

Part 1: Multiple Choice—Write the letter of the correct answer on blank provided.

MC 1 pt each

1. Jill decides to make cheesecakes to sell at the Fall Festival. Jill spent \$32.00 for the booth decorations and each cheesecake will cost \$6.75 per cake to make. Write a linear function for the total cost of the cheesecakes.

A) $C(x) = 32x + 6.75$

B) $C(x) = 6.75x + 32$

C) $C(x) = 38.75x$

D) $C(x) = 26.25x$

1. B

2. Given $A = \{(-2, -1, 0)\}$ and $B = \{1, 2, 3\}$, determine which of the sets ordered pairs represents a function from A to B.

A) $\{(-1, 1), (0, 2), (1, 2), (2, 3)\}$

B) $\{(-1, 2), (0, 1), (-2, 3)\}$

C) $\{(-1, 2), (0, 2), (1, 3), (2, 3)\}$

D) None of these

2. B

3. In which of the following equations is y a function of x?

A) $2x - 9 = 17 - 3y$

B) $2x + 5 = |4y|$

C) Both a and b

D) Neither a nor b

3. A

4. Given $g(x) = \frac{\sqrt{x-2}}{x-3}$, state the domain of the function.

A) $[2, \infty)$

B) $[2, 3) \cup (3, \infty)$

C) $[2, 3)$

D) $(-\infty, 3) \cup (3, \infty)$

4. B

5. Given $g(x) = -x^2 + 2x + 1$, find $g(x+4)$

A) $-x^2 + 10x + 25$

B) $-x^2 - 6x - 7$

C) $(x+4)^2 + 1$

D) $-x^2 + 2x - 6$

5. B

6. The parent function $f(x) = x^3$ is reflected over the x-axis, has a horizontal shrink of 2 and is translated 3 units up, 4 units to the left. Write the equation of the resulting function.

A) $g(x) = -\left(\frac{1}{2}x - 4\right)^3 + 3$

B) $g(x) = -(2x + 8)^3 + 3$

C) $g(x) = \left(-\frac{1}{2}x - 8\right)^3 + 3$

D) $g(x) = (-2x + 4)^3 + 3$

7. Determine if $f(x) = -2x^3 - 2x$ is even, odd, or neither.

A) even

B) odd

C) neither

8. Given the point $(-2, -3)$ on the graph of an even function. Find a second point on the graph.

A) $(2, -3)$

B) $(-2, 3)$

C) $(2, 3)$

9. Given $f(x) = \begin{cases} 5 & x \leq -3 \\ -2x + 1 & -2 < x \leq 5 \\ 3x^2 & x > 5 \end{cases}$, find $f(5)$ Evaluate the function.

A) 5

B) 75

C) -9

D) 66

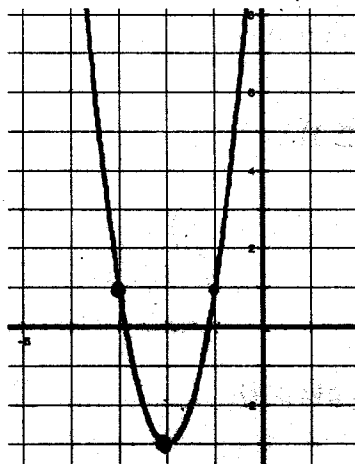
10. What is the equation for the graph at the right?

A) $f(x) = \left(\frac{1}{2}x + 4\right)^2 - 3$

B) $f(x) = (2x + 4)^2 - 3$

C) $f(x) = (2x - 4)^2 - 3$

D) $f(x) = (x - 4)^2 - 3$



11. Let $f(x) = x + 3$ and $g(x) = x^2 - 4$, find $(fg)(2)$

A) 5

B) 3

C) 0

D) 21

6. B

7. B

8. A

9. C

10. B

11. C

12. Let $f(x) = x+3$ and $g(x) = x^2-4$, find $\left(\frac{f}{g}\right)(x)$ and state the domain.

12. B

A) $\left(\frac{f}{g}\right)(x) = \frac{x}{x^2} - \frac{3}{4}$
domain: $(-\infty, 2)$

