

I. Appendix A, p. A2: Numbers, Inequalities, and Absolute Values

A. Example 1, p. A4

1.  $1+x < 7x+5$

2.

B. Example 2, p. A5

1.  $4 \leq 3x-2 < 13$

C. Example 3, p. A5

1.  $x^2 - 5x + 6 \leq 0$

2.

D. Example 4, p. A6

1.  $x^3 + 3x^2 > 4x$

2.

3.

E. Extra example #1

1.  $2x+1 < 4x-3 \leq x+7$

2.

F. Extra example #2

1.  $\frac{1+x}{1-x} > 1$

2.

G. Extra example #3

1.  $|2x+1| = |5x+3|$

2.

H. Example 8, p. A8

1.  $|3x+2| \geq 4$

2.

3.

I. Properties of absolute value

1. If  $a \geq 0$ ,  $|a| =$

2. If  $a < 0$ ,  $|a| =$

3.  $\sqrt{a^2} =$

4. Triangle Inequality Theorem:

II. Appendix B, p. A10: Coordinate Geometry and Lines

A.

III. Appendix C, p. A16: Graphs of 2<sup>nd</sup> Degree Equations

A. #32, p. A23

1. Identify and sketch:  $4x^2 + 9y^2 - 16x + 54y + 61 = 0$

2.

3.

IV. Appendix D, p. A24: Trigonometry

A. Know trigonometric identities, pp. A28-A29

Optional:  $\tan(x+y)$  and  $\tan(x-y)$

## V. Appendix Extras

### A. Binomial Theorem

1.  $(a+b)^n =$

$$\begin{aligned} & \binom{n}{0}a^n b^0 + \binom{n}{1}a^{n-1}b^1 + \binom{n}{2}a^{n-2}b^2 + \binom{n}{3}a^{n-3}b^3 + \dots + \binom{n}{n-3}a^3b^{n-3} + \binom{n}{n-2}a^2b^{n-2} + \binom{n}{n-1}a^1b^{n-1} + \binom{n}{n}a^0b^n = \\ & a^n b^0 + na^{n-1}b^1 + \frac{n(n-1)}{2}a^{n-2}b^2 + \frac{n(n-1)(n-2)}{6}a^{n-3}b^3 + \dots + \frac{n(n-1)(n-2)}{6}a^3b^{n-3} + \frac{n(n-1)}{2}a^2b^{n-2} + na^1b^{n-1} + a^0b^n \\ & = a^n + na^{n-1}b + \frac{n(n-1)}{2}a^{n-2}b^2 + \frac{n(n-1)(n-2)}{6}a^{n-3}b^3 + \dots + \frac{n(n-1)(n-2)}{6}a^3b^{n-3} + \frac{n(n-1)}{2}a^2b^{n-2} + nab^{n-1} + b^n \end{aligned}$$

### B. Factoring the difference of Perfect $n$ th Powers

1.  $x^n - a^n = (x-a) \cdot (x^{n-1}a^0 + x^{n-2}a^1 + x^{n-3}a^2 + x^{n-4}a^3 + \dots + x^3a^{n-4} + x^2a^{n-3} + x^1a^{n-2} + x^0a^{n-1})$   
 $= (x-a) \cdot (x^{n-1} + x^{n-2}a + x^{n-3}a^2 + x^{n-4}a^3 + \dots + x^3a^{n-4} + x^2a^{n-3} + xa^{n-2} + a^{n-1})$

## Chapter 1: Functions and Models

### I. 1.1, Four Ways to Represent a Function, p. 11

#### A. Functional representation

- 1.
- 2.
- 3.
- 4.

#### B. Topics are shown geometrically: graphically or visually, numerically, algebraically, and verbally: descriptive

#### C. Example 6, p. 17

1. a. Find the domain and sketch  $f(x) = \sqrt{x+2}$  ;  
Domain:

b. Find the domain of  $g(x) = \frac{1}{x^2 - x}$

#### D. Extra example

1. Find the domain of  $h(x) = \sqrt{2-x-x^2}$

E. Sketch the piecewise function  $f(x) = \begin{cases} 1-x, & x \leq 1 \\ x^2, & x > 1 \end{cases}$  ;  $\Rightarrow$

#### F. Function symmetry

1. Even function:
  - a. E.g.
  - b.

2. Odd function:

a. E.g.

b.

G. Increasing and Decreasing Functions

1. A function  $f$  is increasing on an interval  $I$

2. A function  $f$  is decreasing on an interval  $I$

II. 1.3, Transforming Functions: New Functions from Old Functions, p. 38

A. Transformations

1. Analyze Figure 1, Figure 2, and Figure 3, p. 39

B. Example 1, p. 40

1. Use  $y = \sqrt{x}$  to graph the following:

a.  $\sqrt{x} - 2$

b.  $\sqrt{x-2}$

c.  $-\sqrt{x}$

d.  $2\sqrt{x}$

e.  $\sqrt{-x}$

C. Example 2, p. 40

1. Sketch  $x^2 + 6x + 10$

D. Example 3, p. 40

1. Sketch using the sine function

a.  $y = \sin 2x$

b.  $y = 1 - \sin x$

E. Example 5, p. 42

1. Sketch  $y = |x^2 - 1|$

F. Composition of Functions

1. Example 8, p. 44
2.  $f(x) = \sqrt{x}$ ,  $g(x) = \sqrt{2-x}$ , find each function and domain
  - a.  $f \circ g$ 
    - i.
  - b.  $g \circ f$ 
    - i.
  - c.  $f \circ f$ 
    - i.
  - d.  $g \circ g$ 
    - i.

G. Example 9, p. 45

1. Find  $f \circ g \circ h$  if  $f(x) = \frac{x}{x+1}$ ,  $g(x) = x^{10}$ ,  $h(x) = x+3$

H. Extra example #1

1.  $\phi(x) = \sqrt{\frac{x^2 - 2x}{x-1}}$ , find domain
2. Domain:

I. Extra example #2

1. Graph  $y = 2 - \sqrt{x+1} \Rightarrow$

J. Extra example #3

1. Graph  $y = ||x| - 1| \Rightarrow$