Functions 10 – Solving Ineq. Graphically & Algebraically Name _____
10.1 – Ironman Training Per ____ Date _____

For the annual Ironman World Championship in Kailua-Kona, the athletes train year round. Many of the athletes train using heart rate monitors to better equip their bodies for the grueling race. The athletes try to keep their heart rate at or below their target heart rate. To find this, the athletes take their age and subtract it from 180 to determine a target heart rate (measured in beats per minute, or *bpm*).

1. Using T for the target heart rate and a for the age (in years), write the symbolic form for the function $T(a)$ to determine the target heart rate based on age, and then state the domain for T.

2. Use your symbolic form to determine target heart rates for athletes of age:

   a. 26 years old

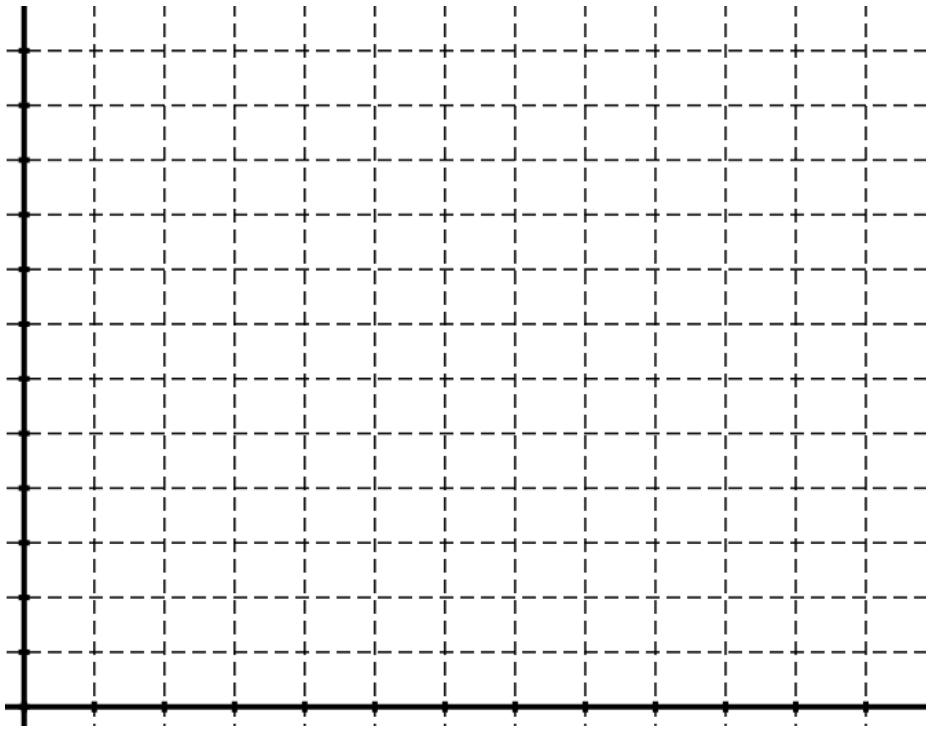
   b. 37 years old

3. Use your symbolic form to determine what age an athlete would have the following target heart rates:

   a. 156 bpm

   b. 137 bpm

4. Carefully graph below the function $T(a)$ represented by your symbolic form. Be sure to label each axis.



5. Just using the above graph, find the target heart rate of athletes with ages:

a. 55 years old

b. 20 years old

7. When the athletes train, they want to keep their actual heart rate at or below their target heart rate.

a. What heart rates would be acceptable for a 33 year old?

