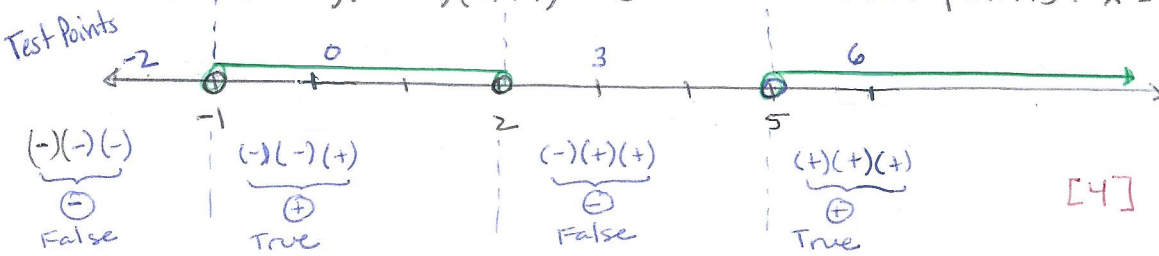


# Math 113

## Group Quiz 12 Solutions

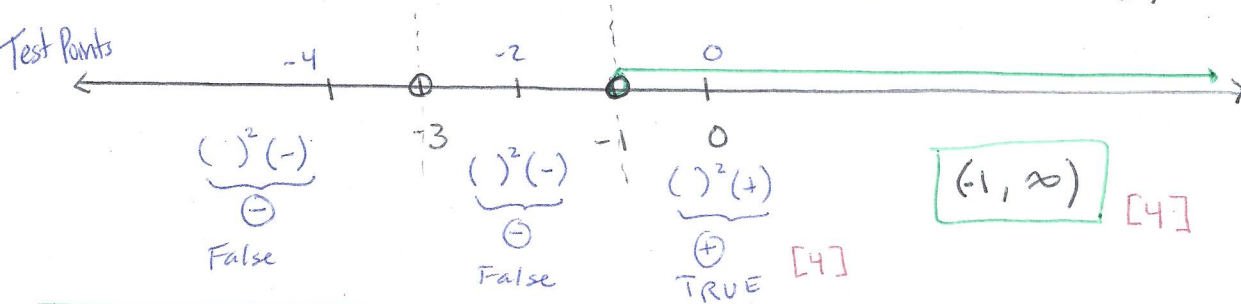
①

a)  $(x-5)(x-2)(x+1) > 0$       Critical points:  $x = -1, 2, 5$  [2]



$(-1, 2) \cup (5, \infty)$  [4]

b)  $(x+3)^2(x+1) > 0$       Critical points:  $x = -3, -1$  [2]



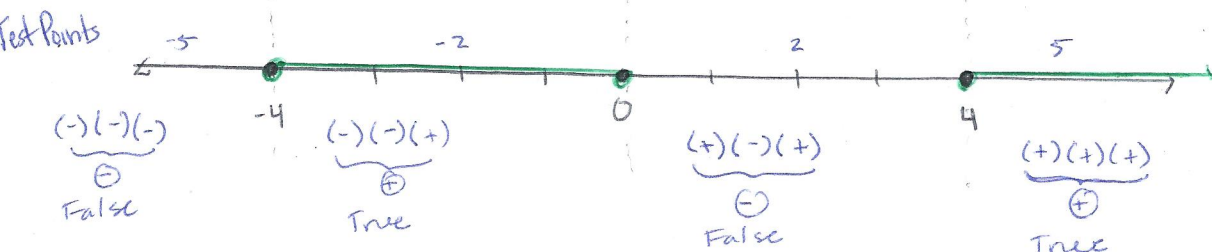
c)  $16x \leq x^3$

$0 \leq x^3 - 16x$

$x^3 - 16x \geq 0$

$x(x^2 - 16) \geq 0$

$x(x-4)(x+4) \geq 0$       Critical points:  $x = 0, 4, -4$  [2]

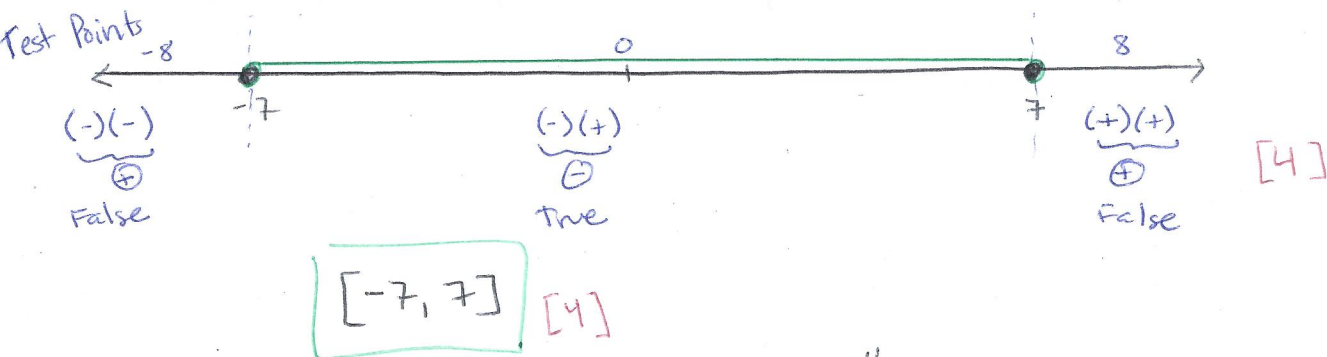


$[-4, 0] \cup [4, \infty)$  [4]

① d)  $x^2 \leq 49$

$x^2 - 49 \leq 0$

$(x-7)(x+7) \leq 0$  Critical Points:  $x=7, -7$  [2]



	Leading term	Looks like	End Behavior	Possible Graph
② a) $P(x) = x(x^2 - 3)$ $= x^3 - 3x$	$x^3$		$y \rightarrow \infty$ as $x \rightarrow \infty$ $y \rightarrow -\infty$ as $x \rightarrow -\infty$	II
b) $Q(x) = -x^2(x^2 - 3)$ $= -x^4 + 3x^2$	$-x^4$		$y \rightarrow -\infty$ as $x \rightarrow \infty$ $y \rightarrow -\infty$ as $x \rightarrow -\infty$	IV
c) $R(x) = -x^5 + 5x^3 - 3x$	$-x^5$		$y \rightarrow -\infty$ as $x \rightarrow \infty$ $y \rightarrow \infty$ as $x \rightarrow -\infty$	III
d) $S(x) = \frac{3}{2}x^6 - 4x^4$	$\frac{3}{2}x^6$		$y \rightarrow \infty$ as $x \rightarrow \infty$ $y \rightarrow \infty$ as $x \rightarrow -\infty$	I, V or VI
e) $T(x) = x^4 + 3x^3$	$x^4$		$y \rightarrow \infty$ as $x \rightarrow \infty$ $y \rightarrow \infty$ as $x \rightarrow -\infty$	I, V or VI
f) $V(x) = -x^3 + 3x^2$	$-x^3$		$y \rightarrow -\infty$ as $x \rightarrow \infty$ $y \rightarrow \infty$ as $x \rightarrow -\infty$	III

↑ [6 each]      ↑ [4 each]