

Calculus I 21-111  
Skills Assessment  
Due January 18

Name:

**Note:** This assessment will not in any way affect your grade.

1. Simplify each of the following expressions as much as possible:

(a)  $x(y + z) - z(x + y) + 2y(x - z) - 3(3y - 2z)$

(b)  $\frac{2}{5} - \frac{1}{2} + \frac{1}{3}$

(c)  $\frac{x}{x+2} - \frac{2}{x+1}$

(d)  $2^{-2}x^2y^{-2}(2z)^3x^{-2}(2y)^3z^5$

(e)  $\frac{\left(\frac{1}{2}x^{-2}y^2\right)^2}{\left(\frac{xy}{y^{-1}}\right)^{-1}}$

(f)  $\sqrt{a^2b^2}$  (assume  $a > 0$  and  $b > 0$ )

(g)  $\sqrt{a^2 + b^2}$  (assume  $a > 0$  and  $b > 0$ )

(h)  $\left(\frac{9a^8}{16b^4}\right)^{-\frac{1}{2}}$

2. Determine all solutions to the following equations:

(a)  $3x - 7 = 5$

(b)  $x^2 - 5x + 6 = 0$

(c)  $2x^2 + 3x - 2 = 0$

(d)  $\frac{2x+1}{5} + \frac{3x+2}{2} = x$

3. Let  $f(x) = 3x + 1$ , and  $g(x) = \frac{1}{x-1}$ .

(a) Evaluate  $f(g(2))$ .

(b) Evaluate  $g(f(2))$ .

(c) Give a simplified expression for  $g(f(x))$ .

4. Determine the equation of the line through the point  $(2, 3)$  and having slope  $-2$ .

5. You pay \$21.20 for an item including a 6% sales tax in the cost. How much was the item without the tax?

6. Make a rough sketch of each of these functions:  $f(x) = 2, g(x) = x, h(x) = x^2, j(x) = x^3, k(x) = -x^4, m(x) = 1/x, p(x) = |x|, q(x) = 2^x$ .