C) $\left(\frac{f}{g}\right)(x) = \frac{x+3}{x^2-4}$
domain: $(-\infty, -2] \cup [-2, 2) \cup [2, \infty)$

B) $\left(\frac{f}{g}\right)(x) = \frac{x+3}{x^2-4}$
domain: $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

D) $\left(\frac{f}{g}\right)(x) = \frac{x+3}{x^2-4}$
domain: $(-\infty, -3) \cup (3, \infty)$

13. Given $f(x) = 1 - \sqrt{3x+1}$ and $g(x) = 25x^2$, find $(f \circ g)(1)$

13. C

A) -25

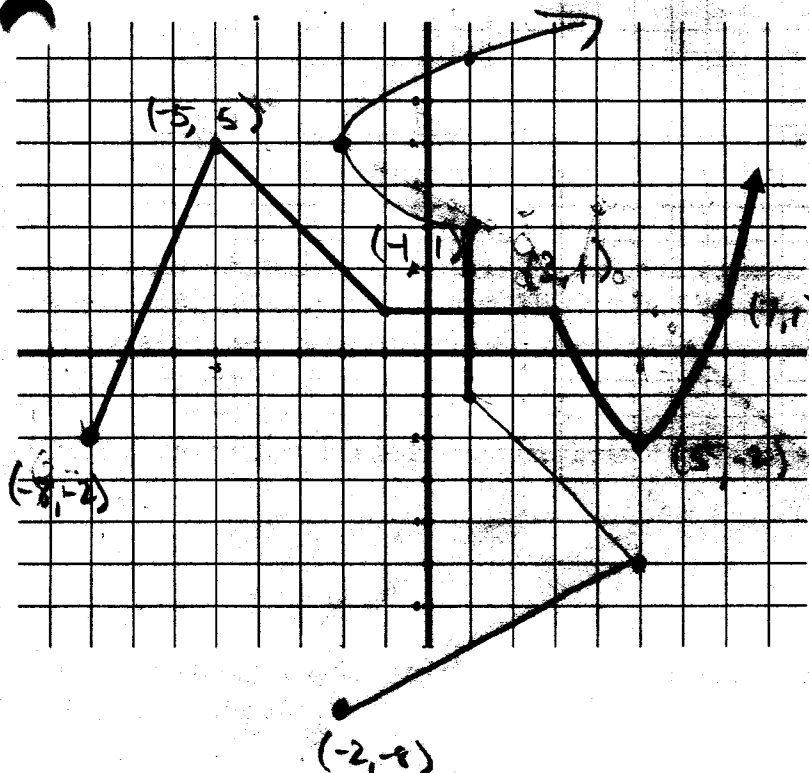
B) 25

C) $1 - \sqrt{76}$

D) Not possible

14. Use the graph below to answer the following questions. Use interval notation to answer.

6 pts



A. Function? YES $+1/2$

B. Domain: $[-8, \infty)$ $+1/2$

C. Range: $[-4, \infty)$ $+1/2$

D. Interval(s) of Increase: $[-8, -5)$ & $(5, \infty)$ $+1/2$

E. Interval(s) of Decrease: $(-5, -1)$ & $(3, 5)$ $+1/2$

F. Is the inverse a function? NO $+1/2$

G. Even, Odd, neither? neither $+1/2$

F. Find $f(4)$: -1 $+1/2$

H. What is x if $f(x) = 1$: $[-1, 3]$ $+1/2$

