

## Review for final

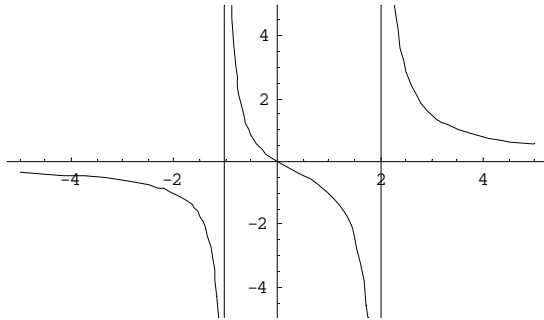
### Section 3.5

1. For each of the following find (a) symmetry, (b) y-intercepts, (c) x-intercepts, (d) vertical asymptotes, (e) horizontal asymptotes, (f) plot additional points if needed and graph.

a.  $f(x) = \frac{3x}{x-1}$

b.  $f(x) = \frac{4x^2}{x^2-9}$  on another sheet

c.  $f(x) = \frac{4x}{x^2-1}$



2.

a. As  $x \rightarrow -1^-$ ,  $f(x) \rightarrow \underline{-\infty}$

b. As  $x \rightarrow -1^+$ ,  $f(x) \rightarrow \underline{\infty}$

c. As  $x \rightarrow 2^-$ ,  $f(x) \rightarrow \underline{-\infty}$

d. As  $x \rightarrow 2^+$ ,  $f(x) \rightarrow \underline{\infty}$

e. As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \underline{0}$

f. As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \underline{0}$

### Section 3.6

3. Solve for x:  $x^2 + 5x + 4 > 0$   $(-\infty, -4) \cup (-1, \infty)$

4. Solve for x:  $-x^2 + x \geq 0$   $[0, 1]$

5. Solve for x:  $\frac{x-3}{x+4} < 0$   $(-4, 3)$

6. Solve for x:  $\frac{x-2}{x+2} \leq 2$   $(-\infty, -6] \cup (-2, \infty)$

### Section 4.1

7. Approximate each number using your calculator. Round to three decimal places.
- $5^{\sqrt{3}}$      16.242
  - $6^{-1.2}$      0.116
  - $e^{3.4}$      29.694
8. Find the accumulated value of an investment of \$5000 for 10 years at an interest rate of 6.5% if the money is
- Compounded semiannually     \$9479.19
  - Compounded quarterly     \$9527.79
  - Compounded monthly     \$9560.92
  - Compounded continuously     \$9577.70

### Section 4.2

9. Write each in its equivalent exponential form
- $2 = \log_9 x$       $9^2 = x$
  - $\log_5 125 = y$       $5^y = 125$
10. Write each in its equivalent logarithmic form
- $5^{-3} = \frac{1}{125}$       $\log_5 \frac{1}{125} = -3$
  - $\sqrt[3]{64} = 4$       $\log_{64} 4 = \frac{1}{3}$
  - $8^y = 300$       $\log_8 300 = y$
11. Evaluate each expression without using a calculator
- $\log_6 \sqrt{6}$      1/2
  - $\log_3 \frac{1}{9}$      -2
  - $\log_7 1$      0
  - $\log_5 5^7$      7
  - $7^{\log_7 23}$      23
  - $\log 10,000$      4
  - $10^{\log 53}$      53
  - $\ln \frac{1}{e^7}$      -7
  - $e^{\ln 300}$      300

### Section 4.3

12. Expand each of the following
- $\log 0.001x$       $-3 + \log x$
  - $\log_5 \frac{125}{y}$       $3 - \log_5 y$

c.  $\ln \frac{e^4}{5}$        $4 - \ln 5$

d.  $\log_b(xy^3)$        $\log_b x + 3\log_b y$

e.  $\log_8\left(\frac{64}{\sqrt{x+1}}\right)$        $2 - \frac{1}{2}\log_8(x+1)$

f.  $\ln \sqrt{ex}$        $\frac{1}{2} - \frac{1}{2}\ln x$

g.  $\log_5\left(\sqrt[3]{\frac{x^2y}{25}}\right)$        $\frac{2}{3}\log_5 x + \frac{1}{3}\log_5 y - \frac{2}{3}$

