Math 1100: Exam Review Problems

In addition to completing this review sheet, you should review your quizzes and homework. Also, old exams are available on Blackboard for you to use for review.

Section 0.1

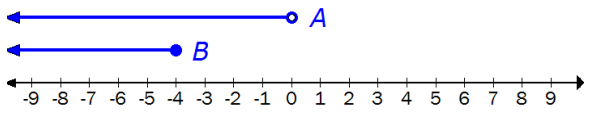
1. Given the set $\{-5.238, -\frac{4}{3}, \sqrt{2}, 0, 1.232332333..., \frac{\pi}{4}, 4.3\overline{2}, \sqrt[3]{27}, 103\}$, determine the:

   (a) Rational Numbers (b) Integers (c) Natural Numbers

2. Write each set using interval notation:

   (a) $\{x \mid -10 < x \leq -5\}$ (b) $\{x \mid x \leq -2 \text{ or } x > 4\}$ (c) $\{x \mid x \neq 7, -6\}$

3. Given the sets shown on the graph below, find interval notation for:



   (a) $A \cup B$

   (b) $A \cap B$

Section 0.2

1. Perform the indicated operations and simplify.

   (a) $\left(\frac{1}{6} - \frac{1}{5}\right) \div \frac{7}{10}$ (b) $\frac{4}{\frac{1}{3} + \frac{3}{5}}$ (c) $\frac{5 - 3^{-2}}{6^{-1} + 2}$

   (d) $(-64)^{1/2}$ (e) $9^{-3/2}$ (f) $6\sqrt{32} - 4\sqrt{18}$

   (g) $(\sqrt{2} + \sqrt{5})^2$ (h) $\frac{-3-6}{1(-5)+6} - \frac{6(-7)}{-2(3)+2}$

   (i) $\frac{10 - \sqrt{(-10)^2 - 4(2)(3)}}{2(2)}$ (j) $-6^2 - 24 \div 2^3 \cdot 3 - 5$

2. Use rules of exponents to find the missing expression (marked with a ?).

   (a) $\frac{(k^{2a})^3}{k^{3a-1}} = k^?$ (b) $\frac{\sqrt[4]{A}}{\sqrt[3]{A^5}} = A^?$

Section 0.3

1. Solve.

   (a) $-5[5-4(3-s)] = 7-4(3s-8)$

   (b) $y - 6Rsk = 9R$, for R

   (c) $8C = \frac{1}{5}p(s+6y)$, for s

2. Solve and write your answer using interval notation.

   (a) $\dfrac{2-7x}{5} - \dfrac{1-2x}{15} \geq -1$

   (b) $7x - 3 \geq 7(x+1)$

   (c) $x + 1 \leq -3$ or $3x + 2 > 11$

   (d) $4x - 1 > 12$ or $x - 5 \leq 35 - 3x$

   (e) $4(1-x) < 4$ and $\dfrac{x-4}{3} \leq \dfrac{1}{3}$

   (f) $3x + 7 < 34$ and $x - 6 \leq -8$

Section 0.4

1. Solve.

   (a) $13 - |z+4| = 3$

   (b) $|6p+5| - 10 = -22$

2. Solve and write your answer using interval notation.

   (a) $|10x - 10| > -8$

   (b) $|-8-2x| < 4$

   (c) $|10x-4| - 5 \leq -14$

   (d) $\left|\dfrac{x-7}{4}\right| \geq 9$

Section 0.5

1. Perform the indicated operations and simplify.

   (a) $(3q^2 - 9q - 6) + (4q^2 - 5q - 2) - (2q - 2)$

   (b) $(5y + 6z)(3y - z)$

   (c) $(a + 2b)(a^2 + 5ab + 4b^2)$

   (d) $(6v+7)^2 - (4v-6)(4v+6)$

2. Use long division to find the quotient and remainder.

   (a) $(4x^3 - 2x^2 + 8x - 9) \div (2x - 3)$

   (b) $(9x^5 + 6x^3 - 1) \div (3x^3 + x)$

Section 0.6

1. Factor completely over the integers.

   (a) $4b^3 - 4b^2c - b + c$

   (b) $6x^2 - 7x - 20$

   (c) $a^2 - 9ab + 20b^2$

   (d) $9x^3 - x$

   (e) $9(z-3)^2 - 12(z-3) + 4$

   (f) $6c^6 - 5c^3 + 1$

2. Solve.

   (a) $x(x-5) = 6$

   (b) $z^3 - 9z = 27 - 3z^2$

   (c) $5c^3 = 125c$

   (d) $(a-1)(a+8) = -18$

Section 0.7

1. Solve. If a specific method is listed, use it. Otherwise, use any method.

   (a) $2(x+4)^2-6=44$ (extracting square roots)

   (b) $w^2-4w=2$ (quadratic formula)

