

4/14/12

Chap 1

1. Find all real solutions for x and simplify your answers:

(a) $2x^2 = 6 - x$ (b) $\frac{x}{x-2} + \frac{1}{x+3} = \frac{2x+1}{x^2+x-6}$ (c) $x^2 + 2x - 2 = 0$

(d) $x^4 - 8x^2 - 9 = 0$ (e) $-5 = x + \sqrt{x+17}$ (f) $x^3 + 2x^2 - 3x - 6 = 0$

(g) $(2x-1)^{1/3} = 2$ (h) $x^6 + 3x^3 - 40 = 0$ (i) $7 - 4(x+2) = 3x + 5$

Chap R

2. Simplify each of the following. Write any polynomials in standard form.

(a) $\frac{2 - \frac{1}{2}}{\frac{2}{3} + 1}$ (b) $\frac{1}{x - \frac{4}{x}}$ (c) $5x^2 + x - 3(x-2)^2$ (d) $5(x+1)^3$

(e) $\frac{x^3 + 8}{x+2}$ (f) $\frac{x^2}{x^2 - x - 6} \cdot \frac{x^2 - 4}{x^6}$ (g) $\frac{(x-5)+7}{(x-5)(x+2)}$

R.5

3. Factor completely:

(a) $9x^2 - 25y^2$ (b) $x^4 + 3x^2 - 4$ (c) $a^3 - 27b^3$ (d) $y^3 + 2y^2 - 9y - 18$

(e) $4a^2(3x-1) - 9(3x-1)$ (f) $27x^3 + 1$ (g) $8x^2 - 14x - 15$

6.1, 3.1

4. Let $f(x) = \frac{x}{2} - 2$, $g(x) = x^2 - 3$. Find and simplify:

(a) $(f \circ g)(x)$ (b) $(g \circ f)(x)$ (c) $g(x+h)$ (d) $f^{-1}(x)$ (e) $(g \circ g)(x)$

(f) $-f(x)$ (g) $f(-x)$

5. Consider the quadratic function $f(x) = -2x^2 - 8x + 10$.

(a) Find the vertex. (b) Find the y-intercept (c) Find any x-intercept(s)

6. Solve each of the following. Write your answer in interval notation.

(a) $-7 \leq 1 - 2x < 3$ (b) $\frac{5}{4} - \frac{3x}{10} \geq \frac{x-8}{5}$ (c) $2x^2 + x > 15$ (d) $\frac{3x-2}{x+1} \leq 2$

2.3

7. Find an equation for each line. Write in slope-intercept form where possible.

(a) Through the points $(-1, 4)$ and $(5, 2)$.

(b) Through the points $(3, -2)$ and $(3, 1)$.

(c) Parallel to the line $x - 2y + 6 = 0$ and containing the point $(-4, 3)$.

(d) Parallel to the line $y = 4$ and containing the point $(5, -2)$.

(e) Perpendicular to the line $3x + y - 7 = 0$ and containing the point $(1, -1)$.

2.4

8. Find the center and radius of each of the following circles:

(a) $x^2 + y^2 + 6x + 8 = 0$ (b) $x^2 + y^2 - 2x + 4y - 2 = 0$

2.2
2.39. (a) Find the y-intercept of the line $5x + 2y - 3 = 0$.

(b) Find the slope of the line $5x + 2y - 3 = 0$.

5.1

10. Find the y-intercept, the zeros and the multiplicity of each, and sketch the graph of:

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

Chap R

11. Find each of the following: (a) $3a^2 - 5ab^{-3}$ when $a = -4$ and $b = -2$.

(b) $5 - 2a^{-3}b^{2/3}$ when $a = -2$, $b = 27$.

3.1, 5.1

12. Find the domain for each function:

(a) $g(x) = \frac{3x}{x^2 + 16}$ (b) $h(x) = \sqrt{6 - 2x}$ (c) $f(x) = \frac{1 - x}{x^2 - 9}$

Chap R

13. Simplify completely, reducing all fractions.

(a) $8^{-4/3}$ (b) $\frac{(2a^{-3/2}b^3)^4}{ab^0}$ (c) $\left(\frac{16}{9}\right)^{-1/2}$ (d) $\frac{1}{x-4} - \frac{7}{x^2 - x - 12}$ (e) $\sqrt{45x^{13}}$
 (f) $\frac{8}{a^2 + 2a} - \frac{4}{a}$ (g) $\sqrt{18} - \sqrt{2}$

3.6

14. An open box with a square base is to be made from a square piece of sheet metal 9 inches on a side by cutting out a square from each corner and turning up the sides. Express the volume V of the box in terms of the length x of the side of the square cut from each corner.

