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4. a) Positive:  $]-\infty, -5] \cup [3, +\infty[$

Negative:  $[-5, 3]$

b) Positive:  $\left[\frac{3}{2}, 2\right]$

Negative:  $]-\infty, \frac{3}{2}] \cup [2, +\infty[$

c) Positive:  $\mathbb{R}$

Negative:  $\{1\}$

d) Positive:  $\left\{\frac{1}{2}\right\}$

Negative:  $\mathbb{R}$

5. a) Dom:  $\mathbb{R}$

Ran:  $]-\infty, 9]$

b) Dom:  $\mathbb{R}$

Ran:  $[-16, +\infty[$

6. a) Increasing:  $\left[\frac{1}{2}, +\infty[$

Decreasing:  $]-\infty, \frac{1}{2}]$

b) Increasing:  $]-\infty, \frac{3}{4}]$

Decreasing:  $\left[\frac{3}{4}, +\infty[$

7.  $\left\{\frac{2}{3}, 3\right\}$

8.  $]-\infty, -7] \cup [2, +\infty[$

9. Ran:  $]-\infty, 16]$

10. 5

11. Maximum = 4

12.  $x = \frac{5}{4}$

13.  $]-\infty, \frac{1}{4}]$