

MATH 115
Test 2 Review

Solve the inequality analytically. Support the answer graphically. Give exact values for endpoints.

1) $x^2 + 3x - 28 > 0$

1) _____

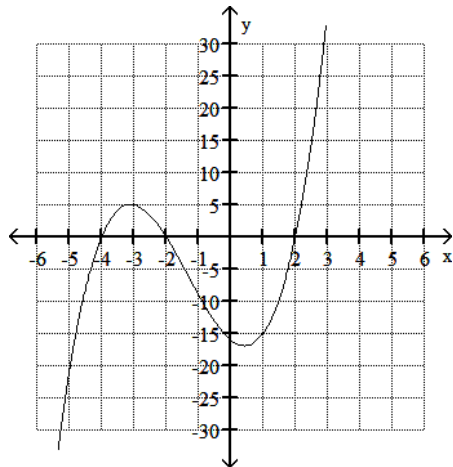
2) $x^2 + 7x \leq -12$

2) _____

Solve the polynomial inequality by graphing.

3) $(x + 4)(x^2 - 4) > 0$

3) _____



Solve the equation.

4) $|6x + 8| = 3$

4) _____

Solve the inequality.

5) $|x - 8| > 2$

5) _____

6) $|1 - 4x| > 4$

6) _____

7) $|8 - x| \leq 3$

7) _____

8) $|-4x + 3| > -4$

8) _____

Find the requested value.

9)

9) _____

$$f(-2) \text{ for } f(x) = \begin{cases} 4x + 1 & \text{if } x < 2 \\ 2x & \text{if } 2 \leq x \leq 4 \\ 2 - 4x & \text{if } x > 4 \end{cases}$$

A) 9

B) -4

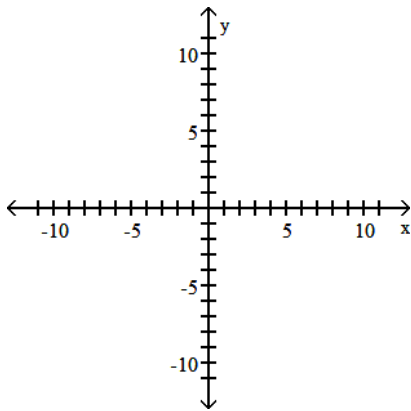
C) -7

D) 10

Graph the function.

10)

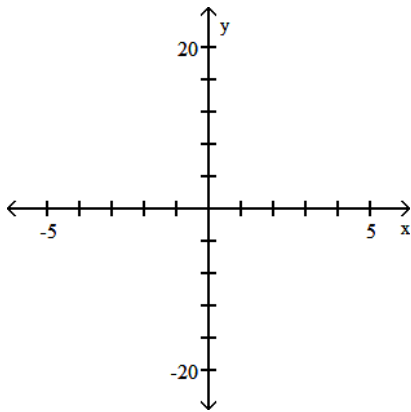
$$f(x) = \begin{cases} 8x + 6 & \text{if } x < 0 \\ 5x^2 - 2 & \text{if } x \geq 0 \end{cases}$$



10) _____

11)

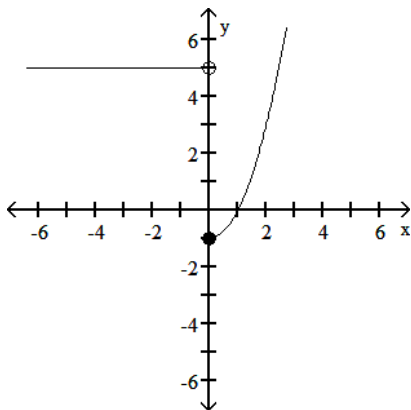
$$f(x) = \begin{cases} 3x + 2 & \text{if } x < -2 \\ x & \text{if } -2 \leq x \leq 3 \\ 2x - 1 & \text{if } x > 3 \end{cases}$$



11) _____

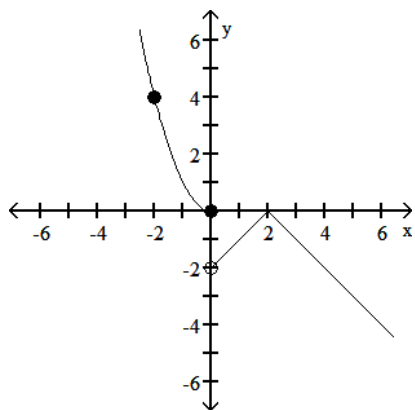
For Problems 12 and 13, give a formula for a piecewise-defined function f for the graph shown. Give its domain and range. Give the intervals where it is increasing, decreasing, or constant.

12)



12) _____

13)



13) _____

Write the slope-intercept form of the line that passes through the given point with slope m .

14) Through $(-3, -2)$, $m = 0$

14) _____

Find the equation of the line that has the given properties. Write the equation in slope-intercept form, if possible.

