

**Math 135 - section 01 - Precalculus Diagnostic Quiz Solutions**  
**September 6, 2019**

- 1) Find all real numbers  $x$  satisfying  $|2x - 6| = 8$ .

*Solution:* The equation with absolute values is the same as  $2x - 6 = 8$  or  $2x - 6 = -8$ . In the first case,  $x = 7$ ; in the second case  $x = -1$ .

- 2) Solve for  $t$ :  $3t^2 - 4t + 1 = 0$  (find all real number solutions).

*Solution:* It's easiest to factor:

$$3t^2 - 4t + 1 = (3t - 1)(t - 1) = 0$$

when  $3t - 1 = 0$  or  $t - 1 = 0$ . Thus  $t = 1/3$ , or  $t = 1$ .

- 3) Which is equal to  $(u^{-5}v^2)^3 \left(\frac{v^2}{u}\right)^{-1}$ ?

*Solution:* We have

$$\begin{aligned}(u^{-6}v^2)^3 \left(\frac{v^{-2}}{u^2}\right)^{-1} &= (u^{-18}v^6) \cdot u^2v^2 \\ &= u^{-16}v^8.\end{aligned}$$

The correct answer is A.

- 4) Find common factors and cancel to simplify:  $\frac{12x}{5x - 10} \cdot \frac{x^2 - 4}{2x + 4}$ .

*Solution:* We have

$$\begin{aligned}\frac{12x}{5x - 10} \cdot \frac{x^2 - 4}{2x + 4} &= \frac{12x}{5(x - 2)} \cdot \frac{(x - 2)(x + 2)}{2(x + 2)} \\ &= \frac{6x}{5}.\end{aligned}$$

The correct answer is B.

- 5) If  $f(x) = 5x^2 - 11$ , find  $f(a + 1) - f(a)$  and simplify.

*Solution:* We have

$$f(a + 1) - f(a) = 5(a + 1)^2 - 11 - (5a^2 - 11) = 5a^2 + 10a + 5 - 11 - 5a^2 + 11 = 10a + 5$$

- 6) Let  $f(x) = x^2 - 3x$  and  $g(x) = x + 1$ . Which function is equal to  $f(g(x))$ ?

*Solution:*

$$f(g(x)) = (x + 1)^2 - 3(x + 1) = x^2 + 2x + 1 - 3x - 3 = x^2 - x - 2.$$

This is function D.