2.1

15. Consider the two points $A = (3, -2)$ and $B = (5, 4)$.

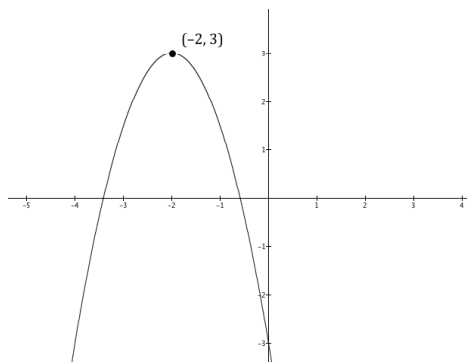
- (a) Find the midpoint of the line segment joining the points A and B .
 (b) Find the distance between the points A and B .

16. Solve for x : (a) $4^{3-2x} = \frac{1}{8}$ (b) $\left(\frac{1}{3}\right)^{x-5} = 81$ (c) $e^{3x-4} = 7$ (d) $\log_2(6x-1) = 4$

4.3

17. (a) Find the equation of the quadratic function shown to the right with vertex $(-2, 3)$ and y -intercept $(0, -3)$.

- (b) Find the range of this function.
 (c) Find the domain of this function.
 (d) Find the x -intercepts.



6.4

18. Compute the following: (a) $\log_5 25$ (b) $\log_2(2^{10})$ (c) $\log_7 7$ (d) $\log_8 1$

(e) $\log_3\left(\frac{1}{9}\right)$

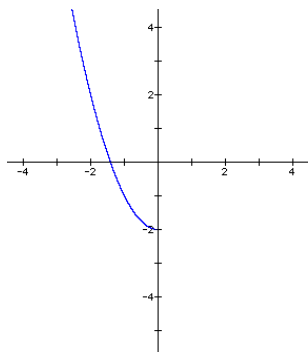
6.3

19. Consider the function $f(x) = 2^x - 2$. (a) Find the y -intercept. (b) Find any x -intercepts.

20. When and where is the Final Exam for this course?

21. The graph of $y = f(x)$ is shown below. Draw the graph of $y = f^{-1}(x)$.

6.2



8.1

22. Solve the system of equations $\begin{cases} 2x + 2y = 5 \\ 4x + y = 1 \end{cases}$.

1.1

23. Solve for a : $3x = \frac{a - 2b}{k + a}$.

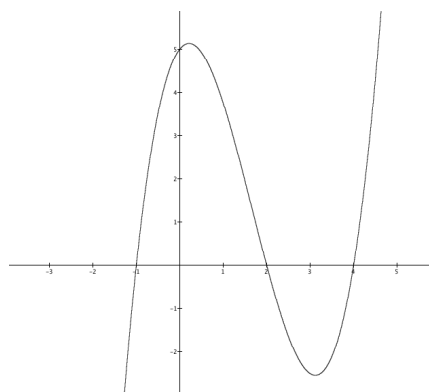
4.5

24. Find the domain: $f(x) = \sqrt{x^2 - x - 6}$.

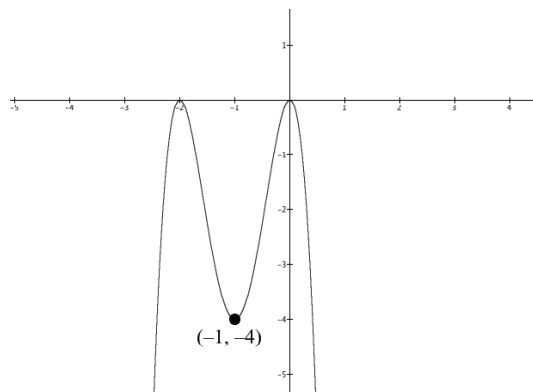
25. Find equations of the polynomials graphs shown below.

5.1

(a)

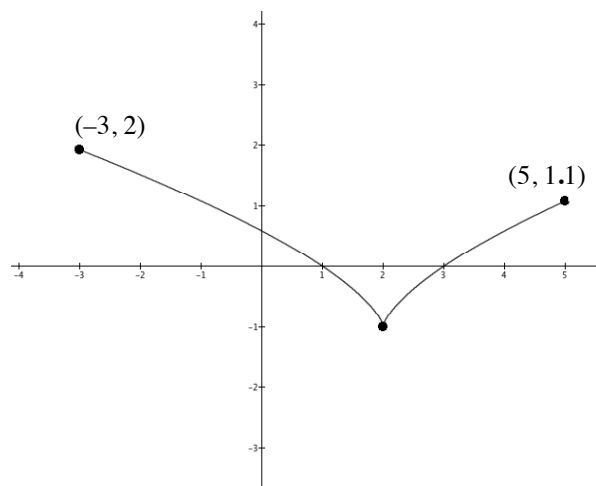


(b)



3.2

26. Use the graph of the function f shown below to answer parts (a) – (e).



(a) Find $f(2)$.