   (c) $x^2-2x-6=0$ (completing the square)

   (d) $x^2+6x+4=0$

   (e) $(u-2)(u-7)=9$

   (f) $3b^4-7b^2-10=0$

   (g) $5(m^2+1)^2-3=122$

   (h) $(y-1)^2-6(y-1)+9=0$

Section 0.8

1. Simplify.

   (a) $\dfrac{6t-30}{5t-20}\div\dfrac{t^2-10t+25}{t^2-8t+16}$

   (b) $\dfrac{6}{x+3}-\dfrac{x+4}{9-x^2}+\dfrac{2x-3}{x^2-6x+9}$

   (c) $\left(\dfrac{4x}{x-2}-\dfrac{2+3x}{x}\right)\cdot\left(\dfrac{x^3-8}{5x+10}\right)$

   (d) $\dfrac{\dfrac{x}{9}-\dfrac{1}{x}}{1+\dfrac{3}{x}}$

   (e) $\dfrac{\dfrac{1}{x^2}-\dfrac{1}{y^2}}{\dfrac{1}{x^2}-\dfrac{2}{xy}+\dfrac{1}{y^2}}$

   (f) $\dfrac{x^{-1}+y^{-1}}{x^{-2}-y^{-2}}$

2. Solve.

   (a) $\dfrac{r}{r-2}-\dfrac{2}{r}=\dfrac{12}{r^2-2r}$

   (b) $\dfrac{y^2+20}{y^2+y-20}+\dfrac{y-3}{4-y}=\dfrac{y}{y+5}$

   (c) Solve for y: $\dfrac{3x}{y}-\dfrac{2}{z}=\dfrac{5}{x}$

Section 0.9

1. Simplify. Assume that all variables represent positive real numbers.

   (a) $\sqrt[3]{64m^5n^{10}}$

   (b) $\sqrt[3]{12w^6r^3}\cdot\sqrt[3]{30w^7r^5}$

   (c) $\dfrac{\sqrt{40a^7b}}{\sqrt{5a^2b^5}}$

   (d) $(\sqrt{2}+\sqrt{5})^2$

2. Rationalize the denominator. $\dfrac{3\sqrt{2}}{4+\sqrt{10}}$

3. Solve.

   (a) $\sqrt{2x+14}-3=x$

   (b) $\sqrt[3]{u^2-1}=2$

   (c) $t^{\frac{2}{3}}-5=20$

   (d) $\dfrac{(7u+2)^3}{3}=9$

   (e) $\dfrac{89}{2z^4+1}-1=7$

Section 1.1

1. Given that a graph passes through the point $(4, -3)$, find another point on the graph if it is symmetric with respect to the:

   (a) x-axis (b) y-axis (c) origin

2. Determine the symmetries of the graph of the following relations (if they exist):

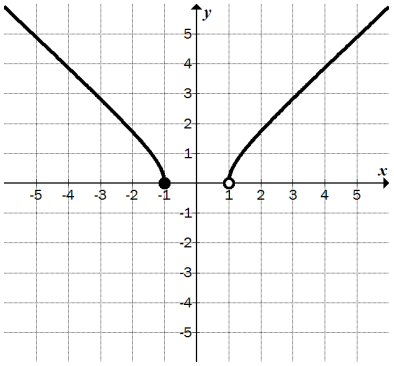
   (a) $x^2 + y^2 = 9$ (b) $8y = 4x^2 - 1$

Section 1.3

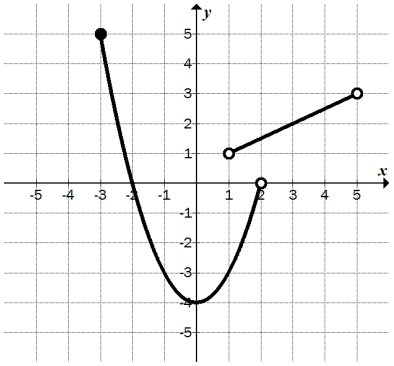
1. Determine whether or not the relation is a function, and then give the domain and range in interval notation:

   (a) $\{(-5, 5), (-2, 5), (4, 6), (-4, 7)\}$ (b) $\{(-4, y) \mid y \leq 2\}$

   (c)



   (d)



Section 1.4

1. Given the function $-x^2 - 3x$, find:

   (a) $f(-2)$ (b) $f(x-2) - f(-2)$

   (c) $f(-2) - f(x)$ (d) where $f(x) = 0$

2. Find $f(1) - f(2)$, given $f(x) = \begin{cases} \dfrac{6-x}{2}, & \text{for } -1 < x < 2 \\ -2, & \text{for } x \geq 2 \end{cases}$

