MATH 1010-2: PRACTICE EXAM #1 SOLUTIONS

1. (24 points – 3 points each) Determine if each of the following assertions is valid. Indicate you answer by clearly circling either TRUE or FALSE.

(a) The collection of pairs $\{(0,1),(1,2),(2,3),(3,4)\}$ represents a function.

$\boxed{\text{TRUE}}$ FALSE

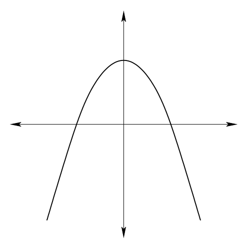
(b) The slope of the line given by $3y + 6x - 10 = 0$ is $-\frac{1}{2}$.

TRUE $\boxed{\text{FALSE}}$

(c) There are real numbers which are not fractions.

$\boxed{\text{TRUE}}$ FALSE

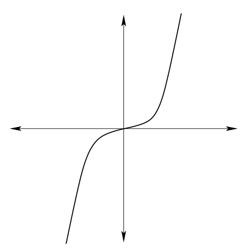
(d) The following



is the graph of $f(x) = -x^2 + 2$.

$\boxed{\text{TRUE}}$ FALSE

(e) The following



is the graph of $f(x) = x^3$.

$\boxed{\text{TRUE}}$ FALSE

(f) $(-1)^{10} = 1$.

$\boxed{\text{TRUE}}$ FALSE

(g) If m is the slope of a line ℓ, then $-m$ is the slope of any line perpendicular to ℓ.

TRUE $\boxed{\text{FALSE}}$

(h) No point on the line $y = x + 2$ lies in the third quadrant.

TRUE $\boxed{\text{FALSE}}$

2. Simplify the following expression:

$$3\left[(x-1)^2+2x(2x+1)-x^3\right]$$

Solution. According to the rules of operations, we should first treat the exponent in $(x-1)^2$. Since $(x-1)^2=(x-1)(x-1)=x^2-2x+1$, we get

$$3\left[x^2-2x+1+2x(2x+1)-x^3\right]$$

The next operation we perform is the multiplication $2x(2x+1)=4x^2+2x$. So now we have

$$3\left[x^2-2x+1+4x^2+2x-x^3\right]$$

Combining like terms inside the parenthesis gives

$$3\left[5x^2-x^3+1\right]$$

Finally multiplying through by 3 we get

$$15x^2-3x^3+3.$$

3. Solve the following equation for x

$$|2x+5|=4.$$

Solution. This is really two linear equations, namely

$$2x+5=4 \qquad \text{or} \qquad 2x+5=-4.$$

The first gives $x=-\frac{2}{2}$, the second gives $x=-\frac{9}{2}$. So our answer is $x=-\frac{1}{2}$ or $x=-\frac{9}{2}$. Both of these check out.

4. Find the equation of the line through $(1,1)$ which is parallel to

$$y = -2x + 5.$$

Write your answer in slope-intercept form.

Solution. The line $y = -2x + 5$ has slope -2 and any line parallel to it has the same slope. Thus we seek the line through $(1,1)$ with slope -2. Using the point-slope form, we have

$$(y-1) = -2(x-1),$$

and simplifying we get

$$y = -2x + 3.$$

5. Solve the following inequality for x. Then graph your solution on the number line.

$$\frac{x-3}{3} + 3 \leq \frac{x}{8}.$$

Solution. We clear the denominators by multiplying through by 24 to get

$$8(x-3) + 3 \cdot 24 \leq 3x$$

or

$$8x - 24 + 72 \leq 3x.$$

Subtracting $3x$ and 48 from both sides gives

$$5x \leq -48$$

and dividing by 5 gives the solution

$$x \leq -\frac{48}{5}.$$

On the number line this is all points to the left of and including $-\frac{48}{5}$.

6. Ticket sales for a play total \$2200. There are three times as many adult tickets sold as children's tickets. The price of an adult ticket is \$6 and the price of a child's ticket is \$4. Find the number of children's tickets which were sold.

Solution. Let x be the number of children's tickets sold. Since they cost \$4 each, they contribute $4x$ dollars to the total ticket sales. Meanwhile the number of adult tickets sold is three times the number of children's tickets, namely $3x$, and since the cost of each is now \$6, the adult tickets contribute $6 \cdot 3x = 18x$ dollars to the total sales. Thus

$$4x + 18x = 2200$$

or

$$22x = 2200$$

or finally

$$x = 100.$$

So there were 100 children's tickets sold.