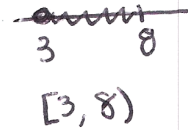


## P.1: Real Numbers

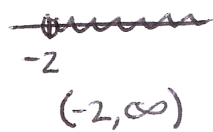
### Inequalities and Interval Notation

Example 1: Graph the following inequalities on a number line then write the inequality as an interval.

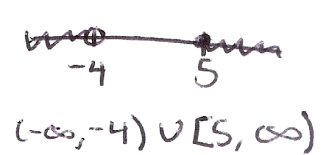
a)  $3 \leq x < 8$



b)  $-2 < x < \infty$



c)  $x < -4$  or  $x \geq 5$

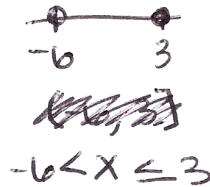


Example 2: Write each interval as an inequality

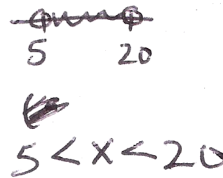
a)  $(-\infty, -1)$

$x < -1$

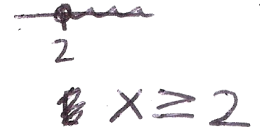
b)  $(-6, 3]$



c)  $(5, 20)$



d)  $[2, \infty)$



### Properties of Exponents

Properties	Examples
Product Rule: $a^m a^n = a^{m+n}$	$x^2 \cdot x^3 = x \cdot x \cdot x \cdot x \cdot x = x^5$
Quotient Rule: $\frac{a^m}{a^n} = a^{m-n}$	$\frac{x^5}{x^2} = \frac{x \cdot x \cdot x \cdot x \cdot x}{x \cdot x} = x^3$
Zero Exponent: $a^0 = 1$	$x^0 = 1$ $(2x^5y^7)^0 = 1$
Negative Exponents: $a^{-m} = \frac{1}{a^m}$	$x^{-3} = \frac{1}{x^3}$ $2x^{-3} = \frac{2}{x^3}$
Power of a Power: $(a^m)^n = a^{mn}$	$(x^2)^3 = (x^2)(x^2)(x^2) = x^6$
Power of a Product: $(ab)^n = a^n b^n$	$(2x)^3 = 2^3 x^3 = 8x^3$
Power of a Quotient: $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$	$\left(\frac{2}{x}\right)^2 = \frac{2^2}{x^2} = \frac{4}{x^2}$

Example 3: Simplify the following using the properties of exponents.

a)  $(2ab^3)(5a^2b^5)$

$$\boxed{10a^3b^8}$$

b)  $\left(\frac{x^2}{y}\right)^{-3}$

$$\left(\frac{y}{x^2}\right)^3 = \boxed{\frac{y^3}{x^6}}$$

c)  $(4x^2y)^3$

$$4^3(x^2)^3y^3$$
$$\boxed{64x^6y^3}$$

d)  $\frac{x^2y}{x^{-3}y^4}$

$$\frac{x^3x^2y}{y^4}$$

$$\boxed{\frac{x^5}{y^3}}$$

e)  $(-2a^2)^3(4ab^5)$

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

$$(-8a^6)(4ab^5)$$

$$\boxed{-32a^7b^5}$$

f)  $\frac{xy^4}{x^3y^2} \cdot \frac{x^{-2}y^3}{y^6}$

$$\frac{xy^4}{x^3y^2} \cdot \frac{y^3}{x^2y^6}$$

$$\frac{xy^7}{x^5y^8} = \boxed{\frac{1}{x^4y}}$$