

Directions: To receive partial credit you must show your work on a problem.

Circle final answers. All problems are 5 points each.

1. Find the slope of the line passing through (4.8, 3.1) and (-5.2, 1.6).

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1.6 - 3.1}{-5.2 - 4.8}$$

$$= \frac{-1.5}{-10} = \boxed{.15} \checkmark$$

3. Find the slope-intercept form of the equation of the line passing through (-10, 4) and has slope $m = 0$.

if $m = 0$ then horizontal line.

$$y = b \quad \boxed{y = 4} \checkmark$$

5. Is the following relation a function ?

$$\{(1, 2), (5, 7), (3, 8), (5, 4)\}$$

No, the 5's repeat \checkmark

7. Evaluate the function at each specified value and simplify. $f(x) = \frac{3x - 4}{5}$

a) $f(2)$

$$f(2) = \frac{3(2) - 4}{5}$$

$$= \frac{6 - 4}{5}$$

$\boxed{f(2) = \frac{2}{5}} \checkmark$

b) $f(-3)$

$$f(-3) = \frac{3(-3) - 4}{5}$$

$$= \frac{-9 - 4}{5}$$

$\boxed{f(-3) = -\frac{13}{5}} \checkmark$

2. Write the equation of the line in slope-intercept form ($y = mx + b$) that goes through (1, 1) and $(6, -\frac{2}{3})$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-\frac{2}{3} - 1}{6 - 1} = \frac{-\frac{2}{3} - \frac{3}{3}}{5} = -\frac{1}{3}$$

$$y - y_1 = m(x - x_1)$$

$$y - 1 = -\frac{1}{3}(x - 1)$$

$$y - 1 = -\frac{1}{3}x + \frac{1}{3}$$

$$y = -\frac{1}{3}x + \frac{4}{3} \checkmark$$

4. Write the equation of the line in slope-intercept form ($y = mx + b$) that goes through (2, 1) and is perpendicular to $4x - 2y = 3$.

$$\frac{-2y}{-2} = \frac{-4x + 3}{-2}$$

$$y = \frac{2}{1}x - \frac{3}{2}$$

$$m = -\frac{1}{2}$$

$$y - y_1 = m(x - x_1)$$

$$y - 1 = -\frac{1}{2}(x - 2)$$

$$y - 1 = -\frac{1}{2}x + 1$$

$$y = -\frac{1}{2}x + 2 \checkmark$$

6. Evaluate the function at each specified value and simplify. $f(x) = \sqrt{x + 8} + 2$

a) $f(-8)$

$$f(-8) = \sqrt{-8 + 8} + 2$$

$$f(-8) = \sqrt{0} + 2$$

$$\boxed{f(-8) = 2} \checkmark$$

b) $f(1)$

$$f(1) = \sqrt{1 + 8} + 2$$

$$= \sqrt{9} + 2$$

$$= 3 + 2$$

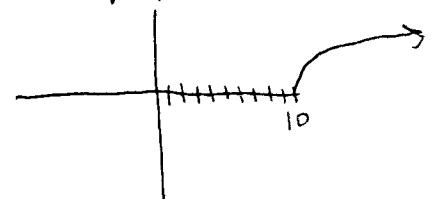
$$\boxed{f(1) = 5} \checkmark$$

8. State the Domain for the following:

(Hint: draw graph first.)

$$g(x) = \sqrt{x - 10}$$

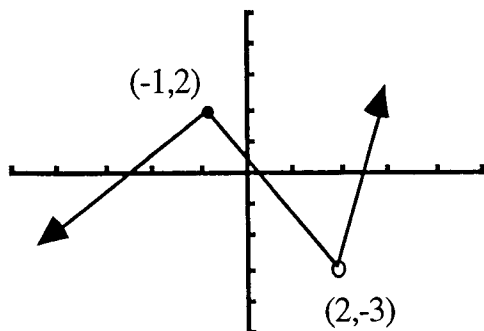
graph:



from looking at the graph

$\boxed{D = [10, \infty)} \checkmark$

9. Determine the intervals of the domain over which the given functions is increasing, decreasing, and constant.



Increasing

$$(-\infty, -1] + [2, \infty)$$

Decreasing

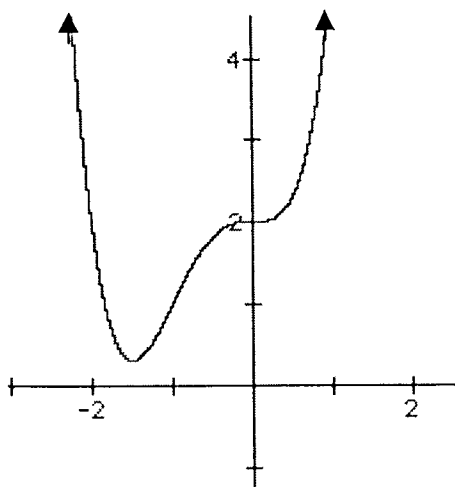
$$[-1, 2)$$

Constant

none

10. Is the following graph a function ?

Yes or No



yes, no vertical line intersects in more than one point!