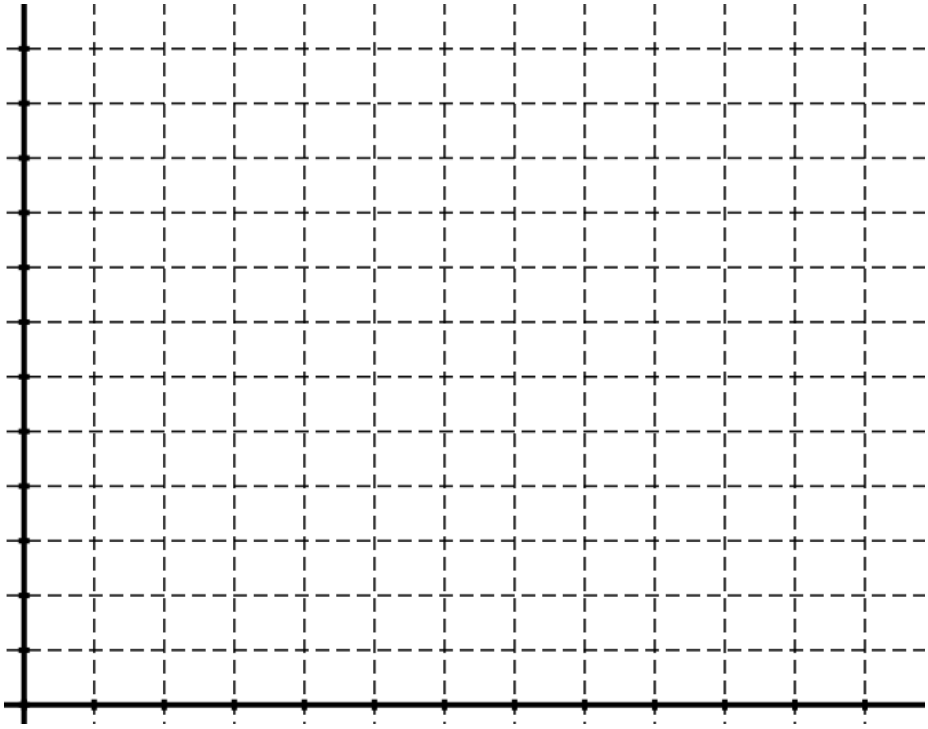
b. What heart rates would be acceptable for a 22 year old?

c. Is a heart rate of 146 acceptable for a 35 year old? Explain your reasoning.

Young Surfboard Designs shapes surfboards for local pros on the North Shore. Owen Young owns the company and he charges a flat fee of $500 for a 5'11" surfboard. He then charges an extra $10 per additional inch.

1. Write the symbolic form for the cost $C(x)$ that Young charges for shaping a surfboard x inches longer than 5'11".

2. Carefully graph your function $C(x)$ on the below graph. Be sure to label your axes.



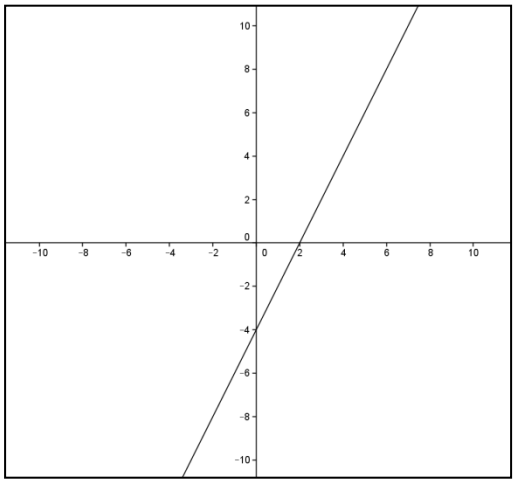
3. What is the cost of shaping a 6'6" surfboard? Put an X on your above graph that represents this cost.

4. Kalani has a budget of $660. He cannot spend more than that on his surfboard. Write an inequality that models this restriction.

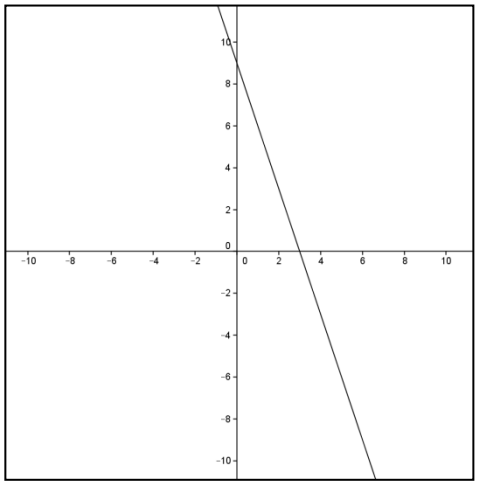
5. Solve the inequality to determine the longest surfboard Kalani can purchase.

