

Name \_\_\_\_\_ Period \_\_\_\_\_  
**Spring 2013 Final Exam Review** Show all work and answers on **SEPARATE PAPER!**  
The review for the final must be completed by the date of the original final exam in order to be eligible for a retest in the event of a failing final exam grade.

**Calculator permitted:**

- Determine which binomial is *not* a factor of  $4x^4 - 21x^3 - 46x^2 + 219x + 180$ . pg.327, ex2
  - $x + 4$
  - $x + 3$
  - $x - 5$
  - $4x + 3$
- Write  $-4x^2(-2x^2 + 5x^3)$  in standard form. Then classify it by degree and number of terms. pg.313, ex1
- Classify  $3x^5 + 8x^4 + x^3$  by degree and by number of terms. pg. 313, ex 1

**DIVIDE:**

- $-4x^3 + x^2 - 4x + 2$  by  $x + 4$ . pg. 328, ex3
- Use synthetic division to find  $P(-1)$  for  $P(x) = x^4 - 5x^3 + x^2 + 2x - 3$ . pg. 329, ex 5

**Find the roots of the polynomial equation.** pg. 348, ex 2

- $2x^3 + 2x^2 - 19x + 20 = 0$
- $x^3 + x^2 - 8x - 8 = 0$

**Factor the expression.** pg. 342, ex 2

- $x^3 - 5x^2 + 7x - 35 = 0$
- Simplify  $\sqrt[3]{24a^{10}b^{15}}$ . Assume that all variables are positive.

**Divide and simplify. Assume that all variables are positive. Rationalize the denominator of the expression if necessary.** pg. 382, ex 5

- $\frac{\sqrt[3]{270x^{20}}}{\sqrt[3]{5x}}$
- $\frac{\sqrt{5x^8y^{10}}}{\sqrt{7x^2y^3}}$

- The formula for the volume of a sphere is  $V = \frac{4}{3}\pi r^3$ . Find the radius, to the nearest hundredth, of a sphere with a volume of 12 in.<sup>3</sup>.

**Simplify.** 14.  $-\sqrt{6} + 4\sqrt{36} + 5\sqrt{6}$  pg.387, ex 3

**Solve the equation.**

- $\sqrt{x+6} + 4 = 8$  pg.397, ex 1
- $(x-9)^{\frac{3}{5}} = 8$  pg. 397, ex 1

**Multiply.** 17.  $(-5 - \sqrt{2})(2 + \sqrt{2})$  pg. 387, ex 4

- An initial population of 250 quail increases at an annual rate of 17%. Write an exponential function to model the quail population. pg. 439, ex 2
- Write an exponential function  $y = ab^x$  for a graph that includes (0, 5) and (2, 45). pg.440, ex 3
- The half-life of a certain radioactive material is 83 hours. An initial amount of the material has a mass of 179 kg. Write an exponential function that models the decay of this material. Find how much radioactive material remains after 22 hours. Round your answer to the nearest thousandth. pg. 448, ex 3
- Suppose you invest \$1700 at an annual interest rate of 7.3% compounded continuously. How much will you have in the account after 2 years? pg. 450, ex 5
- Write the equation in logarithmic form:  $3^7 = 2,187$  pg. 455, ex 2
- Write the equation  $\log_{64} 16 = \frac{2}{3}$  in exponential form.

**Write the expression as a single logarithm.** 38-42: pg. 463, ex 2, 3

24.  $6 \log_8 v + 7 \log_8 q$

25.  $\log_6 64 - \log_6 8$

**Expand the logarithmic expression.**

26.  $\log_9 8m^5$

**Solve for x. Round to the nearest thousandth.**

27.  $6e^{4x} - 2 = 3$

28.  $\log 5x + \log 3 = 0$

29. Suppose that  $y$  varies jointly with  $w$  and  $x$  and inversely with  $z$  and  $y = 70$  when  $w = 2$ ,  $x = 10$  and  $z = 2$ . Write the equation that models the relationship. Then find  $y$  when  $w = 8$ ,  $x = 5$  and  $z = 7$ . pg. 498, ex 4, 5

**Identify the points of discontinuity: are they holes or vertical asymptotes AND horizontal asymptote.** pg. 510, ex1-2-3

30.  $y = \frac{x+8}{x^2-9x+18}$

31. Describe the vertical asymptote(s) and hole(s) for the graph of  $y = \frac{(x-2)(x+4)}{(x+4)(x+5)}$ .

**Is the relationship between the variables in the table a direct variation, an inverse variation, or neither? If it is a direct or inverse variation, write a function to model it.** pg. 497, ex 1

32.

