Before you get started: Please introduce yourself to your groupmates.

**Review**

**Instructions:** Please work together on this worksheet. You will get participation points for actively discussing the material as well as for uploading your own worksheet to the course assignment page later. If you have a question, please ask your teammates. There are absolutely no "stupid questions," so don't be embarrassed if you don't know something. Everyone has knowledge gaps because of the pandemic, so we all need to work hard to catch up. Please be kind to each other.

This worksheet covers some of the specific algebra and precalculus material you'll need later in the class.

1. Find equations for the following lines and sketch their graphs.
   - (a) The line with slope 3 and y-intercept 2.
   
   \[ y = 3x + 2 \]
   
   - (b) The line with slope 3 passing through the point (2,1).
   
   \[ (y - 1) = 3(x - 2) \]
   \[ y = 3x - 5 \]
   
   - (c) The line which contains the points (1,1) and (3,2).
   
   \[ m = \frac{2 - 1}{3 - 1} = \frac{1}{2} \]
   \[ (y - 1) = \frac{1}{2}(x - 1) \]
   \[ y = \frac{1}{2}x + \frac{1}{2} \]
   
2. The height and velocity of a projectile in feet at time \( t \) in seconds is given by:

   \[ p(t) = -16t^2 + 50t + 8, \quad v(t) = p'(t) = -32t + 50 \]
   
   - (a) How high was the projectile when it was fired?
     \[ p(0) = 8 \]
   
   - (b) How fast was the projectile fired?
     \[ v(0) = 50 \]
   
   - (c) When is the projectile at the highest point?
     \[ v(t) = 0, \quad -32t + 50 = 0 \]
     \[ t = \frac{25}{16} \]
   
   - (d) How high does the projectile go?
     \[ p\left(\frac{25}{16}\right) = \frac{476625}{16} \]
3. Simplify the following fraction by rationalizing the denominator, then factoring to cancel a term between the numerator and denominator.

\[ f(x) = \frac{x - 5}{\sqrt{42x + 46} - 16} \cdot \frac{\sqrt{42x + 46} + 16}{\sqrt{42x + 46} + 16} = \frac{x - 5}{42x - 210} \]

4. True or False: The function \( y = \frac{9x - 63}{x^2 + 6x - 91} \) has a vertical asymptote at \( x = 7 \).

\[ y = \frac{9}{(x - 7)(x + 13)} = \frac{9}{x + 13} \quad \text{False} \]

5. Solve the inequality \( |x - 4| < 3 \) and draw the solution set on a number line.

\[-1 < x - 4 < 3 \]
\[ -3 < x < 7 \]

6. Suppose we know that the statement “If A, then B” is true. Then does the statement “If B, then A” also have to be true? How about the statement “If not B, then not A”? Find "real world" implications to demonstrate your answer.

Imagine everyone follows the rules and
A = “Bob is drinking”, B = “Bob is at least 21”.
If B, then A: No. If not B, then not A: Yes.

7. Sketch the graphs of each of the following functions.

(a) \( e^x \)
(b) \( e^{-x} \)
(c) \( \ln x \)
(d) \( \ln(x - 2) \)
(e) \( \sqrt{x} \)
(f) \( \frac{1}{\sqrt{x}} \)
(g) \( |x| = \sqrt{x^2} \)
8. Sketch the graph of these four functions on the same set of axes.

(a) \( \sin x \)
(b) \( \cos x \)
(c) \( \tan x \)
(d) \( 5 + 2 \cos x \)

9. Draw a 30-60-90 triangle and a 45-45-90 triangle, each with a hypotenuse of length 1. Then fill in the lengths of the remaining sides. Use the unit circle \( x^2 + y^2 = 1 \) and your triangles to compute \( \tan(\pi/3) \), \( \sin(7\pi/6) \), and \( \sec(5\pi/3) \).

10. Now that you’ve had a chance to work together, please come up with an interesting name for your team.

11. Please finish this worksheet on your own, scan your work (eg with the app Scannable) into pdf format, and upload it to the course site. Everyone should scan and upload their own work. Instructions are on the course site.