Functions 10 – Solving Ineq. Graphically & Algebraically Name _____
10.3 – Solving Inequalities Graphically Per ____ Date _____

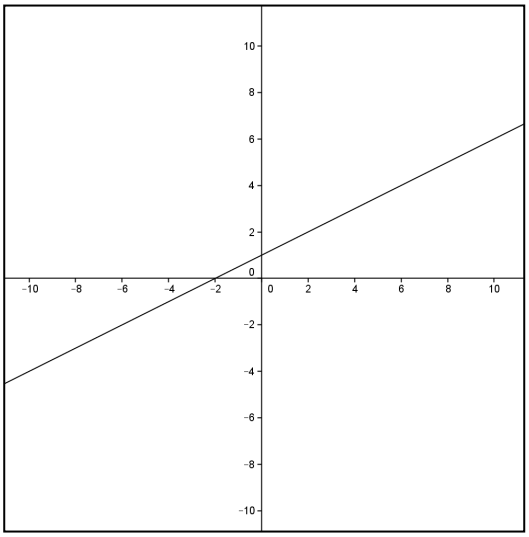
For each of the following graphs for $f(x)$, shade the portion of the x-axis corresponding to x values for which $f(x) > 0$. (Remember, x-coordinates on a graph correspond to function inputs, and y-coordinates correspond to function outputs.) Write the solution below the graphs using set notation.



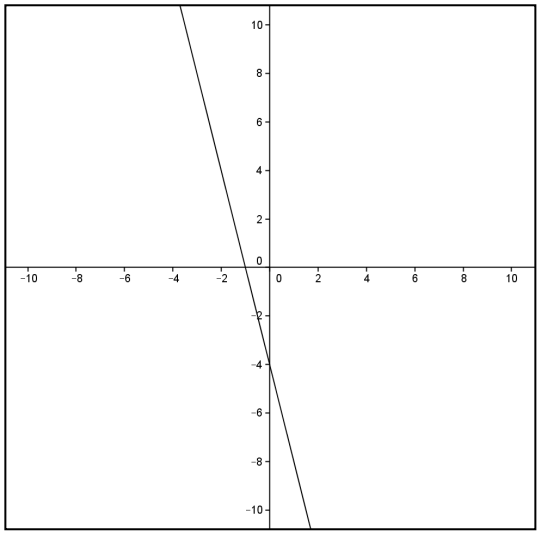
1. $f(x) > 0$ for _____



2. $f(x) > 0$ for _____



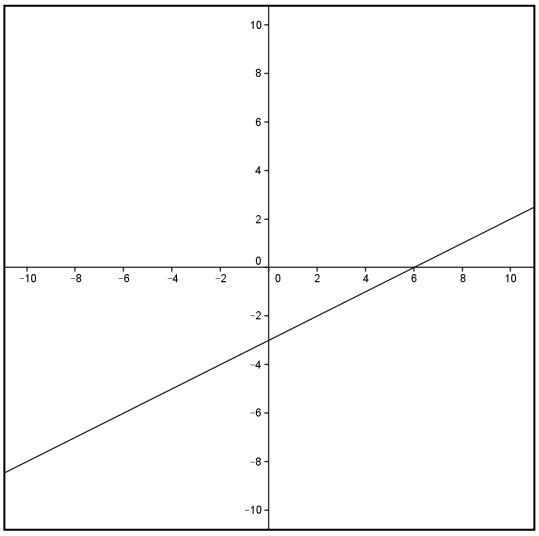
3. $f(x) > 0$ for _____



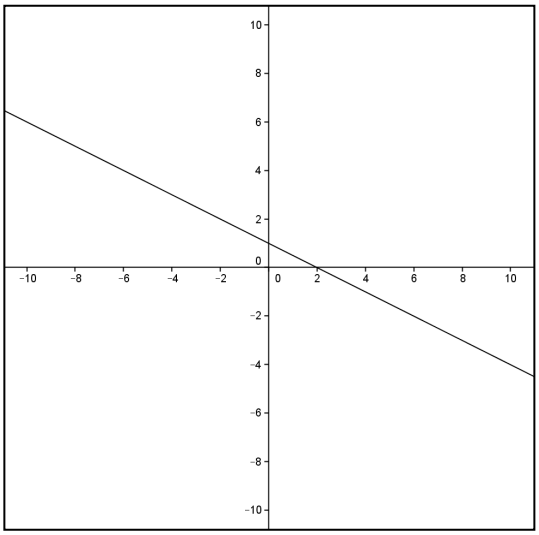
4. $f(x) > 0$ for _____

Functions 10 – Solving Ineq. Graphically & Algebraically Name _____
10.3 – Solving Inequalities Graphically Per ____ Date _____