3. Find the domain of the function:

   (a) $f(x) = \dfrac{\sqrt[3]{x+5}}{x^2 - 4}$ (b) $g(x) = \dfrac{x-3}{\sqrt{x+2}}$

Section 1.5

1. Find and simplify the difference quotient $\left(\dfrac{f(x+h)-f(x)}{h}\right)$ for each function:

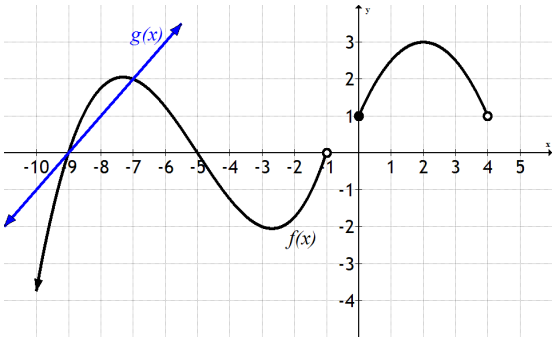
   (a) $f(x) = -x^2 - 2x + 3$ (b) $f(x) = \dfrac{-1}{x-2}$

2. Given $f(x) = \sqrt{x-2}$ and $g(x) = x^2 - 9$, find each function below, and its domain:

   (a) $(f+g)(x)$ (b) $(f/g)(x)$ (c) $(g/f)(x)$

Section 1.6

1. Given the graph of $f(x)$ (the broken curve) and $g(x)$ (the line), find:



   (a) The domain of f (b) The range of f

   (c) The interval(s) where f is increasing (d) The interval(s) where f is decreasing

   (e) The interval(s) where f is constant (f) Local maximum(s) & minimum(s) of f

   (g) $f(2)$ (h) Solve $f(x) = 3$

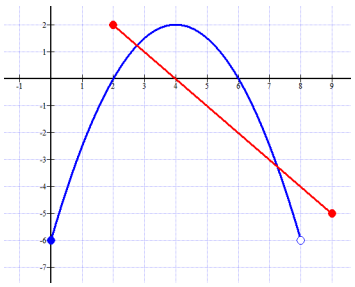
   (i) The x-intercept(s) of f (j) The y-intercept(s) of f

   (k) The zero(s) of f (l) Where $f(x) \geq 0$

   (m) The number of solutions to $f(x) = -1$ (n) If $f(x)$ appears even/odd/neither

   (o) Where $g(x) \geq 0$ (p) Where $g(x) < f(x)$

2. Given the functions $f(x)$ (line segment) and $g(x)$ (parabola) shown, find:



   (a) $(f+g)(6)$ (b) $\left(\dfrac{f}{g}\right)(4)$

   (c) $(g-f)(2)$ (d) $(fg)(0)$

3. Determine whether the functions are even/odd/neither and state what that would mean about the graph of the function.

   (a) $f(x) = \dfrac{2x}{x^2+1}$ (b) $f(x) = |x| - x^2$

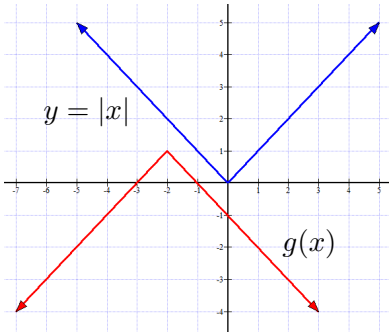
Section 1.7

1. If $(2, -3)$ is on the graph of $y = f(x)$, find the corresponding point on the graph of:

   (a) $y = -3f(-5x) - 2$

   (b) $y = \frac{1}{2}f(x - 5) + 2$

2. Find the equation of the function $g(x)$, given that it is a transformation of the graph of $y = |x|$.



3. Find a formula for a function $g(x)$ whose graph is obtained from $f(x) = \sqrt{x}$ by:

   (a) reflecting across the y-axis, stretching horizontally by a factor of 2 and shifting down 3 units.

   (b) shrinking vertically by a factor of $\frac{1}{2}$, reflecting across the x-axis, and shifting right 3 units and up 4 units.

4. Sketch the graph of $f(x) = -3|x - 5| + 2$ and determine:

   (a) the domain of f

   (b) the range of f

   (c) interval(s) on which f is inc/dec/constant

   (d) local max/min and absolute max/min

Section 2.1

1. Find the equation (in slope-intercept form, if possible) of the line:

   (a) passing through $(-2, 2)$ and $(1, -3)$

   (b) passing through $(-2, -3)$ and $(1, -3)$

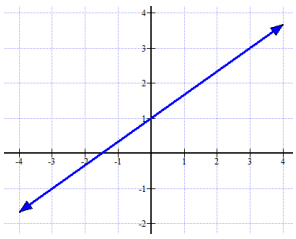
   (c) passing through $(5, -4)$, parallel to the line $y = -\frac{4}{5}x - 3$

   (d) passing through $(5, -4)$, perpendicular to $y = -1$

2. Find the value of k, so that the line containing the points $(k, 2)$ and $(2, -2)$ is perpendicular to the line containing the points $(-5, 3)$ and $(0, 7)$.

