

1. For each inequality, state whether it is true or false.

(a) $3 \leq 8$

(b) $8 < 4$

(c) $9 > 9$

(d) $1,245 \leq 1,245$

(e) $-12^3 - 6$

(f) $3^2 \leq 5^2$

(g) $(-3)^2 \geq 3^2$

(h) $.99 \leq .98$

2. For each of the following inequalities, determine if it is true or false at the given value of the replacement variable.

(a) $3x + 2 \leq 2x - 5$ for $x = 8$

*(b) $3x + 2 \leq 2 - 3x$ for $x = -2$

(c) $(x - 3)^2 > -3(x + 2)$ for $x = 3$

*(d) $\frac{2(3 - 2x)}{5} \leq 2x - 3(x + 1)$ for $x = -1$

(e) $\frac{x^2 - 4x + 9}{6} > \frac{3x + 1}{5}$ for $x = 3$

*(f) $\left| \frac{-2(5 - x)}{3} \right| \geq \frac{3x - 1}{2}$ for $x = -1$

3. A pressure gage for a boiler allows the boiler to run as long as $\frac{3(x+5)-1}{2} + 4(2x-3) \leq 125$ psi, where x is the pressure reading at the sensor. If the pressure gets too high the machine will shut down to prevent any injuries but it will also cost the company money. Test the following values to see what pressures will be safe for the machine to run at.

Pressure readings	Calculations	Safe?
$x = 12$		
$x = 13$		
$x = 14$		

*(b) If the machine cannot run unless the has a pressure above 35 pounds per cubic inch, test to see if a reading of 5 would keep the machine functional.

4. Write the appropriate inequality sign ($<$ or $>$) in the box that will make each of the following true at the given point.

(a) $4x + 2$ $1 - 3x$ for $x = -2$

*(b) $\frac{2x + 1}{-3}$ $4(2 - 3x)$ for $x = -2$

(c) $2x^2 + 5$ $|1 - 9x|$ for $x = 4$

*(d) $\frac{3(2x - 5)}{3} + 2$ $8(3x - 6)$ for $x = 5$

R1. Solve the equation for y and then find y when $x = -3$: $y + 2x = 5$

R2. Solve for x : $-2(3x - 4) = -2x + 2$

*R3. Solve for r : $9 - 3r = 14$

R4. Simplify: $(-3x^4)^2$

*R5. Simplify: $-(3x^4)^2$

R6. Which of the following choices is equivalent to the expression $(x - 2)(6 - 4x) + (5x + 4)(x - 2)$? Show the calculations that lead to your choice and check using a value of x .

(1) $(x - 2)(x + 2)$

(2) $(x - 2)(9x + 10)$

(3) $(x - 2)(x + 10)$

(4) $(x - 2)(10 - 9x)$

1. (a) True
 (b) False
 (c) False
 (d) True
 (e) False
 (f) True
 (g) True
 (h) False

2. (a) False
 (b) True
 (c) True
 (d) False
 (e) False
 (f) True

3. (a) $x = 12$, 109, Yes
 $x = 13$ 118.5, Yes
 $x = 14$ 128, No
 (b) 42.5, Yes
 4. (a) $<$
 (b) $<$
 (c) $>$
 (d) $<$

- R1. $y = 11$
 R2. $x = \frac{3}{2}$
 R3. $r = \frac{-5}{3}$
 R4. $9x^8$
 R5. $-9x^8$
 R6. (3)