$x$	-7	-4	-1	4
$y$	105	60	15	-60

**Multiply or divide. State any restrictions on the variables.** pg. 518, ex1-2

33.  $\frac{x+5}{x+3} \div \frac{x+6}{x^2+9x+18}$

34.  $\frac{a^2}{a+2} \cdot \frac{a^2+3a+2}{a^2+5a}$

**Add or subtract. Simplify if possible.** pg. 523, ex 2-4

35.  $\frac{b^2+7b+10}{b^2+10b+16} - \frac{6}{b+8}$

36.  $\frac{6}{k+7} + \frac{5}{k^2-49}$

**Simplify the complex fraction.** pg. 524, ex5-6

37.  $\frac{\frac{3}{3k} - \frac{1}{5k}}{\frac{3}{5k} + \frac{1}{4k}}$

38.  $\frac{\frac{m^2+11m+30}{m+1}}{\frac{m+4}{m+6}}$

**Solve the equation. Check the solution.** pg. 530, ex1-2

39.  $\frac{7}{3d} + \frac{6}{5d} = -5$

40.  $\frac{-1}{x-4} = \frac{2}{x-5}$

41. Write an equation of an ellipse with center (3, 4), horizontal major axis of length 16, and minor axis of length 10. pg. 593 ex 1
42. Write an equation for the translation of  $x^2 + y^2 = 9$ , 8 units right and 6 units up. 10.3
43. Write an equation of a parabola with a vertex at the origin and a directrix at  $y = 6$  10.2
44. Identify the vertex, focus, and directrix of the graph of  $12(y-3) = (x+5)^2$ .

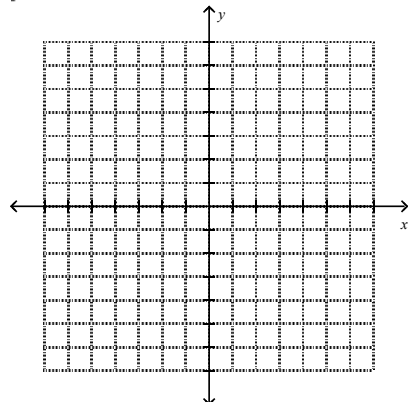
**Identify the conic section. If it is a parabola, give the vertex. If it is a circle, give the center and radius. If it is an ellipse or a hyperbola, give the center and foci.** 10.6

45.  $5x^2 + 7y^2 - 20x - 42y + 48 = 0$       46.  $5x^2 - 2y^2 + 30x - 20y - 15 = 0$
47. The optimal height  $h$  of the letters of a message printed on pavement is given by the formula  $h = \frac{0.00252d^{2.27}}{e}$ . Here  $d$  is the distance of the driver from the letters and  $e$  is the height of the driver's eye above the pavement. All of the distances are in meters. Find  $h$  for  $d = 90$  m and  $e = 1.4$  m. Show your work.
48. The velocity of sound in air is given by the equation  $v = 20\sqrt{273 + t}$ , where  $v$  is the velocity in meters per second and  $t$  is the temperature in degrees Celsius.
- Find the temperature when the velocity of sound in air is 318 meters per second. Round the answer to the nearest degree.
  - Find the velocity of sound in meters per second when the temperature is  $20^\circ\text{C}$ . Round the answer to the nearest meter per second.
49. Mr. Yonker bought himself a new blue Lexus convertible. The cost of this brand new auto is \$49,950.00. Well, it is estimated to depreciate in value at an annual rate of 14%. What will the value of his car be when it is 4 years old?
50. A mirror with a parabolic cross section is used to collect sunlight on a pipe located at the focus of the mirror. The pipe is located 2 inches from the vertex of the mirror. Write an equation of the parabola that models the cross section of the mirror. Assume that the parabola opens upward.
51. The maximum load a cylindrical column can support varies directly as the fourth power of the diameter and inversely as the square of the height. A column that is 2 ft. in diameter and 10 ft. high can support up to 6 tons. If a column is 1 ft. in diameter and 12 ft. high, what is the maximum load it can support?
52. A group of college students are volunteering for Help the Homeless during their spring break. They are putting the finishing touches on a house they built. Working alone, Irina can paint a certain room in 7 hours. Paulo can paint the same room in 6 hours. Write an equation that can be used to find how long it will take them working together to paint the room. How many hours will it take them to paint the room? If necessary, round your answer to the nearest hundredth.
53. The landscape plans of a public park include a circular fountain. The plans have been gridded where the units are meters. The center of the fountain is located on the plans at the coordinates of  $(4, -5)$ . The diameter of the fountain is 14 meters.
- Write an equation that models the outline of the fountain as located on the landscape plans.
  - Find the circumference of the fountain (round to the nearest meter).