3. A cable company charges a \$20 installation fee and \$55 per month of service. Write a function for $C(t)$ that represents the total cost of t months of cable service. What is the total cost for 6 months of service? What is the domain of $C(t)$? What is the range of $C(t)$?

4. Find the equation of the line graphed below:



Section 2.3

1. For the function $g(x) = -2x^2 + 4x + 4$, find:

   (a) the vertex

   (b) the axis of symmetry

   (c) intervals on which g is inc/dec

   (d) the max/min of g

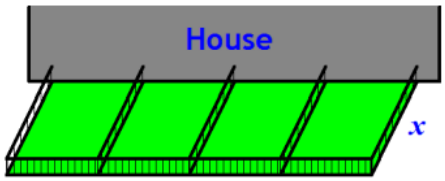
   (e) the range

   (f) the x-intercept(s)

   (g) the y-intercept(s)

   (h) the zeros

2. Tessa has 40 feet of fencing available to construct a fence that will divide her garden into four rectangular sections. Her house forms one side of the garden and x represents the width, as shown below. Determine the largest total area that can be enclosed.



3. A model rocket is launched with an initial velocity of 48 ft/s from a height of 85 ft. the height of the rocket, in feet, t seconds after it has been launched is given by the function $s(t) = -16t^2 + 48t + 85$. Determine the time at which the rocket reaches its maximum height and find the maximum height.

Section 2.4

1. Solve for x and put your answer in interval notation.

   (a) $x^2 \leq 9$

   (b) $3x^2 > 16x - 16$

2. Find the domain of the function $f(x) = \sqrt{25 - 4x^2}$, using interval notation.

Section 3.1

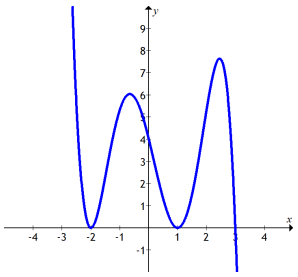
1. For the following functions, find the end behavior, zeros and their multiplicity, y-intercept, and then graph:

   (a) $f(x) = -x^3(x-2)^2(x+1)(x-3)^2$

   (b) $f(x) = x^3 + 2x^2 - 4x - 8$

2. Solve the inequality: $2x^3 - 8x^2 + 8 \leq 2x$

3. Determine the equation of the polynomial, $f(x)$, of minimum degree whose graph is shown:



Sections 4.1 & 4.2

1. For the following functions, determine the domain, vertical asymptote(s), horizontal asymptote(s), x-intercept(s), y-intercept(s) and any holes that exist, and then graph:

   (a) $f(x) = \dfrac{2x^2 - 5x + 3}{x^2 - x}$ (b) $f(x) = \dfrac{-4}{x^2 - 4}$

2. Find a rational function, $f(x)$, that satisfies the given conditions: VA: $x = -2$, HA: $y = 0$, $y-$intercept $(0, 4)$

Section 4.3

1. Solve, and write your answer using interval notation.

   (a) $\dfrac{y}{y+1} \leq 0$ (b) $\dfrac{(w-1)^2}{w^2 - 9} < 0$ (c) $\dfrac{x-2}{x+4} \geq 3$

Section 5.1

1. Given the functions $f(x) = x^2 - 1$ and $g(x) = \sqrt{x+2}$, find (and simplify):

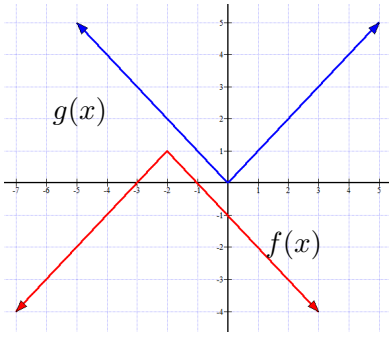
   (a) $(f \circ g)(2)$ (b) $(g \circ g)(-1)$

   (c) $(f \circ g)(x)$ (d) The domain of $(f \circ g)(x)$

2. Given the functions $f(x) = \dfrac{1}{x}$ and $g(x) = \dfrac{2}{3-x}$, find (and simplify):

   (a) $(f \circ g)(x)$ and its domain (b) $(g \circ f)(x)$ and its domain

3. Given the functions $f(x)$, graphed in red, and $g(x)$, graphed in blue, find:



   (a) $(f \circ g)(0)$

   (b) $(g \circ f)(2)$

   (c) $(f \circ f)(-4)$

4. Given the function $h(x) = \sqrt{4x^2 - 1}$, find functions $f(x)$ and $g(x)$ such that $h(x) = (f \circ g)(x)$. (Answers may vary.)

