

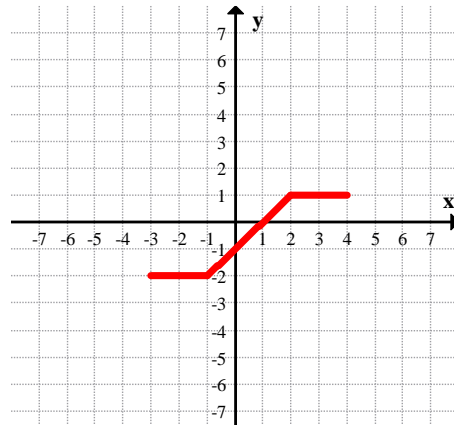
Ch 1 Sequences and Series

1. The 20th term of an arithmetic sequence is 107, and the common difference is 5. Determine the first term, the general term, and the 40th term of this sequence.
2. The terms $5 + x$, 8, and $1 + 2x$ are consecutive terms in an arithmetic sequence. Determine the value of x and state the three terms.
3. Determine the sum of each arithmetic series, given the first and n th terms.
a) $t_1 = -3, t_{14} = 62$ b) $t_1 = \sqrt{3}, t_{10} = 18\sqrt{3}$
4. Determine the first term, the common ratio, and an expression for the general term of each geometric sequence.
a) $t_5 = 900, t_7 = 0.09$ b) $t_3 = -1728, t_6 = 373\,248$ c) $t_5 = 28, t_{11} = 1792$ d) $t_2 = 3, t_4 = 0.75$
5. The fourth term of a geometric series is 30; the ninth term is 960. Determine the sum of the first nine terms.
6. A ball is dropped from a height of 2.0 m onto a floor. On each bounce the ball rises to 75% of the height from which it fell. Calculate the total distance the ball travels before coming to rest.

Ch 2 Transformations

1. Given $y = f(x)$, sketch a graph of the following:

- a. $y = 2f(x+3)$
- b. $y = f(2x-4) - 1$
- c. $y = -f\left(\frac{1}{3}x\right) + 2$
- d. $y = f^{-1}(x)$
- e. $y = f(-x-1)$



2. Determine the equation of $y = 2x^2 - x + 3$ after a reflection in the:
a. x -axis b. y -axis
3. If $(-2, 3)$ is on the graph of $y = f(x)$, find a point that must be on:
a. $y = f(-2x-6) - 3$ b. $y = -f\left(\frac{1}{2}x-4\right) + 2$
c. $y = f^{-1}(x) + 1$ d. $y = f^{-1}(x-1) - 3$

4. Find the inverse of the following functions:

a. $f(x) = \frac{1}{2}x + 1$

b. $f(x) = \frac{2}{2x+3}$

5. Given $f(x) = 2x^2 + x + 3$ and $g(x) = 3x + 1$, find:

a. $f(x) + g(x)$

b. $(f - g)(x)$

c. $g(f(1))$

d. $f(g(1))$

e. $g(f(-3))$

f. $(g \circ f)(x)$

Ch 3 Polynomials

1. Sketch and determine the domain of: $y = x(x-2)^2(x+1)$

2. Find the equation of the function with zeroes of $\frac{3}{2}$, 4, and -1 and passing through $(2, 3)$.

3. Factor fully: $f(x) = x^3 - 4x^2 - 7x + 10$

4. Solve by factoring:

a. $2x^3 - 5x^2 - x + 6 = 0$

b. $2x^3 - 5x^2 - 11x = 4$

c. $2x^3 + 7x^2 + 2x = 3$

5. Solve:

a. $-x(x+3)(2x-5) \geq 0$

b. $x^4 - 9x^2 \leq 0$

6. Find the remainder when $3x^3 + 4x^2 - x + 2$ is divided by $x + 2$.

7. When $x^3 + kx^2 - 6x + 4$ is divided by $x - 4$, the remainder is -36 . Find the value of k .

8. Divide the following:

a. $\frac{3x^3 - x^2 + 2x + 4}{x + 4}$

b. $(x^4 - x^2 + 7) \div (x + 1)$

9. A piece of cardstock 40cm long and 10cm wide is used to make an open top box by cutting a square from each corner. What is the length of square that must be cut from each corner if the volume of the box must be 408 cm^3 .

Ch 4 Radical and Rational Functions

1. Find the domain and range for each:

a. $y = \sqrt{3-x}$

b. $y = -\sqrt{2x+7} - 1$

c. $f(x) = -\sqrt{-x} - 3$

2. Solve:

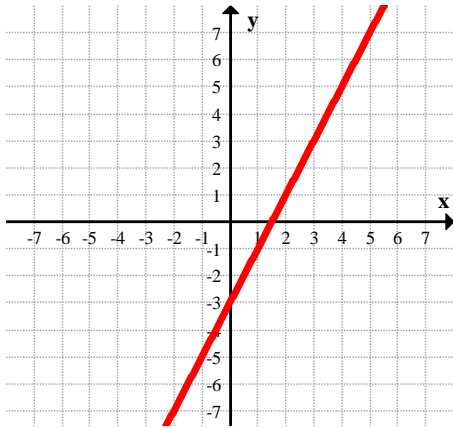
a. $2\sqrt{x-3} + 5 = 15$

b. $\sqrt{x} + \sqrt{x-16} = 8$

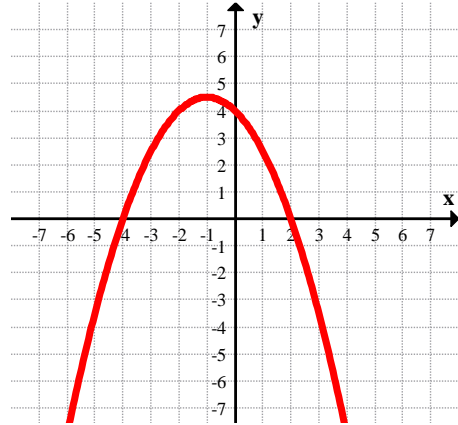
c. $2x = \sqrt{x+3} - 5$

3. Given $y = f(x)$, sketch $y = \sqrt{f(x)}$:

a.



b.



