Chapter 9 REVIEW

1. Solve the following inequalities and give the solutions as an interval.
2. $2x-3>5x+1$
3. $3-2\left(x-5\right)\leq 2x+3$
4. $\frac{2}{3}\left(5x+1\right)<\frac{1}{2}(3x-6)$
5. $\frac{2x+5}{3}\geq \frac{4x-1}{5}$

1. Determine the signs of the following expressions (and imagine what the graph can look like).
a) $f\left(x\right)=(x-3)(5+x)(x+1)$

b) $g\left(x\right)=(2x-3)^{2}(3x-4)^{3}$

c) $h\left(x\right)=\frac{2x^{2}-x-15}{x^{2}+5x+6}$

d) $k\left(x\right)=\frac{2x^{2}+7x-4}{x^{2}+3x-4}$
2. Solve the following inequalities and write your answer as an interval.

a) $\left(2-x\right)\left(x+5\right)>0$

b) $(2x-5)(x+3)(2x-4)\leq 0$

c) $\frac{x^{2}+x-6}{x+1}<0$

d) $\frac{x^{2}-4x+4}{x^{2}+2x-3}\geq 0$
3. Test the given values for the following inequalities :
a) $x=-3$ for $-2x^{3}+2x-5>0$ d) $x=-3$ for $\frac{3\sqrt{5-x}}{2x-4}>0$

b) $x=2$ for $x^{4}-5x^{2}+4\leq 0$ e) $x=-1$ for $-x^{4}-5x+12\geq 0$

c) $x=2$ for $\frac{-2x^{3}+2x-5}{x^{2}-5}>0$ f) $x=-2$ for $\frac{(x+3)(x-2)}{x^{2}+x+1}\leq 0$
4. A theatre seats 2000 people and charges $10 per ticket. At this price, all the tickets can be sold. A recent survey indicates that for every $1 increase in price, the number of tickets sold will decrease by 100. Determine the ticket prices that would result in revenue of at least $15000 by solving an inequality.
5. In a right triangle, one leg is 10cm shorter than twice the length of the other leg. If the legth of the hypotenuse is at least 8cm, determine the possible lengths of the legs by solving an inequality.
6. A farmer wants to build a rectangular pen with some fencing material. He also wants to divide it into four equal compartments using the same fencing material (parallel to the width). If the farmer has only 1000m of fencing, what widths would make the area of the pen at most 15000 m2?
7. Determine 2 numbers whose sum is 30 and whose product is at least 200.
8. Determine an inequality that would have the given solutions sets.

a) $-\frac{1}{2}<x<4$

b) $x\leq -\frac{3}{2}$ et $x\geq \frac{1}{4}$

c) $0\leq x\leq \frac{4}{3}$

SOLUTIONS

1. a) $(-\infty ;-\frac{4}{3})$ b) $[\frac{5}{2};\infty )$ c) $(-\infty ;-2)$ d) $(-\infty ;14]$
2. a) – 0 + 0 – 0 + b) – 0 + 0 + c) + || - 0 + || - 0 + d) + || + 0 - || +
3. a) $(-5,2)$ b) $(-\infty ;-3]U\left[2;\frac{5}{2}\right]$ c) $\left(-\infty ;-3\right)U(-1;2)$ d) $\left(-\infty ;-3\right)U(1:\infty )$
4. a) yes b) yes c) yes d) no e) yes f) yes
5. $-3.7\leq x\leq 13.6$. There can be -3 to 13 increases of $1, which leads to prices between $7 and $23.
6. $x\geq 7$
7. $0<x\leq 36.75$ or $163.25 \leq x<200$
8. $10\leq x\leq 20$
9. Answers may vary
a) $2x^{2}-7x-4<0$ b) $8x^{2}-7x-4<0$ c) $3x^{2}-4x\leq 0$