.5.9) Use the "Laws of Logarithms" to write the expression as a single logarithm: $\ln 7 + \ln x + \ln y$.
- (4.5.17) Use the "Laws of Logarithms" to expand the expression as much as possible: $\log \sqrt{x^3 y^{-4}}$.
- (4.6.25) Solve the equation: $8e^{-5x-2} - 4 = -90$.
- (4.6.39) Solve the equation: $\ln(-3x) - \ln(x^2 - 6x) = 0$.
- (5.1.47) Find the area of a sector of a circle with central angle $\pi/6$ and radius 20cm.
- Explain the geometric meaning of 1 radian. Understanding this will be useful for the next problem.
- Consider the following sector of the **unit** circle. The length of the arc determined by the angle is equal to 2. Find the area of the sector. Note: the measure of the angle is intentionally omitted - it can be determined easily from the information provided.



- (5.1.51) Find the smallest positive angle (measured in degrees) that is coterminal to $-110°$.
- Convert from degrees to radians: $90°, 100°, -540°$.
- Convert from radians to degrees: $\pi/3, -5\pi/12, 11\pi/6$.
- (5.2.25) Find the reference angle for $100°$.
- (5.2.53) Find $\cos\theta$ if $\sin\theta = -1/4$ and $\pi \leq \theta \leq 3\pi/2$.
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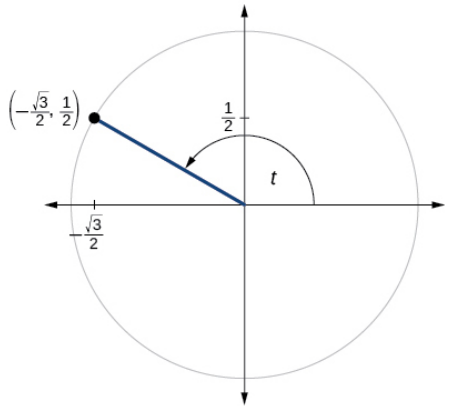
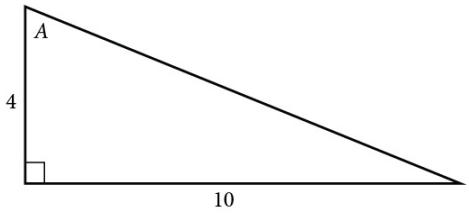
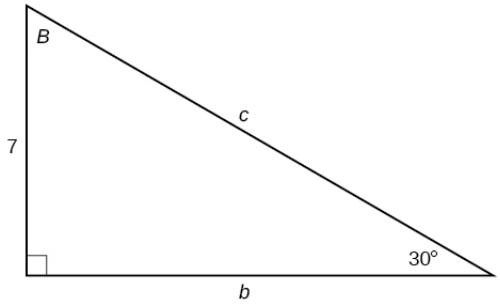
- Find $\cos(t + \pi/2)$ if t is the angle in the following picture:



- Evaluate all six trig functions at the angle $4\pi/3$.
- (4.3.39) Evaluate all six trig functions at θ given that $\cos\theta = -1/3$ and θ is in the third quadrant.
- (5.3.41) Evaluate all six trig functions at θ given that $\sin\theta = \sqrt{3}/2$ and $\cos\theta = 1/2$.
- Evaluate all six trig functions at the angle A:



- (5.4.29) Find the unknown side lengths b and c of the triangle



- Assuming that a 370-foot tall giant redwood grows vertically, if I walk a certain distance from the tree and measure the angle of elevation to the top of the tree to be 60°, how far from the base of the tree am I?