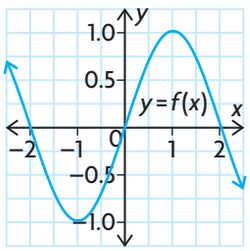
4 Chapter Self-Test



1. Solve for x in $3x^3 - 3x^2 - 7x + 5 = x^3 - 2x^2 - 1$.

2. Consider the graph shown of the function $y = f(x)$.

a) Determine where $f(x)$ is positive, negative, and zero.

b) Determine where the instantaneous rate of change in $f(x)$ is positive, negative, and zero. Find the average rate of change in $f(x)$ from $x = 1$ to $x = 2$.

3. A pizza company is advertising a special card. The card costs \$50, but allows the owner to purchase pizzas for \$5 each for one full year. Pizzas are normally \$12 each.

a) Write expressions that represent the cost of n pizzas with and without the card.

b) How many pizzas would you have to purchase in a year to make the card worthwhile?

4. Solve the following inequalities.

a) $4x - 5 < -2(x + 1)$

b) $-4 \leq -(3x + 1) \leq 5$

c) $(x + 1)(x - 5)(x + 2) > 0$

d) $(2x - 4)^2(x + 3) \geq 0$

5. The height in metres of a projectile launched from the top of a building is given by $h(t) = -5t^2 + 20t + 15$, where t is the time in seconds since it was launched.

a) How high was the projectile at the moment of launch?

b) At what time does the projectile hit the ground?

c) What is the average rate of change in height from the time the object was launched until the time it hit the ground?

6. Consider the following function: $f(x) = x^3 + x^2 + 1$.

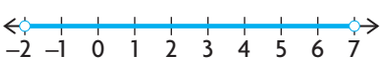
a) Estimate the slope of the tangent line at $x = 1$.

b) What are the coordinates of the point of tangency?

c) Determine the equation of the tangent line.

7. Explain why the polynomial $f(x) = 4x^{2008} + 2008x^4 + 4$ has no zeros.

8. The following number line shows the solution to a double inequality.



a) Write the solution using set notation.

b) Create a double inequality that has both a linear and a constant term for which this is the solution set.

9. A box that holds an expensive pen has square ends, and its length is 13 cm longer than its width. The volume of the box is 60 cm^3. Determine the dimensions of the box.