

MATH 1130 Quiz 1

Name: Solutions

Term: Fall 2017

Instructor: Alex Rice

Problem 1 (6 points): Each of the following subsets of the real numbers can be described in four different ways: with a verbal description, as the solution to one or more inequalities, in interval notation, or with a picture on the real number line. For each part, one of these four descriptions is provided. Provide the other three missing descriptions.

a) i) Verbal Description: All real numbers that are at least -5 .

ii) Inequality/Inequalities: $x \geq -5$

(iii) Interval Notation: $[-5, \infty)$

(iv) Number Line Sketch: 

b) i) Verbal Description: the numbers whose distance from 5 is less than 7

ii) Inequality/Inequalities: $|x - 5| < 7$

(iii) Interval Notation: $(-2, 12)$

(iv) Number Line Sketch: 

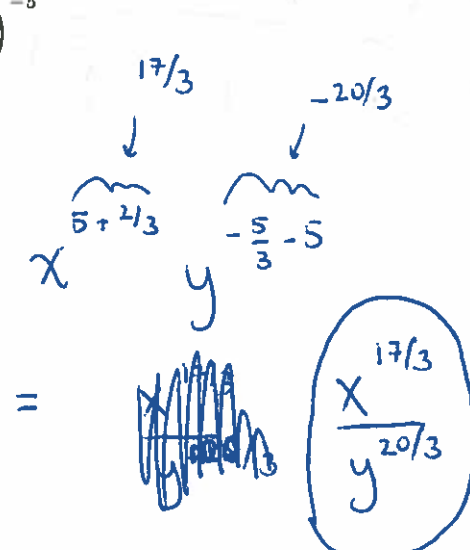
Problem 2 (4 points): Rewrite the following expression, as simplified as possible, using only positive exponents and no root symbols.

$$\sqrt[3]{x^2 y^{-5} z^3} \left(\frac{y^5 z}{x} \right)^{-5}$$

$$= (x^2 y^{-5} z^3)^{1/3} \cdot (y^5 z^1 x^{-1})^{-5}$$

$$= x^{2/3} y^{-5/3} z^1 \cdot y^{-5} z^{-1} x^5 = x^{5 - 2/3} y^{-5 - 5/3} z^{1 - 1}$$

$$= x^{17/3} y^{-20/3} z^0 = x^{17/3} y^{-20/3}$$



Problem 3 (4 points): Write the following polynomial in standard form, and determine its degree.

$$\begin{aligned} & x^3(x^2+1)(x^5-7) - x^{10} \\ & x^3(x^7+x^5-7x^2-7) - x^{10} \\ & = x^{10} + x^8 - 7x^5 - 7x^3 - x^{10} \\ & = x^8 - 7x^5 - 7x^3 \\ & \text{degree 8} \end{aligned}$$

Problem 4 (6 points): Factor the following polynomials as much as possible.

a) $x^7 + 12x^6 + 32x^5$

$$\begin{aligned} & = x^5(x^2 + 12x + 32) \\ & = x^5(x+4)(x+8) \end{aligned}$$

b) $x^8 - 18x^4 + 81$

$$\begin{aligned} & = (x^4 - 9)^2 \\ & = (x^2 + 3)^2(x^2 - 3)^2 \end{aligned}$$