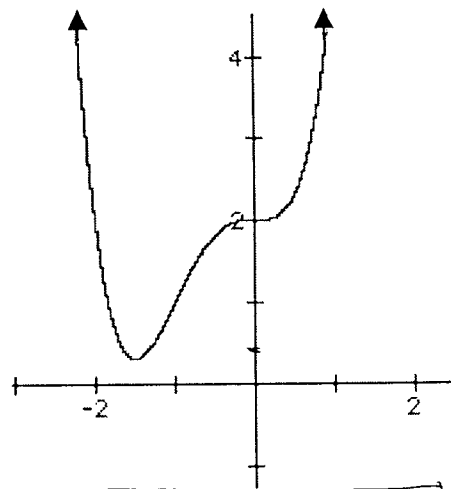
12. Write an equation for the function that is described as follows:

The shape of $f(x) = |x|$ but moved 10 units up and reflected over the x-axis.

Answer:

$$f(x) = -|x| - 10$$

11. State the Domain and Range for the following graph:



Domain = $(-\infty, \infty)$

Range = $[1, \infty)$



13. Write an equation for the function that is described as follows:

The shape of $f(x) = x^3$ but moved 6 units to the left, and 6 units down.

Answer:

$$f(x) = (x+6)^3 - 6$$

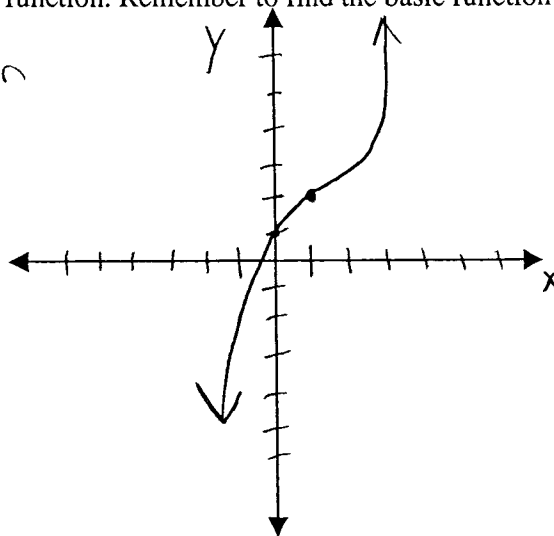
14. Describe the transformation that occurs in the function. Remember to find the basic function first.
Also sketch the graph.

$$f(x) = (x-1)^3 + 2$$

basic function
 $y = x^3$

Description:

shift 2 units up
and 1 unit right



For $f(x) = x^2$ and $g(x) = 2 - x$ Find the following:

15. $(f+g)(x) = f(x) + g(x)$

$$= x^2 + 2 - x \quad \checkmark$$

17. $(f \cdot g)(x) = f(x) \cdot g(x)$

$$= x^2(2-x) = 2x^2 - x^3 \quad \checkmark$$

16. $(f-g)(x) = f(x) - g(x)$

$$= x^2 - (2-x)$$

$$= x^2 - 2 + x = x^2 + x - 2 \quad \checkmark$$

18. $(f/g)(x)$

$$= \frac{f(x)}{g(x)} = \frac{x^2}{2-x} \quad \checkmark$$

For $f(x) = x^2 + 1$ and $g(x) = x - 4$ Find the following:

19. $(f \cdot g)(6) = f(6) \cdot g(6)$

$$= (37) \cdot (2) = 74 \quad \checkmark$$

20. $(f+g)(2) = f(2) + g(2)$

$$= (2^2 + 1) + (2 - 4)$$

$$= (5) + (-2)$$

$$= 3 \quad \checkmark$$

For $f(x) = \frac{1}{3}x - 3$ and $g(x) = 3x + 1$ Find the following:

21. $(f \circ g)(x) = f[g(x)]$

$$= \frac{1}{3}(3x+1) - 3 = x + \frac{1}{3} - 3$$

$$= x + \frac{1}{3} - \frac{9}{3} = x - \frac{8}{3} \quad \checkmark$$

22. $(g \circ f)(12) = g[f(12)]$

$$= g\left[\frac{1}{3}(12) - 3\right]$$

$$= g[4 - 3]$$

$$= g[1] = 3(1) + 1 = 4 \quad \checkmark$$

23. $(f \circ f)(x)$

$$= f[f(x)]$$

$$= \frac{1}{3}\left(\frac{1}{3}x - 3\right) - 3$$

$$= \frac{1}{9}x - 1 - 3 = \frac{1}{9}x - 4 \quad \checkmark$$

24. $(g \circ g)(2)$

$$= g[g(2)]$$

$$= g[3(2) + 1]$$

$$= g[7] = 3(7) + 1 = 22 \quad \checkmark$$

Answers to Sample Test 2

1. $m = 0.15$	2. $y = \frac{-1}{3}x + \frac{4}{3}$
3. $y = 4$	4. $y = \frac{-1}{2}x + 2$
5. NO the 5's repeat !	6. a) 2 b) 5
7. a) $\frac{2}{5}$ b) $-\frac{13}{5}$	8. $[10, \infty)$
9. Inc. = $(-\infty, -1]$ and $(2, \infty)$ Decr. = $[-1, 2)$ Const = None	10. Yes
11. Domain = $(-\infty, \infty)$ Range = $[0.5, \infty)$	12. $f(x) = - x - 10$
13. $f(x) = (x + 6)^3 - 6$	14. Vertical shift of $f(x) = x^3$ 2 units upward and horizontal shift of 1 unit to the right.
15. $f(x) = x^2 - x + 2$	
16. $f(x) = x^2 + x - 2$	
17. $f(x) = x^2(2 - x) = 2x^2 - x^3$	
18. $f(x) = \frac{x^2}{2 - x}$	
19. 74	
20. 3	
21. $(f \circ g)(x) = x - \frac{8}{3}$	
22. 4	
23. $(f \circ f)(x) = \frac{1}{9}x - 4$	
24. 22	