Section 5.2

1. Determine whether the following functions are one-to-one. If they are one-to-one, find the inverse, $f^{-1}(x)$

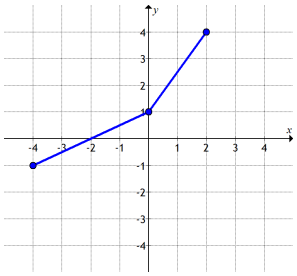
   (a) $f(x) = (x-3)^2 + 2$

   (b) $f(x) = \sqrt[3]{x+1}$

   (c) $f(x) = \dfrac{x-3}{x+1}$

   (d) $f(x) = |x+5|$

2. Given the function graphed below, graph its inverse on the same graph. State the domain and range of both the original function and its inverse.



3. Given a function $f(x)$ and its inverse $f^{-1}(x)$, find:

   (a) $f^{-1}(f(-27))$

   (b) A point on the inverse if $f(5) = -1$

Section 6.1

1. Convert to logarithmic form:

   (a) $2^r = x$

   (b) $e^{-x} = 5$

   (c) $10^y = x + 3$

2. Convert to exponential form:

   (a) $\log_3 x = y$

   (b) $\log(x^3) = 4$

   (c) $\ln(y) = 5$

3. Simplify:

   (a) $\log_2(16)$

   (b) $\log(1000)$

   (c) $\ln(e^2)$

   (d) $\log(.01)$

   (e) $\log_4\left(\dfrac{1}{64}\right)$

   (f) $\log_9(3)$

   (g) $\ln\left(\dfrac{1}{e^2}\right)$

   (h) $\log_5(1)$

   (i) $\log_3(3^{-8})$

4. Find the domain of the function, using interval notation: $f(x) = \log(5 - 2x)$

5. Graph and find the domain, range, asymptote, and y-intercept.

   (a) $f(x) = -3^{x+2} - 1$

   (b) $f(x) = e^{-x} + 2$

   (c) $f(x) = \log_3(-x) + 1$

   (d) $f(x) = -\ln(x+2)$

Section 6.2

1. Expand and simplify where possible using sums and differences of logarithms.

   (a) $\ln\sqrt{\dfrac{e^4x}{y^5}}$ (b) $\log_b\left(\dfrac{b^4}{x^2y^3}\right)$ (c) $\log\left(\dfrac{x^3}{1000}\right)$

2. Write as a single logarithm, and simplify (if possible).

   (a) $\dfrac{1}{2}\log(x) - 3\log(y) - 2\log(z)$ (b) $\log_5(3) - \log_5(150) + \log_5(10)$

3. True or False:

   (a) $\log_2(x) = \dfrac{\ln(x)}{\ln(2)}$ (b) $\log_b(xy) = \log_b(x)\cdot\log_b(y)$ (c) $e^{\ln(x)} = x$

   (d) $\log_b\left(\dfrac{x}{y}\right) = \dfrac{\log_b(x)}{\log_b(y)}$ (e) $\log_b\left(\dfrac{1}{x}\right) = -\log_b(x)$ (f) $\log_b(b) = b$

   (g) $\log_b(0) = 1$ (h) $\dfrac{\log_b(x)}{\log_b(y)} = \log_b(x) - \log_b(y)$

Sections 6.3 & 6.4

1. Solve.

   (a) $\dfrac{3^{x^2}}{9^{2x}} = \dfrac{1}{27}$ (b) $2 = \dfrac{25}{5+3e^{-x}}$ (c) $3^{4t-7} = 13^t$

   (d) $\log(x) + \log(x-99) = 2$ (e) $\log(10x+2) - \log(3x+9) = \log(3)$

   (f) $2\ln(x) = \ln(3x-4) + \ln(2x)$ (g) $\log_3(x-1) - \log_3(x+1) = 3$

2. For the following one-to-one functions, find the x-intercept(s) and y-intercept(s) (if they exist). Then find the inverse of each function.