I. Graph the inverse of the function
(Use the same coordinate plane)

W

18

15. Given $f(x) = \sqrt[3]{x-2} + 1$

A. What is the domain of f ?

$x \geq 2$

B. What is the range of f ?

15. A. $(-\infty, \infty) + 1$

B. $(-\infty, \infty) + 1$

+3 C. $f^{-1}(x) = (x-1)^3 + 2$

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

+1 Range: $(-\infty, \infty)$

C. Find the inverse of f .

$x = \sqrt[3]{y-2} + 1$

$x-1 = \sqrt[3]{y-2}$

$(x-1)^3 = y-2$

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

16. Use the composition of functions to prove $f(x) = \sqrt[3]{3x-10}$ and $g(x) = \frac{x^3+10}{3}$ are inverses. +3

$f(g(x)) = \sqrt[3]{3(\frac{x^3+10}{3})-10}$

$g(f(x)) = \frac{(\sqrt[3]{3x-10})^3+10}{3}$

$= \frac{3x-10+10}{3} = \frac{3x}{3} = x$

$= \sqrt[3]{x^3+10-10}$

$= \sqrt[3]{x^3}$

$= x$

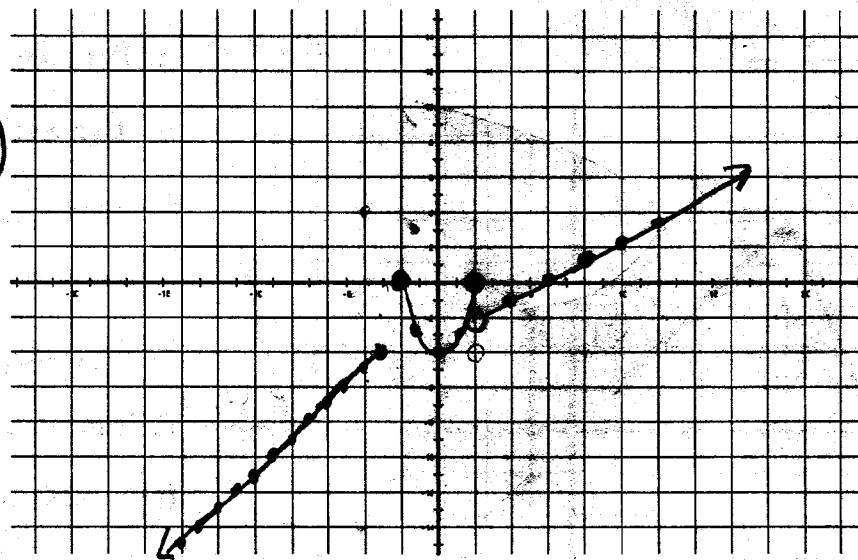
17. Graph the piecewise function +4

$f(x) = \begin{cases} -|x-1| & x < -3 \\ x^2-4 & -2 \leq x \leq 2 \\ \frac{x}{2}-3 & x > 2 \end{cases}$