15) Contains $(2, -5)$; parallel to $y = 2x - 2$

15) _____

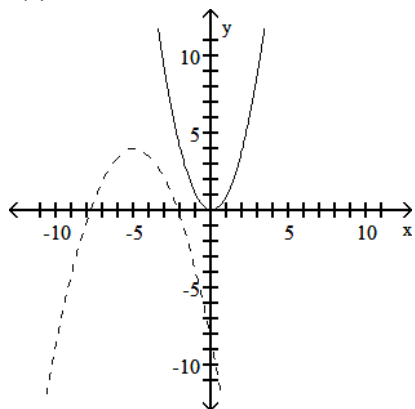
16) Contains $(5, -2)$; perpendicular to the line $y = \frac{1}{7}x + 4$

16) _____

The graph of the given function is drawn with a solid line. The graph of a function, $g(x)$, transformed from this one is drawn with a dashed line. Find a formula for $g(x)$.

17) $f(x) = x^2$

17) _____



Write the equation that results in the desired transformation.

18) The absolute value function, vertically stretched by a factor of 1.3 and reflected across the y -axis

18) _____

Fill in each blank with the appropriate response.

19) The graph of $y = -5|x|$ can be obtained from the graph of $y = |x|$ by vertically stretching by a factor of ___ and reflecting across the ___-axis.

19) _____

20) The graph of $y = -5(x - 4)^2 + 7$ can be obtained from the graph of $y = x^2$ by shifting horizontally ___ units to the ____, vertically stretching by a factor of ____, reflecting across the ___-axis, and shifting vertically ___ units in the ____ direction.

20) _____

Give the equation of the function whose graph is described.

21) The graph of $y = x^2$ is shifted 3 units to the left. This graph is then vertically stretched by a factor of 5 and reflected across the x-axis. Finally, the graph is shifted 7 units downward. 21) _____

22) The graph of $y = |x|$ is reflected across the y-axis and vertically shrunk by a factor of $\frac{1}{3}$. 22) _____
This graph is then reflected across the x-axis. Finally, the graph is shifted 4 units upward.

Find the requested composition or operation.

23) $f(x) = 3 - 3x$, $g(x) = -8x + 3$ 23) _____
Find $(f + g)(x)$.

24) $f(x) = 2x - 8$, $g(x) = 6x - 2$ 24) _____
Find $(f - g)(x)$.

25) $f(x) = 8x + 5$, $g(x) = 3x + 4$ 25) _____
Find $(fg)(x)$.

26) $f(x) = 9x^2 - 8x$, $g(x) = x^2 - 2x - 48$ 26) _____
Find $\left(\frac{f}{g}\right)(x)$.

Answer Key

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1) $(-\infty, -7) \cup (4, \infty)$

2) $[-4, -3]$

3) $(-4, -2) \cup (2, \infty)$

4) $\left\{-\frac{5}{6}, -\frac{11}{6}\right\}$

5) $(-\infty, 6) \cup (10, \infty)$

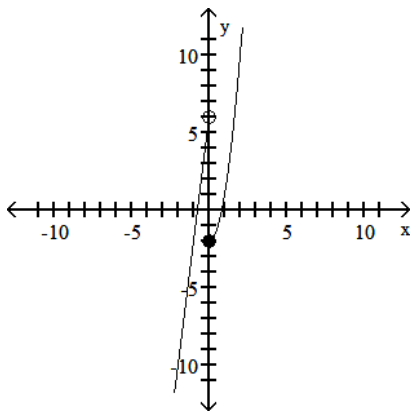
6) $\left(-\infty, -\frac{3}{4}\right) \cup \left(\frac{5}{4}, \infty\right)$

7) $[5, 11]$

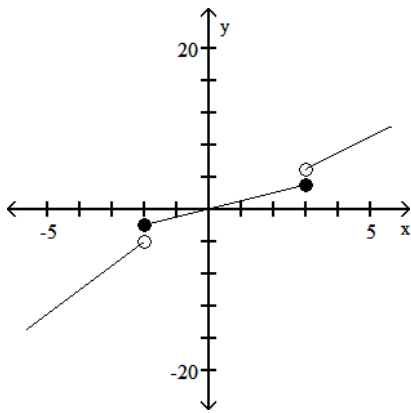
8) $(-\infty, \infty)$

9) C

10)



11)



12)

$$f(x) = \begin{cases} 5 & \text{if } x < 0 \\ x^2 - 1 & \text{if } x \geq 0 \end{cases}$$

13)

$$f(x) = \begin{cases} x^2 & \text{if } x \leq 0 \\ -|x - 2| & \text{if } x > 0 \end{cases}$$

14) $y = -2$

15) $y = 2x - 9$

16) $y = -7x + 33$

17) $g(x) = -\frac{1}{2}(x + 5)^2 + 4$

Answer Key

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18) $y = 1.3|-x|$

19) 5; x

20) 4; right; 5; x; 7; upward

21) $y = -5(x + 3)^2 - 7$

22) $y = -\frac{1}{3}|-x| + 4$

23) $-11x + 6$

24) $-4x - 6$

25) $24x^2 + 47x + 20$

26) $\frac{9x^2 - 8x}{x^2 - 2x - 48}$