   (a) $f(x) = 5e^{2x} - 10$ (b) $f(x) = 2\log_3(x+3) - 4$

Answer Key

Section 0.1

1.(a) $-5.238, -\frac{4}{3}, 0, 4.3\overline{2}, \sqrt[3]{27}, 103$

1.(b) $0, \sqrt[3]{27}, 103$

1.(c) $\sqrt[3]{27}, 103$

2.(a) $(-10, -5]$

2.(b) $(-\infty, -2] \cup (4, \infty)$

2.(c) $(-\infty, -6) \cup (-6, 7) \cup (7, \infty)$

3.(a) $(-\infty, 0)$

3.(b) $(-\infty, -4]$

Section 0.2

1.(a) $-\frac{1}{21}$

1.(b) $\frac{30}{7}$

1.(c) $\frac{88}{39}$

1.(d) Not a real number

1.(e) $\frac{1}{27}$

1.(f) $12\sqrt{2}$

1.(g) $7 + 2\sqrt{10}$

1.(h) $-\frac{39}{2}$

1.(i) $\dfrac{5 - \sqrt{19}}{2}$

1.(j) -50

2.(a) ? $= 3a + 1$

2.(b) ? $= -\frac{17}{12}$

Section 0.3

1.(a) $s = -\frac{1}{2}$

1.(b) $R = \dfrac{y}{9 + 6sk}$

1.(c) $s = \dfrac{40C - 6py}{p}$

2.(a) $(-\infty, \frac{20}{19}]$

2.(b) No solution

2.(c) $(-\infty, -4] \cup (3, \infty)$

2.(d) $(-\infty, \infty)$

2.(e) $(0, 5]$

2.(f) $(-\infty, -2]$

Section 0.4

1.(a) $z = -14, 6$

1.(b) No solution

2.(a) $(-\infty, \infty)$

2.(b) $(-6, -2)$

2.(c) No solution

2.(d) $(-\infty, -29] \cup [43, \infty)$

Section 0.5

1.(a) $7q^2 - 16q - 6$

1.(b) $15y^2 + 13yz - 6z^2$

1.(c) $a^3 + 7a^2b + 14ab^2 + 8b^3$

1.(d) $20v^2 + 84v + 85$

2.(a) Q: $2x^2 + 2x + 7$, R: 12

2.(b) Q: $3x^2 + 1$, R: $-x - 1$

Section 0.6

1.(a) $(2b - 1)(2b + 1)(b - c)$

1.(b) $(2x - 5)(3x + 4)$

1.(c) $(a - 5b)(a - 4b)$

1.(d) $x(3x - 1)(3x + 1)$

1.(e) $(3z - 11)^2$

1.(f) $(2c^3 - 1)(3c^3 - 1)$

2.(a) $x = -1, 6$

2.(b) $z = -3, 3$

2.(c) $c = -5, 0, 5$

2.(d) $a = -2, -5$

Answer Key

Section 0.7

1.(a) $x = -9, 1$

1.(b) $w = 2 \pm \sqrt{6}$

1.(c) $x = 1 \pm \sqrt{7}$

1.(d) $x = -3 \pm \sqrt{5}$

1.(e) $u = \dfrac{9 \pm \sqrt{61}}{2}$

1.(f) $b = \pm\sqrt{\dfrac{10}{3}}$

1.(g) $m = \pm 2$

1.(h) $y = 4$

Section 0.8

1.(a) $\dfrac{6(t-4)}{5(t-5)}$

1.(b) $\dfrac{9x^2 - 32x + 33}{(x-3)^2(x+3)}$

1.(c) $\dfrac{(x+2)(x^2+2x+4)}{5x}$

1.(d) $\dfrac{x-3}{9}$

1.(e) $\dfrac{y+x}{y-x}$

1.(f) $\dfrac{xy}{y-x}$

2.(a) $r = -2, 4$

2.(b) $y = 7$

2.(c) $y = \dfrac{3x^2 z}{5z + 2x}$

Section 0.9

1.(a) $4mn^3\sqrt[3]{m^2 n}$

1.(b) $2w^4 r^2 \sqrt[3]{45wr^2}$

1.(c) $\dfrac{2a^2\sqrt{2a}}{b^2}$

1.(d) $7 + 2\sqrt{10}$

2. $2\sqrt{2} - \sqrt{5}$

3.(a) $x = 1$

3.(b) $u = \pm 3$

3.(c) $t = \pm 125$

3.(d) $u = \frac{1}{7}$

3.(e) $z = \pm\frac{3}{2}$

Section 1.1

1.(a) $(4, 3)$

1.(b) $(-4, -3)$

1.(c) $(-4, 3)$

2.(a) symmetric about x-axis, y-axis, origin

2.(b) symmetric about y-axis

Section 1.3

1.(a) Is a function, $D = \{-5, -2, 4, -4\}$, $R = \{5, 6, 7\}$

1.(b) Not a function, $D = \{-4\}$, $R = (-\infty, 2]$

