

1. Below is a list of some "simple" algebra problems. Some of the solutions are correct and some of them are wrong! For each problem:

- (A) determine if the answer is correct;
- (B) determine if there are any mistakes made in solving the problem and list them
(Note that just because the answer is correct does not mean there are no mistakes);
- (C) if the answer to (A) or (B) is **NO**, redo the problem correctly;
if the answers to (A) and (B) are **YES**, devise a correct method to solve the problem.

(a) $\frac{x^2 - 1}{x + 1} = \frac{x^2 + (-1)}{x + 1} = \frac{x^2}{x} + \frac{-1}{1} = x - 1$

(b) $(x + y)^2 - (x - y)^2 = x^2 + y^2 - x^2 - y^2 = 0$

(c) $\frac{9(x - 4)^2}{3x - 12} = \frac{3^2(x - 4)^2}{3x - 12} = \frac{(3x - 12)^2}{3x - 12} = 3x - 12$

(d) $\frac{x^2 y^5}{2x^{-3}} = x^2 y^5 * 2x^3 = 2x^6 y^5$

(e) $\frac{(2x^3 + 7x^2 + 6) - (2x^3 - 3x^2 - 17x + 3)}{(x + 8) + (x - 8)} = \frac{(2x)^2 - 17x + 9}{2x} = 2x - 17x + 9 = -15x + 9 = -6x$

(f) $\frac{x^{-1} + y^{-1}}{x^{-1} - y^{-1}} = \frac{(x + y)^{-1}}{(x - y)^{-1}} = \left(\frac{x + y}{x - y}\right)^{-1} = -\frac{x + y}{x - y} = \frac{x + y}{y - x}$

2. Find the domain of each of the following functions.

(a) $f(x) = 2x + 10$

(b) $f(x) = \frac{x + 4}{2x + 10}$

(c) $f(x) = \sqrt{2x + 10}$

(d) $f(x) = \frac{x + 4}{\sqrt{2x + 10}}$

(e) $f(x) = \sqrt{x(x + 3)(2x + 5)}$

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

3. For each of the following, find functions f and g such that $h = f \circ g$.

(a) $h(x) = \frac{1}{(x^2 + 5x - 2)^4}$

(b) $h(x) = \sqrt{x^2 + 9}$

4. Find the **exact** value of each expression.

(a) $\sec\left(\frac{\pi}{4}\right)$

(b) $\arcsin\left(-\frac{\sqrt{3}}{2}\right)$

(c) $\arccos\left(\sin\left(\frac{\pi}{3}\right)\right)$

(d) $\tan\left(\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)\right)$

5. Find all values of t in the interval $[0, 2\pi]$ that satisfy the given equation.

(a) $\cos t = -\frac{\sqrt{3}}{2}$

(b) $\sin 2t = \frac{1}{2}$

(c) $2\cos^2 t - 3\cos t + 1 = 0$

6. Assume that $\cos t = -\frac{1}{2}$ and $\frac{\pi}{2} < t < \pi$. Determine the following.

a) $\sin t$

b) $\tan t$

c) $\sec t$

d) $\csc t$

7. Determine the **exact** values of the following trigonometric functions.

(a) $\sin\left(-\frac{\pi}{12}\right)$

(b) $\cos\left(\frac{7\pi}{12}\right)$

8. If $\cos t = -\frac{4}{5}$ and $\frac{\pi}{2} < t < \pi$, determine the following:

(a) $\cos 2t$

(b) $\sin 2t$

(c) $\sin(t/2)$

9. (a) Find the slope-intercept equation of the line that passes through $(3, 2)$ is perpendicular to the y -axis.

(b) Find the slope-intercept equation of the line that has x -intercept $(2,0)$ and y -intercept $(0,6)$.