

## Algebra Review

1. Simplify by factoring the numerator:  $\frac{x^2 - x - 6}{x - 3}$ .
2. Simplify by factoring the numerator:  $\frac{2x^2 + 3x - 5}{x - 1}$ .
3. Rationalize the denominator:  $\frac{3}{\sqrt{7} - 2}$ .
4. Rationalize the numerator:  $\frac{\sqrt{x} - 1}{x - 1}$ .
5. Rationalize the numerator:  $\frac{\sqrt{x} - \sqrt{a}}{x - a}$ .
6. Simplify:  $(\sqrt{x})^4$ .
7. Expand, combining exponents:  $x^2(x + \sqrt{x})$ .
8. Factor out  $x^{3/2}$  from the following expression:  $2x^4 - x^{3/2}$ .
9. Add by finding a common denominator:  $\frac{2}{5} + \frac{7}{6}$
10. Simplify using a common denominator:  $\frac{1}{2x} - \frac{2}{y}$
11. Simplify:  $\frac{\frac{1}{2} + \frac{1}{x}}{x}$
12. Simplify:  $\frac{\frac{1}{3} - \frac{1}{y}}{3 - y}$
13. Convert from degrees to radians:
  - (a)  $60^\circ$
  - (b)  $180^\circ$
  - (c)  $-210^\circ$
14. Convert from radians to degrees:
  - (a)  $\frac{3\pi}{4}$
  - (b)  $-\frac{\pi}{2}$
  - (c)  $\frac{5\pi}{4}$

15. Evaluate the following, giving exact answers.

(a)  $\cos 0$

(b)  $\sin 90^\circ$

(c)  $\tan \frac{\pi}{3}$

(d)  $\sin \frac{5\pi}{4}$

(e)  $\cos 300^\circ$

(f)  $\tan \frac{3\pi}{2}$

16. Graph two full periods of the following trigonometric functions. Label both axes carefully.

(a)  $y = \sin(x)$

(b)  $y = \cos(x)$

(c)  $y = \tan(x)$

## Answers

1.  $x + 2$
2.  $2x + 5$
3.  $\sqrt{7} + 2$
4.  $\frac{1}{\sqrt{x} + 1}$
5.  $\frac{1}{\sqrt{x} + \sqrt{a}}$
6.  $x^2$
7.  $x^3 + x^{5/2}$
8.  $x^{3/2}(2x^{5/2} - 1)$
9.  $\frac{47}{30}$
10.  $\frac{y - 4x}{2xy}$
11.  $\frac{x + 2}{2x^2}$
12.  $-\frac{1}{3y}$
13. (a)  $\frac{\pi}{3}$   
(b)  $\pi$   
(c)  $-\frac{7\pi}{6}$
14. (a)  $135^\circ$   
(b)  $-90^\circ$   
(c)  $225^\circ$
15. (a) 1  
(b) 1  
(c)  $\sqrt{3}$   
(d)  $-\frac{1}{\sqrt{2}}$

(e)  $\frac{1}{2}$

(f) Undefined

16. See [desmos.com](https://www.desmos.com).