(b) For what values of x is $f(x) = 0$?

(c) What is the domain of f ?

(d) What is the range of f ?

(e) How many times does the graph of $y = -2$ cross the graph of f ?

(f) Find $f(3)$.

3.2,
5.227. For the functions given, find any x -intercepts, y -intercepts, and give the domain.

$$(a) f(x) = \frac{3x-2}{x+1} \quad (b) f(x) = \frac{x+5}{x^2-9} \quad (c) f(x) = \frac{x^2-3x-4}{x-2} \quad (d)$$

R.8

28. Rationalize the denominator and simplify your answer: (a) $\frac{6}{\sqrt{10}}$ (b) $\frac{2}{5-\sqrt{3}}$

R.4

29. Find the quotient and remainder when $2x^4 - 5x^3 + x - 7$ is divided by $x^2 + 3$.OMIT
Kunkle's 10130. For $f(x) = 5x^2 + x - 3$, find $\frac{f(x+h) - f(x)}{h}$ and simplify your answer.

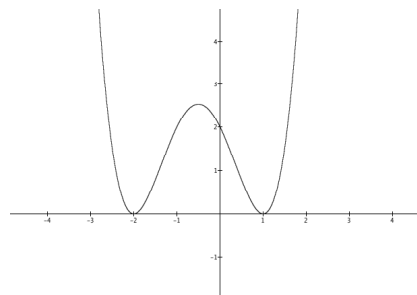
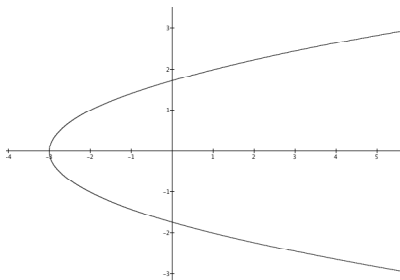
31. Which of the following is/are functions?

3.2

A. $x^2 + y^2 = 9$

B.

C.

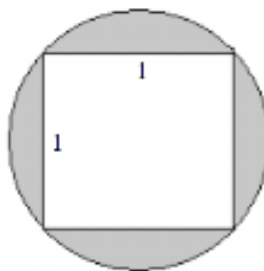
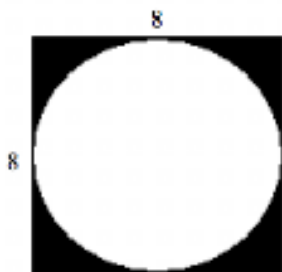


R.3

32. Find the area of the shaded region. Express answer in terms of π .

(a)

(b)

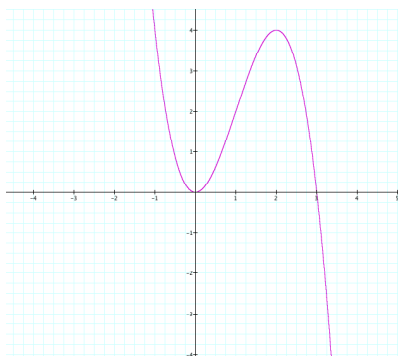


33. Karla has received a graduation present of \$4,000. She invests part of it in a certificate of deposit (CD) and the rest in a bond. At the end of one year she gets a combined total of \$218 in interest from the two investments. The CD had an annual interest rate of 4% and the bond an annual interest rate of 6%. How much was invested in the bond?