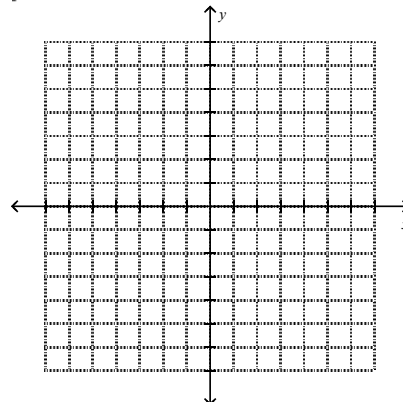
\*\*\*\*\* **Non-Calculator Section** \*\*\*\*\*

**Graph:**

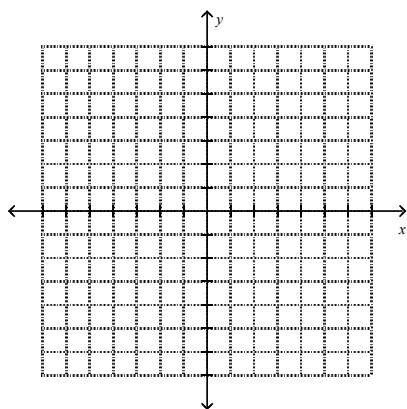
54.  $y = \sqrt{x} + 1$  pg. 421, ex1-3



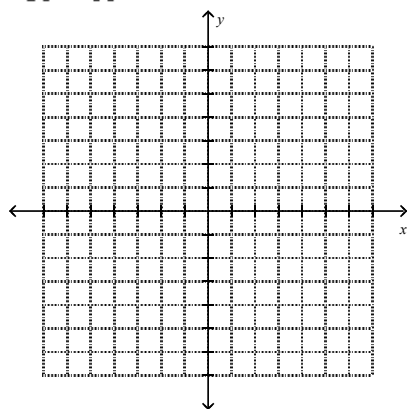
55.  $y = \sqrt{x + 2}$



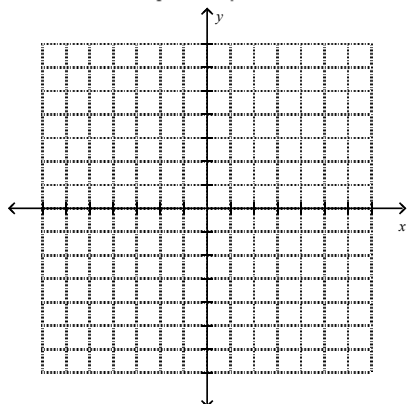
56.  $4x^2 - 16y^2 = 64$  pg. 568 ex 1



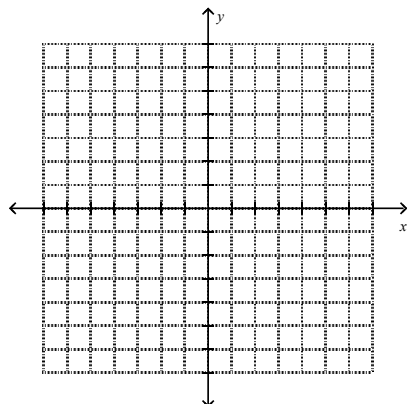
57.  $\frac{x^2}{36} + \frac{y^2}{18} = 1$  pg. 580, ex 4



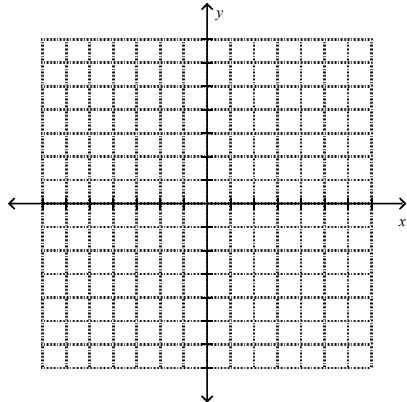
58.  $(x - 5)^2 + (y - 5)^2 = 4$  pg. 573 ex 4



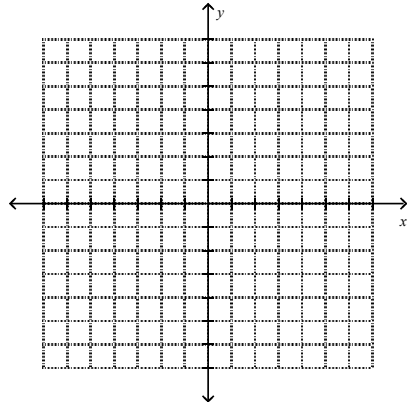
59.  $8(y - 4) = (x + 5)^2$  pg. 568 ex5



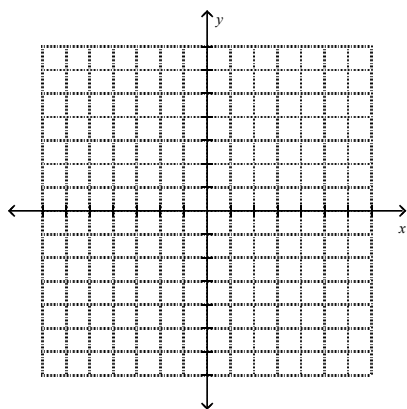
60.  $y = (4)^x$  pg. 447 ex1



61.  $y = 2(4)^x$



62.  $y = \log_4 x$  pg. 456 ex 5-6



63.  $y = \frac{1}{x - 3} + 3$  pg. 505 ex. 4

