

# Practice Midterm 2

Math 3C: Precalculus

Instructor: David Lenz

Midterm: Thursday November 21 at 8:00 PM in Ledden Auditorium.

**Bring your student ID.** Do NOT bring a calculator or any formula sheets.

**Problem 1** True or False. Write the word “True” or “False” next to each statement. You *do not* need to show your work for this question.

\_\_\_\_\_ The function  $k(x) = \log_5(x)$  is one-to-one.

\_\_\_\_\_ The equation  $(x + 1)^2 + (x - 4)^2 = 4$  represents a circle of radius 4 centered at the point  $(-1, 4)$ .

\_\_\_\_\_ An angle with measure  $30^\circ$  is coterminal with an angle of measure  $-690^\circ$ .

\_\_\_\_\_ The function  $3a^3 - 2a^2 + 10a + 2$  has at most 4 horizontal intercepts.

\_\_\_\_\_ The function  $g(z) = \frac{z+1}{z+2}$  has a vertical asymptote at  $z = -1$ .

\_\_\_\_\_ An angle that measures  $\frac{3\pi}{4}$  radians is  $135^\circ$  when measured in degrees.

\_\_\_\_\_ The range of  $y = 2^{x-2}$  is all  $y > 2$ .

\_\_\_\_\_  $r(s) = 2 + 4s^2 - s^6 + 3s^4$  is an even function.

**Problem 2** Let  $p(y) = -2(y - 2)^2(y + 1) = -2y^3 + 6y^2 - 8$ .

What is the long-run behavior of  $p(y)$ ?

What are the roots of  $p(y)$  and their multiplicities?

Sketch a graph of  $p(y)$ . Your sketch needs to only show the general shape of the graph, but you must label the horizontal intercepts.

**Problem 3** Solve the equation  $3 \cdot (5)^{4x-1} = 12$  for  $x$ .

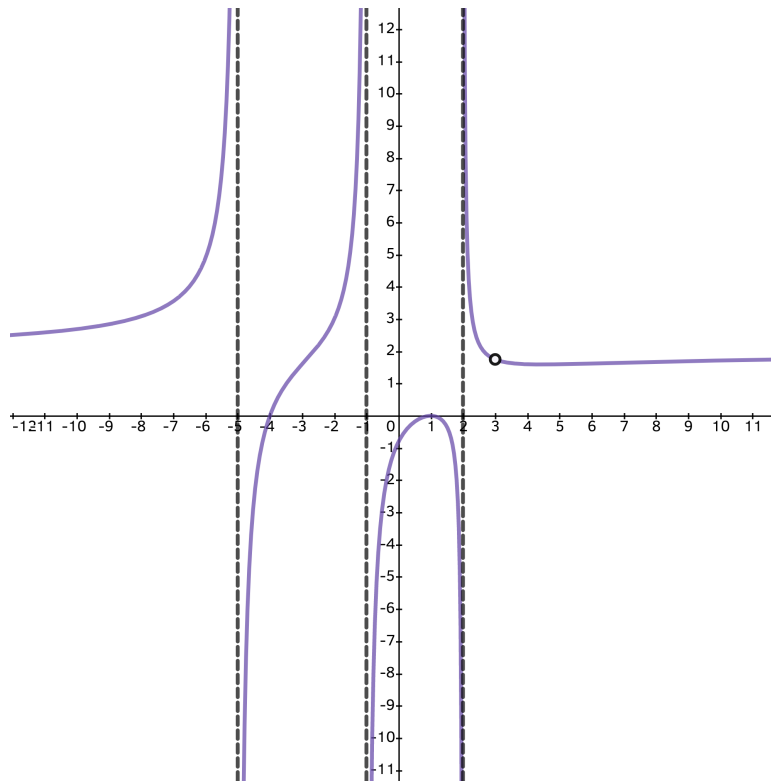
**Problem 4** Solve the equation  $\log_3(9a^4) = 3$  for  $a$ .

**Problem 5** Suppose that there is a bank account with \$10000 dollars in it that earns interest at an annual rate of 10%. How much money will be in the account after 2 years?

Let  $C(t)$  be a function that gives the amount of money in the account after  $t$  years. What is a formula for  $C(t)$ ?

**Problem 6** Solve the equation  $2y^2 - 6y - 3 = \frac{1}{2}$  for  $y$ .

**Problem 7** Let  $g(b)$  be the function graphed in the following diagram.



What is the horizontal asymptote of  $g(b)$ ?

What are the vertical asymptotes  $g(b)$ ?

What are the horizontal intercepts of  $g(b)$ ?

Which of the following could be a formula for  $g(b)$ ? (*circle one*)

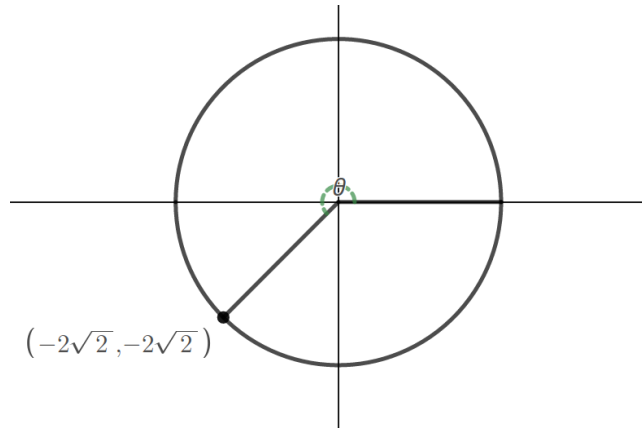
$$g(b) = \frac{2(b-1)^2(b+4)}{(b+1)(b+5)(b-2)}$$

$$g(b) = \frac{(b-3)(b+2)(b-5)}{(b+5)(b-1)(b-3)}$$

$$g(b) = \frac{2(b-3)(b-1)^2(b+4)}{(b+1)(b+5)(b-2)(b-3)}$$

$$g(b) = \frac{2(b+1)(b+5)(b-2)(b-3)}{(b-1)^2(b+4)(b-3)}$$

**Problem 8** Let  $\theta$  be the angle in the following picture. The circle pictured has radius 4.



What is  $\sin(\theta)$ ?

What is  $\cos(\theta)$ ?