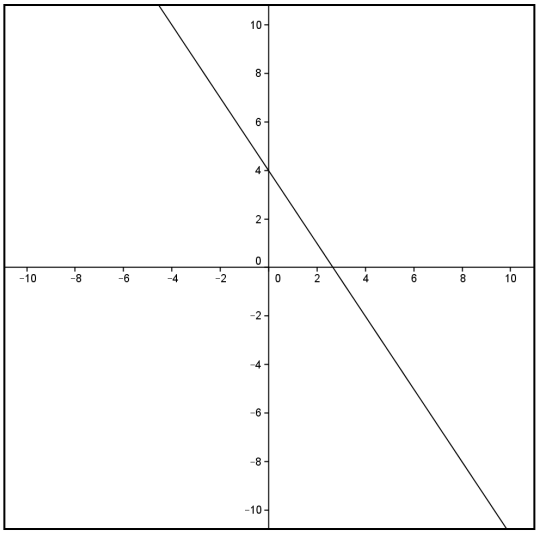
For each of the following graphs for $f(x)$, shade the portion of the x-axis corresponding to x values for which $f(x) < 0$. (Remember, x-coordinates on a graph correspond to function inputs, and y-coordinates correspond to function outputs.) Write the solution below the graphs using set notation.



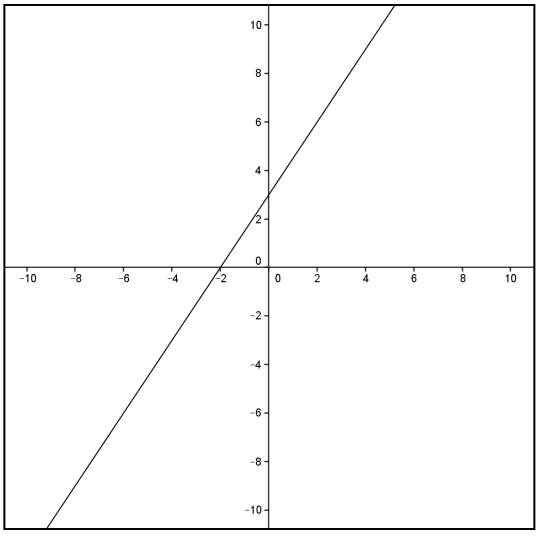
5. $f(x) < 0$ for _____



6. $f(x) < 0$ for _____



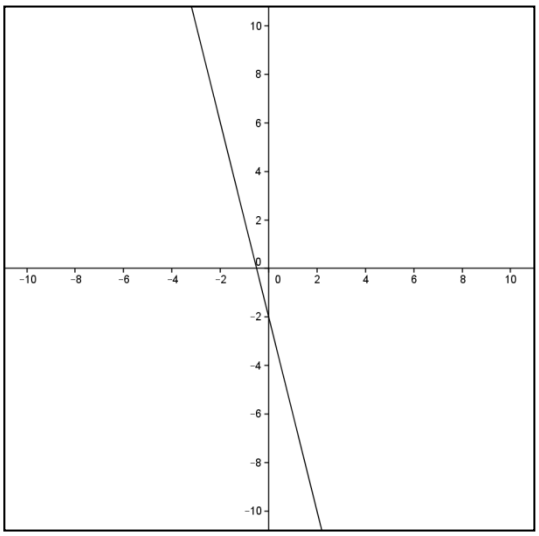
7. $f(x) < 0$ for _____

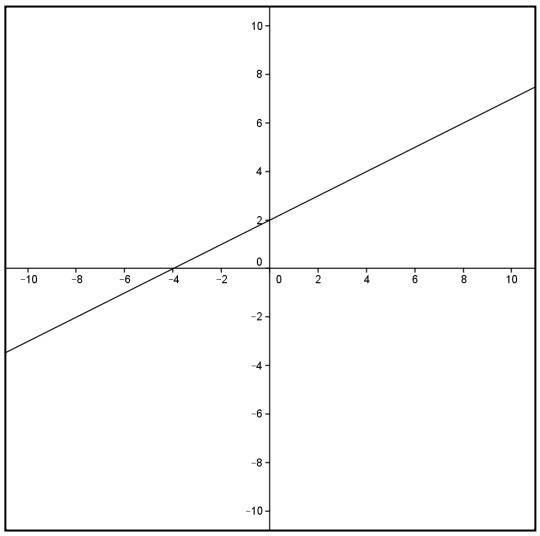


8. $f(x) < 0$ for _____

Functions 10 – Solving Ineq. Graphically & Algebraically Name _____
10.3 – Solving Inequalities Graphically Per ____ Date _____

For the next two graphs of $f(x)$, shade the portion of the x-axis that indicates those x-values for which $f(x) < 6$. Write the solution below the graphs using set notation.

