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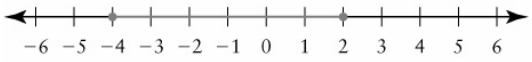
2.5 Solve Inequalities Using Technology

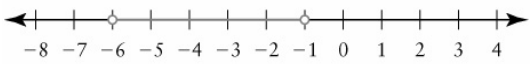
BLM 2–7
(page 1)

1. Write inequalities for the values of x shown.

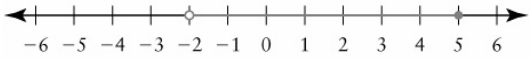
a)



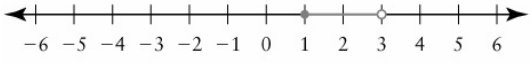
b)



c)



d)



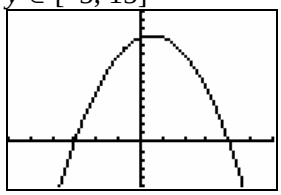
2. Write the intervals into which the x-axis is divided by each set of x-intercepts of a polynomial function.
a) –7, –1
b) 3, 4
c) –2, 6, 0

3. Describe what the solution to each inequality indicates about the graph of $y = f(x)$.
a) $f(x) > 0$ when $-3 < x < -1$ or $x > 2$
b) $f(x) \leq 0$ when $-2 \leq x \leq 0$ or $0 \leq x \leq 2$

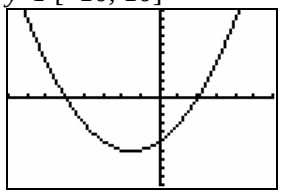
4. Sketch a graph of a quartic polynomial function $y = f(x)$ such that $f(x) > 0$ when $-2.5 < x < -0.5$ or $1 < x < 3$ and $f(x) < 0$ when $x < -2.5$ or $-0.5 < x < 1$ or $x > 3$.

5. For each graph write
i) the x-intercepts
ii) the intervals of x for which the graph is positive.
iii) the intervals of x for which the graph is negative.

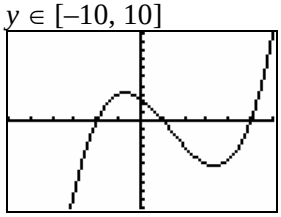
a) Window variables: $x \in [-6, 6]$, $y \in [-5, 15]$



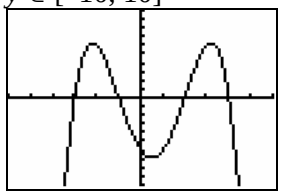
b) Window variables: $x \in [-8, 6]$, $y \in [-10, 10]$



c) Window variables: $x \in [-6, 6]$, $y \in [-10, 10]$



d) Window variables: $x \in [-6, 6]$, $y \in [-10, 10]$



6. Solve each polynomial inequality by graphing the polynomial function.
a) $x^2 - 2x - 8 \leq 0$
b) $x^2 + 7x + 6 > 0$
c) $x^3 + x^2 - 16x - 16 \geq 0$
d) $x^3 - 2x^2 - 5x + 6 < 0$
e) $x^3 - 4x^2 - 11x + 30 \leq 0$

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7. Solve each polynomial inequality. Use a computer algebra system, if available.
a) $2x^2 - 5x - 3 < 0$
b) $4x^2 - 28x + 45 \geq 0$
c) $x^3 - 4x^2 + x + 6 > 0$
d) $x^3 + x^2 - 9x - 9 \leq 0$
e) $x^3 - 6x^2 - x + 30 \geq 0$

8. Use Technology Solve each polynomial inequality by first finding the approximate zeros of the related polynomial function. Round answers to two decimal places.
a) $2x^2 - 5x + 1 \geq 0$
b) $2x^3 + x^2 - 3x - 1 < 0$
c) $-4x^3 - 2x + 5 > 0$
d) $x^3 + 2x^2 - 4x - 6 \leq 0$
e) $3x^4 - 5x^2 - 4x + 5 < 0$

9. Solve. Round answers to one decimal place.
a) $3x^3 - 2x^2 - 12x - 12 > 0$
b) $2x^3 + x^2 + 3x - 2 < 0$
c) $-x^3 + 10x - 5 \leq 0$
d) $-2x^4 + 6x^3 - x^2 + 3x - 10 \geq 0$

10. The height, h, in metres, of a golf ball t seconds after it is hit can be modelled by the function $h(t) = -4.9t^2 + 32t + 0.2$. When is the height of the ball less than 10 m? Round to two decimal paces.

11. The solutions given correspond to an inequality involving a quartic function. Write a possible quartic polynomial inequality.
$x < -\frac{5}{2}$ or $\frac{3}{2} < x < \frac{5}{2}$ or $x > 7$

12. Use Technology Solve. Round answers to two decimal places.
$3x^4 + 8x^3 + x^2 - 10 \leq 10x^4 + 3x^3 - 8x - 4$