Problem Set 6

1. Find the average of all factors of 6.

2. List the first ten prime numbers.

3. Graph each of the following points on a coordinate system. What shape do these points form? $A\,(-4,-6)$, $B\,(0,-4)$, $C\,(2,-3)$, $D\,(4,-2)$, and $E\,(8,0)$.

4. Perform the following operations. Show all steps.

   a) $18-2\,(-5)-2\,(11-2\,(-5))$

   b) $\dfrac{-3^2+(-1)^3}{7-3\,(-1)^3}$

   c) $-2^2\left(24-2\,(-3)-5\,(-2)^2\right)-12\big)$

   d) $|-7-2|-|8+3|$

   e) $|-7-2-|8+3||$

   f) $|-7-2\,|-8+3||$

   g) $|-7-|2-8+3||$

   h) $|-7\,|-2-8+3||$

   i) $\sqrt{3\sqrt{49}-\sqrt{25}}$

5. Evaluate $\dfrac{3xy+2x^2-2y^2}{x+2y}$ if

   a) $x=2$ and $y=-3$ b) $x=-1$ and $y=-2$ c) $x=-6$ and $y=3$

6. Evaluate $-p^2+|2pq+q-3|$ if

   a) $p=2$ and $q=-5$ b) $p=-4$ and $q=3$

7. Simplify each of the following algebraic expressions.

   a) $(3x^2-5x+8)+(-3x^2-5x+12)$

   b) $(3x^2-5x+8)-(-3x^2-5x+12)$

   c) $3\,(x-5)-4\,(x-2)$

   d) $5\,(2a+1)-2\,(2-a)-7\,(a+8)$

   e) $(x-5)\,(x-2)$

   f) $(2x-3)\,(2x+3)$

   g) $2\,(m-3)^2-(2m+5)\,(m-3)$

   h) $(a-4)\,(2a+1)-(a-3)^2$

   i) $(3x-1)^3$

8. Consider the equation $3x^3-7x+18=-x+3\,(x^2+6)$.

   a) Is the number 2 a solution of this equation?
   b) Is the number -2 a solution of this equation?
   c) Is the number 1 a solution of this equation?
   d) Is the number -1 a solution of this equation?