Math 580: Quiz 2

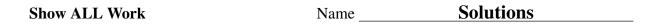**Show ALL Work**   Name _____ **Solutions** _____

1. Calculate $\gcd(6882, 69161)$. Show work justifying your answer.

$\gcd(6882, 69161) = \boxed{31}$

Solution. Using the Division Algorithm more than once, we obtain

$$69161 = 6882 \cdot 10 + 341$$
$$6882 = 341 \cdot 20 + 62$$
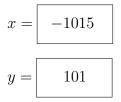$$341 = 62 \cdot 5 + 31$$
$$62 = 31 \cdot 2 + 0.$$

By the Euclidean Algorithm, we obtain $\gcd(6882, 69161) = 31$. $\square$

2. Possibly using information from your work above, find integers x and y such that

$$6882\,x + 69161\,y = \gcd(6882, 69161).$$

Show work that indicates where your answer is coming from. Note: there is more than one correct x and one y. I am only asking for one x and one y.

$x = \boxed{-1015}$

$y = \boxed{101}$

Solution. From the solution for the problem above, we have

$$31 = 341 - 62 \cdot 5$$
$$= 341 - (6882 - 341 \cdot 20) \cdot 5$$
$$= 341 \cdot 101 - 6882 \cdot 5$$
$$= (69161 - 6882 \cdot 10) \cdot 101 - 6882 \cdot 5$$
$$= 69161 \cdot 101 - 6882 \cdot 1015$$

So we want to take $x = -1015$ and $y = 101$. (But there are other solutions.) $\square$