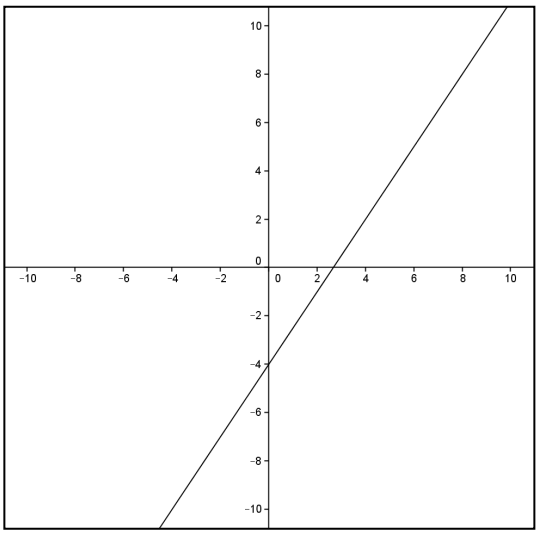


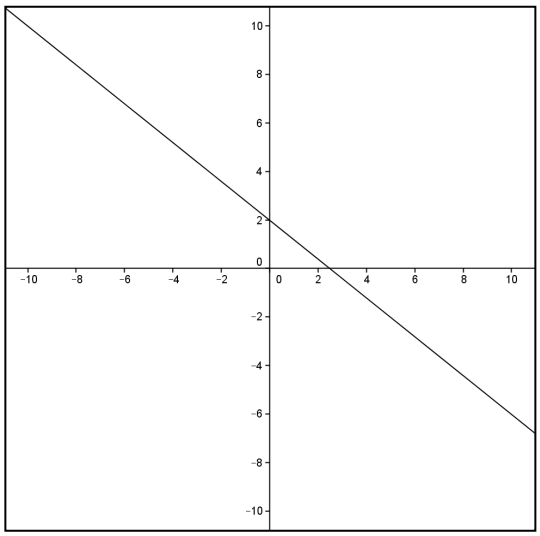


9. $f(x) < 6$ for _____

10. $f(x) < 6$ for _____

For the next two graphs of $f(x)$, shade the portion of the x-axis that indicates those x-values for which $f(x) > -4$. Write the solution below the graphs using set notation

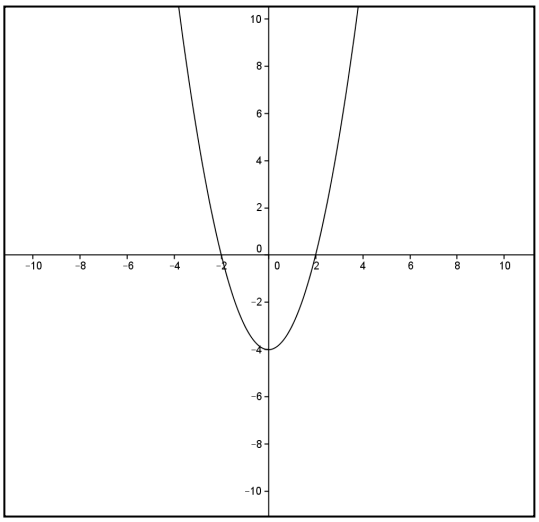


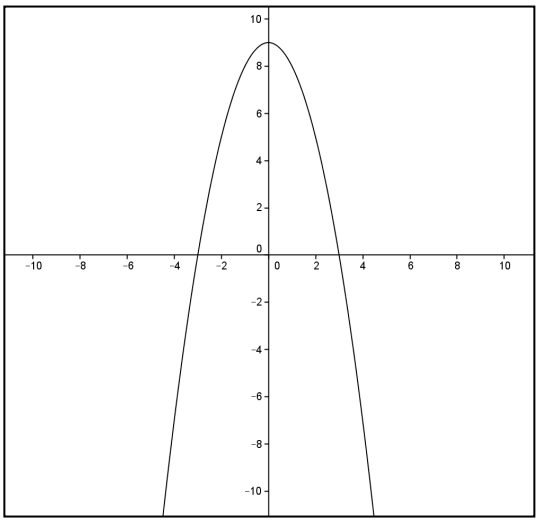


10. $f(x) > -4$ for _____

12. $f(x) > -4$ for _____

For the next two graphs of $f(x)$, shade the portion of the x-axis that indicates those x-values for which $f(x) < 0$. Write the solution below the graphs using set notation.