1.(c) Is a function, $D = (-\infty, -1] \cup (1, \infty)$, $R = [0, \infty)$

1.(d) Not a function, $D = [-3, 5)$, $R = [-4, 5]$

Answer Key

Section 1.4

1.(a) 2

1.(b) $-x^2+x$

1.(c) x^2+3x+2

1.(d) $x=0,-3$

2. $\frac{9}{2}$

3.(a) $(-\infty,-2)\cup(-2,2)\cup(2,\infty)$

3.(b) $(-2,\infty)$

Section 1.5

1.(a) $-2x-h-2$

1.(b) $\dfrac{1}{(x-2)(x+h-2)}$

2.(a) $\sqrt{x+2}+x^2-9$; $D=[2,\infty)$

2.(b) $\dfrac{\sqrt{x-2}}{x^2-9}$; $D=[2,3)\cup(3,\infty)$

2.(c) $\dfrac{x^2-9}{\sqrt{x-2}}$; $D=(2,\infty)$

Section 1.6

1.(a) $(-\infty,-1)\cup[0,4)$

1.(b) $(-\infty,3]$

1.(c) $(-\infty,-7),(-3,-1),(0,2)$

1.(d) $(-7,-3),(2,4)$

1.(e) None

1.(f) max: $2,3$, min: -2

1.(g) 3

1.(h) $x=2$

1.(i) $(-9,0),(-5,0)$

1.(j) $(0,1)$

1.(k) $x=-9,-5$

1.(l) $[-9,-5]\cup[0,4)$

1.(m) 3 solutions

1.(n) Neither

1.(o) $[-9,\infty)$

1.(p) $(-9,-7)$

2.(a) -2

2.(b) 0

2.(c) -2

2.(d) undefined

3.(a) Odd; sym about origin

3.(b) Even; sym. about y-axis

Section 1.7

1.(a) $(-\frac{2}{5},7)$

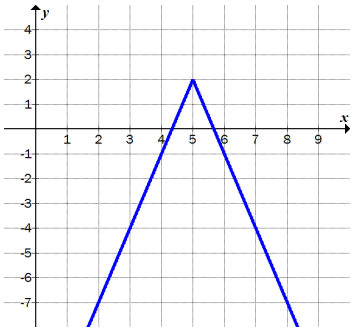
1.(b) $(7,\frac{1}{2})$

2. $g(x)=-|x+2|+1$

3.(a) $g(x)=\sqrt{-\frac{1}{2}x}-3$

3.(b) $g(x)=-\frac{1}{2}\sqrt{x-3}+4$

4.



4.(a) $D=(-\infty,\infty)$

4.(b) $R=(-\infty,2]$

4.(c) Inc: $(-\infty,5)$,
Dec: $(5,\infty)$,
Constant: None

4.(d) Local & Abs. Max: 2

Answer Key

Section 2.1

1.(a) $y = -\frac{5}{3}x - \frac{4}{3}$

1.(b) $y = -3$

1.(c) $y = -\frac{4}{5}x$

1.(d) $x = 5$

2. $k = -\frac{6}{5}$

3. $C(t) = 20 + 55t$; \$350; $D = (0, \infty)$; $R = (20, \infty)$

4. $y = \frac{2}{3}x + 1$

Section 2.3

1.(a) $(1, 6)$

1.(b) $x = 1$

1.(c) Inc: $(-\infty, 1)$
Dec: $(1, \infty)$

1.(d) Max: 6

1.(e) $(-\infty, 6]$

1.(f) $(1 \pm \sqrt{3}, 0)$

1.(g) $(0, 4)$

1.(h) $1 \pm \sqrt{3}$

2. 80 ft^2

3. $t = \frac{3}{2}$ s; 121 ft

Section 2.4

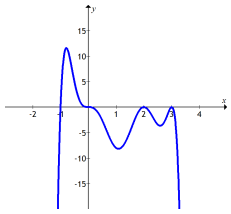
1.(a) $[-3, 3]$

1.(b) $(-\infty, \frac{4}{3}) \cup (4, \infty)$

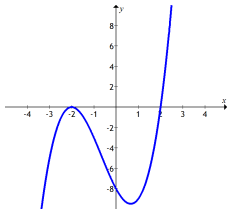
1.(c) $[-\frac{5}{2}, \frac{5}{2}]$

Section 3.1

1.(a) End Behavior: 
Zeros: $x = 0$ (mult=3), $x = 2$ (mult=2),
$x = -1$ (mult=1), $x = 3$ (mult=2)
y-intercept: $(0, 0)$



1.(b) End Behavior: 
Zeros: $x = 2$ (mult=1), $x = -2$ (mult=2)
y-intercept: $(0, -8)$



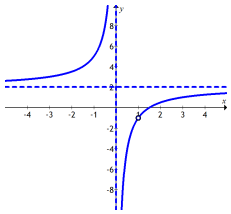
2. $(-\infty, -1] \cup [1, 4]$

3. $f(x) = -\frac{1}{3}(x+2)^2(x-1)^2(x-3)$

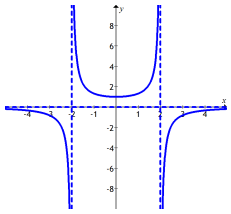
Answer Key

Sections 4.1 & 4.2

1.(a) Domain: $(-\infty, 0) \cup (0, 1) \cup (1, \infty)$
VA: $x = 0$, HA: $y = 2$, Hole: $(1, -1)$
x-int: $(\frac{3}{2}, 0)$, y-int: None