1.7,
8.1

ANSWERS

1. (a) $\frac{3}{2}$, -2 (b) 1 (c) $-1 \pm \sqrt{3}$ (d) 3, -3 (e) -8 (f) $\pm\sqrt{3}$, -2 (g) $\frac{9}{2}$
 (h) -2 , $\sqrt[3]{5}$ (i) $-6/7$
2. (a) $9/10$ (b) $\frac{x}{x^2-4}$ (c) $2x^2+13x-12$ (d) $5x^3+15x^2+15x+5$ (e) x^2-2x+4
 (f) $\frac{x-2}{x^4(x-3)}$ (g) $\frac{1}{x-5}$
3. (a) $(3x-5y)(3x+5y)$ (b) $(x^2+4)(x-1)(x+1)$ (c) $(a-3b)(a^2+3ab+9b^2)$
 (d) $(y+3)(y-3)(y+2)$ (e) $(2a-3)(2a+3)(3x-1)$ (f) $(3x+1)(9x^2-3x+1)$
 (g) $(2x-5)(4x+3)$
4. (a) $\frac{x^2-7}{2}$ (b) $\frac{x^2-8x+4}{4}$ (c) $x^2+2xh+h^2-3$ (d) $f^{-1}(x)=2x+4$ (e) x^4-6x^2+6
 (f) $-\frac{x}{2}+2$ (g) $-\frac{x}{2}-2$
5. (a) $(-2, 18)$ (b) $(0, 10)$ (c) $(-5, 0)$, $(1, 0)$
6. (a) $(-1, 4]$ (b) $(-\infty, 57/10]$ (c) $(-\infty, -3) \cup (5/2, \infty)$ (d) $(-1, 4]$
7. (a) $y = -\frac{1}{3}x + \frac{11}{3}$ (b) $x = 3$ (c) $y = \frac{1}{2}x + 5$ (d) $y = -2$ (e) $y = \frac{1}{3}x - \frac{4}{3}$
8. CENTER RADIUS
 (a) $(-3, 0)$ 1
 (b) $(1, -2)$ $\sqrt{7}$
9. (a) $3/2$ (b) $-5/2$
10. y-intercept: $(0, 0)$ Zeros and multiplicities: 0, multiplicity 2; 3, multiplicity 1.



11. (a) $91/2$ (b) $29/4$
12. (a) All real numbers (b) $(-\infty, 3]$
 (c) All real numbers except $-3, 3$.
13. (a) $\frac{1}{16}$ (b) $\frac{16b^{12}}{a^7}$ (c) $\frac{3}{4}$ (d) $\frac{1}{x+3}$ (e) $3x^6\sqrt{5x}$ (f) $\frac{-4}{a+2}$ (g) $2\sqrt{2}$
14. $V = (9-2x)^2 x$ 15. (a) $(4, 1)$ (b) $2\sqrt{10}$

16. (a) $9/4$ (b) 1 (c) $\frac{4 + \ln 7}{3}$ (d) $\frac{17}{6}$

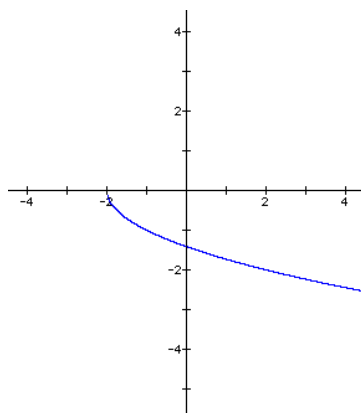
17. (a) $f(x) = -\frac{3}{2}(x+2)^2 + 3$ (b) $(-\infty, 3]$ (c) All real numbers (d) $-2 \pm \sqrt{2}$

18. (a) 2 (b) 10 (c) 1 (d) 0 (e) -2

19. (a) $(0, -1)$ (b) $(1, 0)$

20.

21. $y = f^{-1}(x)$



22. $x = -1/2, y = 3$ 23. $a = \frac{3kx + 2b}{1 - 3x}$ or $a = \frac{-3kx - 2b}{3x - 1}$

24. $(-\infty, -2] \cup [3, \infty)$

25. (a) $y = \frac{5}{8}(x+1)(x-2)(x-4)$ (b) $y = -4x^2(x+2)^2$

26. (a) -1 (b) $1, 3$ (c) $[-3, 5]$ (d) $[-1, 2]$ (e) 0 times (f) 0

27.

	x -intercepts	y -intercept	Domain
(a)	$(2/3, 0)$	$(0, -2)$	$\{x: x \neq -1\}$
(b)	$(-5, 0)$	$(0, -5/9)$	$\{x: x \neq -3, x \neq 3\}$
(c)	$(-1, 0), (4, 0)$	$(0, 2)$	$\{x: x \neq 2\}$

28. (a) $\frac{3\sqrt{10}}{5}$ (b) $\frac{5 + \sqrt{3}}{11}$ 29. Quotient: $2x^2 - 5x - 6$ Remainder: $16x + 11$

30. $10x + 5h + 1$

31. Function: C

32. (a) $64 - 16\pi$ square units (b) $\frac{\pi}{2} - 1$ square units

33. \$2900