Contents

1 algebra

1.1 wallace

1.1.1 distributive property

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

1.1.2 slope

$$m = \frac{\textbf{rise}}{\textbf{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

1.1.3 properties of exponents

$$a^m a^n = a^{m+n} \quad (ab)^m = a^m b^m \quad \frac{a^m}{a^n} = a^{m-n}$$

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \qquad a^{-m} = \frac{1}{a^m} \qquad \frac{1}{a^{-m}} = a^m$$

$$(a^m)^n = a^{mn} \qquad a^0 = 1 \qquad \left(\frac{a}{b}\right)^{-m} = \frac{b^m}{a^m}$$

1.1.4 scientific notation

$$a \times 10^b \text{ where } 1 \leqslant a < 10$$

1.1.5 ways to factor

- GCF
- Grouping
- Trinomials where $a = 1$
  - multiply to $a \times c$
  - add to b
- Trinomials where $a \neq 1$
- Factoring Special Products

1.1.6 factoring special products

difference of square	$a^2 - b^2 = (a - b)(a + b)$
sum of squares	$a^2 + b^2 = \text{Prime}$
perfect square	$a^2 + 2ab + b^2 = (a + b)^2$
sum of cubes	$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
difference of cubes	$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

1.1.7 factoring strategy

- **GCF FIRST**
- **2 terms**: sum of diffs of squares or cubes
- **3 terms**: ac method, watch for perfect squares
- **4 terms**: grouping

1.1.8 cross product

$$\text{if } \frac{a}{b} = \frac{c}{d}, \text{ then } ad = bc$$

1.1.9 definition of radicals

$$\sqrt[m]{a} = b, \text{ if } b^m = a$$

1.1.10 properties of radicals

$$a^m a^n = a^{m+n} \quad (ab)^m = a^m b^m \quad a^{-m} = \frac{1}{a^m}$$

$$\frac{a^m}{a^n} = a^{m-n} \quad \left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad \frac{1}{a^{-m}} = a^m$$

$$(a^m)^n = a^{mn} \quad a^0 = 1 \quad \left(\frac{a}{b}\right)^{-m} = \frac{b^m}{a^m}$$

1.1.11 radicals of mixed index

to be completed

2 geometry