1.(b) Domain: $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$
VA: $x = -2, 2$, HA: $y = 0$, Hole: None
x-int: None, y-int: $(0, 1)$



2. $f(x) = \dfrac{8}{x+2}$

Section 4.3

1.(a) $(-1, 0]$

1.(b) $(-3, 1) \cup (1, 3)$

1.(c) $[-7, -4)$

Section 5.1

1.(a) 3

1.(b) $\sqrt{3}$

1.(c) $x + 1$

1.(d) $[-2, \infty)$

2.(a) $(f \circ g)(x) = \dfrac{3-x}{2}$,
D: $(-\infty, 3) \cup (3, \infty)$

2.(b) $(g \circ f)(x) = \dfrac{2x}{3x-1}$,
D: $(-\infty, 0) \cup (0, \frac{1}{3}) \cup (\frac{1}{3}, \infty)$

3.(a) -1

3.(b) 3

3.(c) 0

4. $f(x) = \sqrt{x}$, $g(x) = 4x^2 - 1$
(answers may vary)

Section 5.2

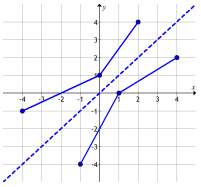
1.(a) Not one-to-one

1.(b) $f^{-1}(x) = x^3 - 1$

1.(c) $f^{-1}(x) = \dfrac{-3-x}{x-1}$

1.(d) Not one-to-one

2. Domain of f: $[-4, 2]$
Range of f: $[-1, 4]$
Domain of f^{-1}: $[-1, 4]$
Range of f^{-1}: $[-4, 2]$



3.(a) -27

3.(b) $(-1, 5)$

Answer Key

Section 6.1

1.(a) $\log_2(x) = r$

1.(b) $\ln 5 = -x$

1.(c) $\log(x+3) = y$

2.(a) $3^y = x$

2.(b) $10^4 = x^3$

2.(c) $e^5 = y$

3.(a) 4

3.(b) 3

3.(c) 2

3.(d) -2

3.(e) -3

3.(f) $\frac{1}{2}$

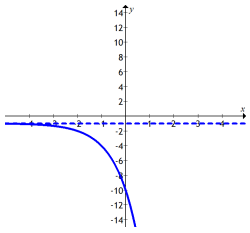
3.(g) -2

3.(h) 0

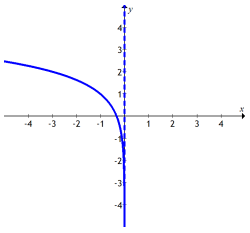
3.(i) -8

4. $(-\infty, \frac{5}{2})$

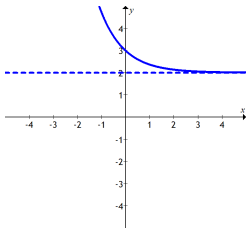
5.(a) D: $(-\infty, \infty)$
R: $(-\infty, -1)$
HA: $y = -1$
y-int: $(0, -10)$



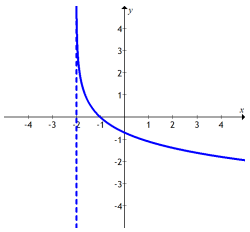
5.(c) D: $(-\infty, 0)$
R: $(-\infty, \infty)$
VA: $x = 0$
y-int: None



5.(b) D: $(-\infty, \infty)$
R: $(2, \infty)$
HA: $y = 2$
y-int: $(0, 3)$



5.(d) D: $(-2, \infty)$
R: $(-\infty, \infty)$
VA: $x = -2$
y-int: $(0, -\ln 2)$



Section 6.2

1.(a) $2 + \frac{1}{2}\ln x - \frac{5}{2}\ln y$

1.(b) $4 - 2\log_b x - 3\log_b y$

1.(c) $3\log x - 3$

2.(a) $\log\left(\dfrac{x^{1/2}}{y^3 z^2}\right)$

2.(b) -1

3.(a) True

3.(b) False

3.(c) True

3.(d) False

3.(e) True

3.(f) False

3.(g) False

3.(h) False

Sections 6.3 & 6.4

1.(a) $x = 1, 3$

1.(b) $x = -\ln(\frac{5}{2})$

1.(c) $t = \frac{7\ln 3}{4\ln 3 - \ln 13}$

1.(d) $x = 100$

1.(e) $x = 25$

1.(f) $x = \frac{8}{5}$

1.(g) No solution

2.(a) x-int: $\left(\dfrac{\ln(2)}{2}, 0\right)$,
y-int: $(0, -5)$,
inverse: $f^{-1}(x) = \dfrac{\ln(\frac{x+10}{5})}{2}$

2.(b) x-int: $(6, 0)$,
y-int: $(0, -2)$,
inverse: $f^{-1}(x) = 3^{\frac{x+4}{2}} - 3$