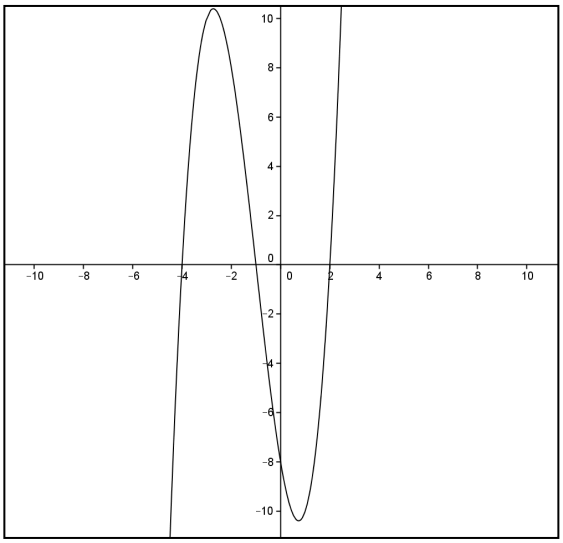


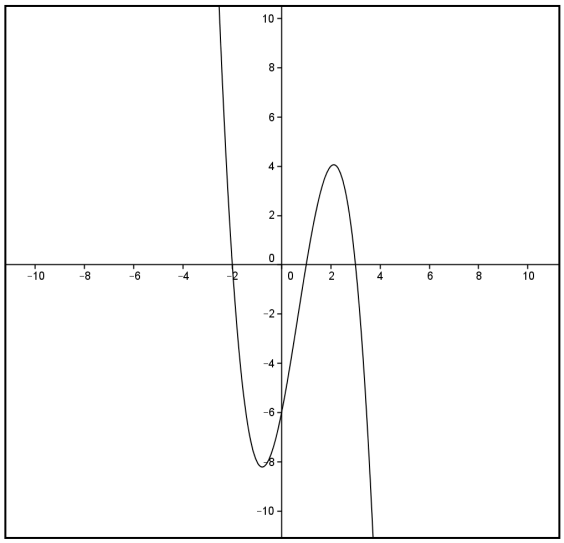


13. $f(x) < 0$ for _____

14. $f(x) < 0$ for _____

For the next two graphs of $f(x)$, shade the portion of the x-axis that indicates those x-values for which $f(x) > 0$. Write the solution below the graphs using set notation





15. $f(x) > 0$ for _____

16. $f(x) > 0$ for _____

Functions 10 – Solving Ineq. Graphically & Algebraically Name _____
10.4 – Stations Worksheet Per ____ Date _____

At each of the stations, use the graph to solve one the given equations. If an equation has no solution, write "No solution" and explain why no solution exists.

Station 1

$x^2 - 36 < 0$ _____

$x^2 - 36 < -20$ _____

$x^2 - 36 > -20$ _____

Station 2

$x^2 + x - 6 < 0$ _____

$x^2 + x - 6 > 0$ _____

$x^2 + x - 6 < -6$ _____

Station 3

$2x - 14 < 0$ _____

$2x - 14 > 0$ _____

$2x - 14 > -8$ _____

Station 4

$x^2 - 9 < 16$ _____

$x^2 - 9 < 0$ _____

$x^2 - 9 > 0$ _____

Station 5

$x^2 + 4x - 5 < -8$ _____

$x^2 + 4x - 5 < 0$ _____

$x^2 + 4x - 5 > 0$ _____

Station 6

$x^3 + 2x^2 + x - 4 > 0$ _____

$x^3 + 2x^2 + x - 4 < 0$ _____

$x^3 + 2x^2 + x - 4 > -4$ _____

Station 7

$x^2 - 2x - 15 < 0$ _____

$x^2 - 2x - 15 > 0$ _____

$x^2 - 2x - 15 < -12$ _____

Station 8

$x^2 - 25 < 0$ _____

$x^2 - 25 < -16$ _____

$x^2 - 25 > -16$ _____

Station 9

$x^2 - x - 2 < 0$ _____

$x^2 - x - 2 < -2$ _____

$x^2 - x - 2 > -2$ _____