13. Condense each of the following

a.  $\log 250 + \log 4$        $3$

b.  $\log(3x+7) - \log x$        $\log\left(\frac{3x+7}{x}\right)$

c.  $\frac{1}{3}\ln x + \ln y$        $\ln(y \cdot \sqrt[3]{x})$

d.  $2\ln x - \frac{1}{2}\ln y$        $\ln\left(\frac{x^2}{\sqrt{y}}\right)$

e.  $\frac{1}{3}(\log_4 x - \log_4 y)$        $\log_4\left(\sqrt[3]{\frac{x}{y}}\right)$

f.  $\frac{1}{3}(\log_4 x - \log_4 y) + 2\log_4(x+1)$        $\log_4\left(\frac{\sqrt[3]{x}(x+1)^2}{\sqrt{y}}\right)$

14. Use common logarithms or natural logarithms and a calculator to evaluate each to four decimal places.

a.  $\log_6 17$        $1.5812$

b.  $\log_{0.3} 19$        $-2.4456$

#### Section 4.4

15. Solve each of the following

a.  $3^x = 81$        $4$

b.  $2^{2x-1} = 32$        $3$

c.  $19^x = 143$        $1.685$

d.  $4e^{7x} = 10,273$        $1.1216$

e.  $e^{4x-5} - 7 = 11,243$        $3.582$

f.  $e^{2x} - 3e^x + 2 = 0$        $0$  and  $0.693$

g.  $\log_5(x-7) = 2$        $32$

h.  $\log_2(4x+1) = 5$        $31/4$

i.  $\log_2(x-1) + \log_2(x+1) = 3$        $3$

- j.  $\ln x = 3$       20.09  
k.  $7 + 3\ln x = 6$     0.717

### Section 5.1

16. Solve each of the following using the addition method

a.  $2x + 3y = 6$   
 $2x - 3y = 6$       (3, 0)

b.  $4x + 3y = 15$   
 $2x - 5y = 1$       (3, 1)

17. Solve each of the following using the substitution method

a.  $x + y = 4$   
 $y = 3x$       (1, 3)

b.  $5x + 2y = 0$   
 $x - 3y = 0$       (0, 0)

### Section 5.2

18. Solve each of the following

a.  $4x - y + 2z = 11$   
 $x + 2y - z = -1$       (2, -1, 1)  
 $2x + 2y - 3z = -1$

b.  $2x - 4y + 3z = 17$   
 $x + 2y - z = 0$       (3, 1, 5)  
 $4x - y - z = 6$

c.  $2x + y = 2$   
 $x + y - z = 4$       (1, 0, -3)  
 $3x + 2y + z = 0$

### Section 5.6

19. Solve each of the following

Objective Function  $z = 3x + 2y$

Constraints  $x \geq 0, y \geq 0$

a.  $2x + y \leq 8$       **Max 16 @ (0, 8)**  
 $x + y \geq 4$

Objective Function  $z = 4x + y$

Constraints  $x \geq 0, y \geq 0$

b.  $2x + 3y \leq 12$       **Max 24 @ (6, 0)**  
 $x + y \geq 3$

Objective Function  $z = x + 6y$

Constraints  $x \geq 0, y \geq 0$

c.  $2x + y \leq 10$       **Max 25 @ (5, 0)**  
 $x - 2y \geq -10$

- d. Food and clothing are shipped to victims of a natural disaster. Each carton of food will feed 12 people, while each carton of clothing will help 5 people. Each 20-cubic-foot box of food weighs 50 pounds and each 10-cubic-foot box of clothing weighs 20 pounds. The commercial carriers transporting food and clothing are bound by the following constraints:

- The total weight per carrier cannot exceed 19,000 pounds.
- The total volume must be less than 8000 cubic feet.

How many cartons of food and clothing should be sent with each plane shipment to maximize the number of people who can be helped?

**300 cartons of food**  
**200 cartons of clothing**