Review Problems

1. Perform the division with reminder: $2009 \div 17 =$

2. Simplify each of the following.

   a) $|-3^3 - 2\,|-5 - 2\,(-4)||$

   b) $\sqrt{-4^2 - (-1)^4 + 2 \cdot 3^2 \div 2 \cdot 6 - 1}$

   c) $\left|(-3)^2 + \left|(-6)^2 + (-2)^3\right| - 2\right| + 1$

3. Simplify each of the following.

   a) $-(3a - 8b) - (5a - b)$

   b) $5x - 3\,(2x - y)$

   c) $-y + 2\,(3x - y) - (2x - y) + 2\,(-2x + y)$

   d) $(3a - 5)^2$

   e) $\left(3\sqrt{2} - 5\right)^2$

   f) $(3a - 5)\,(3a + 5)$

   g) $\left(3\sqrt{2} - 5\right)\left(3\sqrt{2} + 5\right)$

   h) $(3a - 1)\,(3a + 9a^2 + 1)$

   i) $\sqrt{28} - 2\sqrt{63} + \sqrt{700}$

4. Evaluate the algebraic expression $\dfrac{-x + 2x^2 - 1}{x - 1}$ if

   a) $x = 5$ b) $x = -5$ c) $x = 1$ d) $x = -1$

5. Solve each of the following equations. Make sure to check your solutions.

   a) $3\,(x - 1) - 5\,(3x + 2) = -13\,(x + 1)$

   b) $4\,(x - 3) - 2\,(x - 1) = x - 2\,(4 - x)$

   c) $5\,(x - 1) - 2\,(x + 4) = 4 - 3\,(3 - x)$

   d) $(b + 5)\,(b - 2)\,(2b + 11) = 0$

   e) $(2x + 1)\,(2x - 5) = (x - 2)\,(4x - 1)$

   f) $8x = 2x^3$

6. Completely factor each of the following expressions.

   a) $10x - 1000x^3$ b) $-75m^2 + 27$ c) $2x^4y^3 - 32y^3$ d) $(2a + 1)^2 - (3a - 5)^2$

7. Consider the equation $-x + y - 3x^2 = -x^2 - 6\,(x + 1) + x^3$. For each of the following pair of numbers given, determine whether it is a solution of the equation or not.

   a) $x = 2$ and $y = -1$

   b) $x = -1$ and $y = 0$

   c) $x = 3$ and $y = 24$

   d) $x = -2$ and $y = 4$

   e) $x = -3$ and $y = -1$

Review Problems - Answers

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2. a) 33 b) 6 c) 36

3. a) $-8a+9b$ b) $-x+3y$ c) 0 d) $9a^2-30a+25$ e) $43-30\sqrt{2}$ f) $9a^2-25$
   g) -7 h) $27a^3-1$ i) $6\sqrt{7}$

4. a) 11 b) -9 c) undefined d) -1

5. a) 0 b) -2 c) no solution d) $2,-5,-\frac{11}{2}$ e) 7 f) $-2,0,2$

6. a) $-10x\left(10x-1\right)\left(10x+1\right)$ b) $-3\left(5m-3\right)\left(5m+3\right)$
   c) $2y^3\left(x-2\right)\left(x+2\right)\left(x^2+4\right)$ d) $\left(4-5a\right)\left(a-6\right)$

7. a) $-15\neq-14$ no b) $-2=-2$ yes c) $-6=-6$ yes
   d) $-6=-6$ yes e) $-25\neq-24$ no