x	- x-1
-3	-4
-4	-5
-5	-6
-6	-7
-7	-8

x	x^2-4
-2	0
-1	-3
0	-4
1	-3
2	0

x	$\frac{x}{2}-3$
2	-2
4	-1
6	0
8	1



8. Use transformations to graph the function.

$$f(x) = 1 - 3\sqrt{2 + \frac{1}{2}x}$$

$$f(x) = -3\sqrt{\frac{1}{2}(x+4)} + 1$$

A. Graph the parent function using a dotted curve.
(Use the coordinate plane provided.)

B. List the transformations in the correct order

C. Write the list of order pairs for the final graph.

D. Graph $f(x)$.

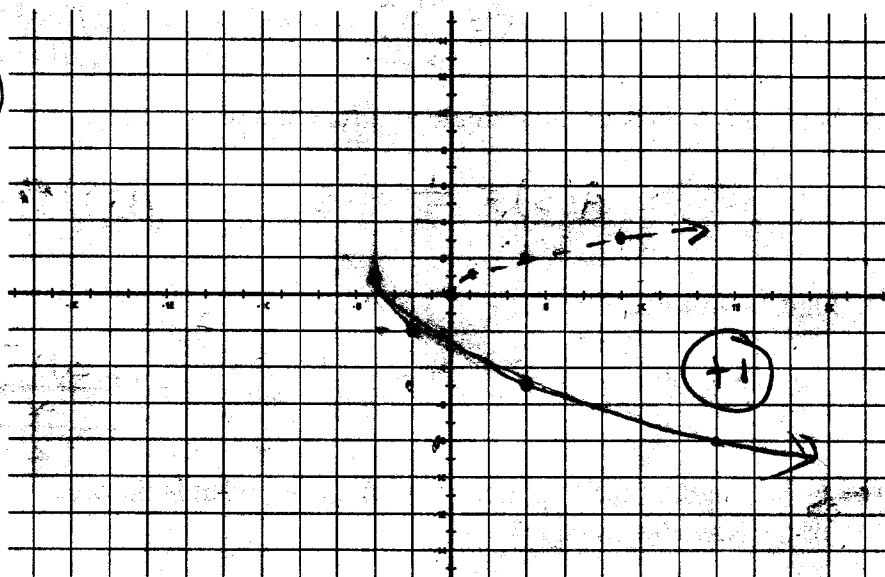
(On the same coordinate plane as part A)

$$P(x) = \sqrt{x}$$

x	P(x)
0	0
1	1
4	2
9	3

R	S
0	0
1	-1
4	-2
9	-3

T	(+3)
-4	1
-2	-2
4	-5
14	-8



X	Y
-4	1
-2	-2
4	-5
14	-8

C.

+6

reflect over x-axis

horizontal stretch of 2; vertical

stretch of 3 translate 4 left & up

(+1)

(+1)

19. Christina is making hot chocolate to sell at this season's first football game. She spent \$25.00 on paper supplies. Each cup of hot chocolate costs Christina 75 cents to make. She plans on selling each cup of hot chocolate for \$2.50.

+4

\$2.50.00 (+1)

$$C(x) = .75x + 25$$

A. Write a cost function and determine the cost for making 300 cups of hot chocolate.

$$C(x) = .75x + 25.00$$

$$C(300) = .75(300) + 25.00$$

$$\frac{3}{4}(300)$$

$$225 + 25.00$$

$$R(x) = 2.5x$$

B. Write a profit function and then determine how many cups must be sold to make \$325

$$P(x) = 1.75x - 25$$

200

(+1)

$$P(x) = 2.5x - (.75x + 25)$$

$$P(x) = 1.75x - 25$$

$$\begin{array}{r} 2.50 \\ - .75 \\ \hline 1.75 \end{array}$$

$$325 = 1.75x - 25$$

$$350 = 1.75x$$

$$350 = 1\frac{3}{4}x$$

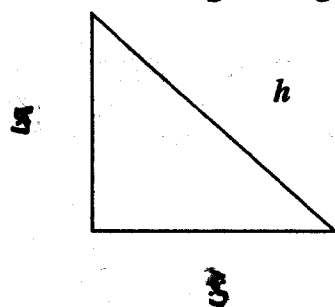
$$\frac{7}{4}x = 350$$

$$x = 350 \cdot \frac{4}{7}$$

$$x = 50 \cdot 4 = 200$$

(+10)

20. Given an isosceles right triangle.



20. A. $s(h) = \frac{h\sqrt{2}}{2}$

B. $A(s) = \frac{s^2}{2}$

C. $\frac{h^2}{4}$

D. 25

A. Write the length of the side s , as a function of the length of the hypotenuse h .

$$2s^2 = h^2$$

$$s = \sqrt{\frac{h^2}{2}}$$

$$s(h) = \frac{h}{\sqrt{2}} = \frac{h\sqrt{2}}{2}$$

B. Write the Area A of the triangle as a function of side s .

$$A(s) = \frac{1}{2} s \cdot s = A(s) = \frac{s^2}{2}$$

C. Find $(A \circ S)(h)$.

$$A(S(h)) = A = \frac{\left(\frac{h\sqrt{2}}{2}\right)^2}{2} = \frac{\frac{2h^2}{4}}{2} = \frac{\frac{h^2}{2}}{2} = \frac{h^2}{4}$$

D. If the length of the hypotenuse is 10 inches, what is the area of the isosceles triangle?

$$A = \frac{10^2}{4} = \frac{100}{4} = 25$$