**MATH 6 HOMEWORK 20**

March 20, 2022

1. **Exponents Laws**

$$a^0 = 1$$

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$(ab)^n = a^n b^n$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$a^{-n} = \frac{1}{a^n}$$

$$(a^m)^n = a^{mn}$$

2. **Radicals**

$$a^{\frac{1}{2}} = \sqrt{a}$$

$$a^{\frac{m}{n}} = \sqrt[m]{a^n}$$

$$\sqrt{ab} = \sqrt{a}\sqrt{b} \qquad \sqrt{\boldsymbol{a + b}} \neq \sqrt{\boldsymbol{a}} + \sqrt{\boldsymbol{b}}$$

3. **Main Algebraic Identities**

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$a^2 - b^2 = (a-b)(a+b)$$

4. **And factorizing**

$$a(b+c) = ab + ac$$

**MATH 6 HOMEWORK 20**

March 20, 2022

1. Without a calculator, compute

$$19999 \cdot 20001$$

*[Use algebraic identity $(a^2 - b^2)$]*

2. Radicals
   a. $\sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} \cdot \sqrt{7} = 7^{\frac{?}{?}} = 7^{?} \cdot \sqrt{7}$
   b. $\sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} = 7^{?} \cdot \sqrt[3]{3^{?}}$
   c. $\sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{3} =$
   d. $(\sqrt{17} - \sqrt{11}) \cdot (\sqrt{17} + \sqrt{11}) =$
   e. $(\sqrt{7} - \sqrt{2}) \cdot (\sqrt{7} + \sqrt{2}) =$
   f. $(\sqrt{11} - \sqrt{3}) \cdot (\sqrt{11} + \sqrt{3}) =$

3. Calculate:

$$\frac{(7-6.35) \div 6.5 + 9.9}{\left(1.2 \div 36 + 1.2 \div 0.25 - 1\frac{5}{16}\right) \div \frac{169}{24}} =$$

4. Factorize (i.e., write as a product) the following expressions:
   *a.* $ac + ab$
   *b.* $x^2 + 3x^3$
   *c.* $x^2 - 2x - yx + 2y$
   *d.* $4x^2 - 4x + 1$
   *e.* $4x^2 + 16x + 2xy + 8y$
   *f.* $x^2(x + 4) + 5(x + 4)$
   *g.* $100x^8y^2 - 16x^4y^6$
   h. $a^2 + 4ab + 4b^2$
   i. $a^2 - 2a + 1$
   j. $x^2 - 7 \quad Hint: 7 = \left(\sqrt{7}\right)^2$
   k. $a^4 - b^4 Hint: a^4 = (a^2)^2$