

Challenge: Skills and Applications

For use with pages 24–30

Check whether the given number is a solution of the equation or inequality.

1. $\frac{28 - x^2}{3x} = 2 + \frac{x + 2}{2x}; 4$

2. $\frac{3}{1 - x} - \frac{9}{2x} = 6x; 0.75$

3. $\frac{8}{2x + 2} = \frac{1}{x - \frac{1}{8}}; \frac{1}{2}$

4. $3 - x^2 = \frac{x}{2}; \frac{3}{2}$

5. $(2x - 7)4 + 3 \geq \frac{5x}{3}; 4$

6. $5 + 2x^2 + 6 < 2^x; 3$

7. $\frac{7 - 2x}{2x + 1} > \frac{x^2 + 1}{2^{x+1}}; 2$

8. $6 - 4x^2 \leq 6 - 4x \div 2 \cdot 5 + 3; \frac{1}{3}$

For Exercises 9–12, use the following information.

The total mass M (in kilograms) of a spacecraft that can be propelled by a magnetic sail around Earth is, in theory, given by

$$M = \frac{0.015m^2}{f}$$

where m is the mass (in kilograms) of the magnetic sail and f is the drag force (in Newtons) of the spacecraft.

A 4000-kilogram magnetic sail theoretically propels a 50,000-kilogram spacecraft in orbit around Earth.

9. Write an equation that models the situation.
10. Is 5 Newtons a solution to the equation from Exercise 9?
11. Is 4 Newtons a solution to the equation from Exercise 9?
12. Solve the equation and interpret your solution.