4. Given the following functions, find the equations of all asymptotes, the coordinates of any holes, and the x and y -intercepts:

a. $f(x) = \frac{1}{4} - \frac{1}{x-4}$

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

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

d. $y = \frac{x^2+4x}{x^2+9x+20}$

e. $y = \frac{x^2+6x+8}{x^2-2x-8}$

5. Sketch the following rational expressions. Label holes and asymptotes:

a. $y = \frac{x^2+4x+4}{x^2+3x-10}$

b. $f(x) = \frac{2(3x-1)(x+4)}{3x^2+10x-8}$

Answer Key:

Ch 1

1. $t_1 = 12, t_n = 5n + 7, t_{40} = 207$

2. $x = \frac{10}{3}; \frac{25}{3}, 8, \frac{23}{3}$

3. a) 413

b) $95\sqrt{3}$

4. a) $t_1 = 9 \times 10^{10}, r = \pm 0.01, t_n = (9 \times 10^{10})(\pm 0.01)^{n-1}$

b) $t_1 = -48, r = -6, t_n = (-48)(-6)^{n-1}$

c) $t_1 = 1.75, r = \pm 2, t_n = (1.75)(\pm 2)^{n-1}$

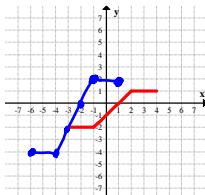
d) $t_1 = \pm 6, r = \pm 0.5, t_n = (6)(\pm 0.5)^{n-1}$

5. 1916.25

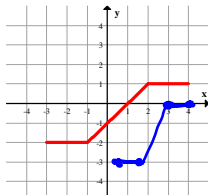
6. 14 m

Ch 2

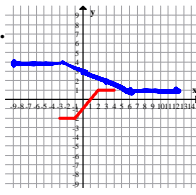
1. a.



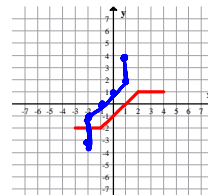
b.



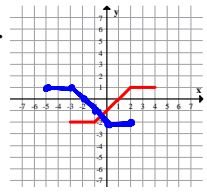
c.



d.



e.



2. a. $y = -2x^2 + x - 3$

b. $y = 2x^2 + x + 3$

3. a. $(-2, 0)$

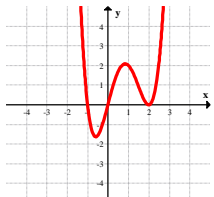
b. $(4, -1)$

c. $(3, -1)$

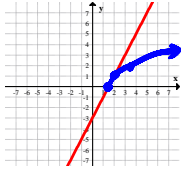
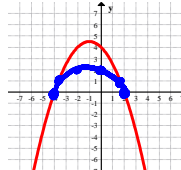
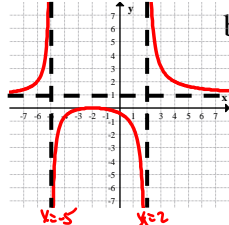
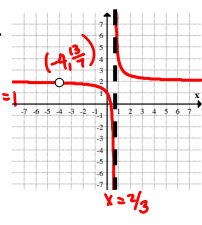
d. $(4, -5)$

4. a. $y = 2x - 2$ b. $y = \frac{1}{x} - \frac{3}{2}$ 5. a. $y = 2x^2 + 4x + 4$ b. $y = 2x^2 - 2x + 2$ c. 19 d. 39 e. 55
f. $6x^2 + 3x + 10$

Ch3

1.  x is all real #s 2. $y = -\frac{1}{2}(2x-3)(x-4)(x+1)$
3. $f(x) = (x-1)(x-5)(x+2)$
4. a. $x = -1, \frac{3}{2}, 2$ b. $x = -1, -\frac{1}{2}, 4$ c. $x = -3, -1, \frac{1}{2}$
5. a. $x \leq -3$, or $0 \leq x \leq \frac{5}{2}$ b. $-3 \leq x \leq 3$ 6. a. $f(-2) = -4$ 7. $k = -5$
8. a. $3x^2 - 13x + 54 - \frac{212}{x+4}$ b. $x^3 - x^2 + \frac{7}{x+1}$ 9. $x = 3\text{cm}$ or 1.67cm

Ch4

1. a. $x \leq 3; y \geq 0$ b. $x \geq \frac{-7}{2}; y \leq -1$ c. $x \leq 0; y \leq -3$
2. a. $x = 28$ b. $x = 25$ c. $x = -2$ 3. a.  b. 
4. a. ha: $y = \frac{1}{4}$, va: $x = 4$, x-int: $(8, 0)$, y-int: $(0, \frac{1}{2})$
b. ha: $y = 0$, va: $x = 0, x = -1$, x-int: $(-\frac{3}{5}, 0)$
c. ha: $y = 3$, va: $x = -1$, x-int: $(\frac{2}{3}, 0)$, y-int: $(0, -2)$ 5. a.  b. 
d. ha: $y = 1$, va: $x = -5$, int: $(0, 0)$, hole: $(-4, -4)$
e. ha: $y = 1$, va: $x = 4$, int: $(-4, 0)$, $(0, -1)$, hole: $(-2, -\frac{1}{3})$