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a b c d e

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GOOD LUCK!

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For grading use:

Number Correct	
	(out of 20 problems)

Total	
	(out of 100 points)

Multiple Choice Questions

*Show all your work on the page where the question appears.
Clearly mark your answer both on the cover page on this exam
and in the corresponding questions that follow.*

1. Find an equation for a linear function $f(x) = mx + b$ for which $f(7) = 2$ and $f(12) = 13$.

Possibilities:

- (a) $f(x) = \frac{13}{12}x + 13$
 - (b) $f(x) = \frac{2}{7}x + 2$
 - (c) $f(x) = \frac{12}{7}x + \frac{13}{2}$
 - (d) $f(x) = -\frac{5}{11}x + \frac{57}{11}$
 - (e) $f(x) = \frac{11}{5}x - \frac{67}{5}$
-

2. A gallon of paint can cover 400 square feet. Find how many gallon containers of paint should be bought to paint 2 coats on each wall of a rectangular room with dimensions 19 feet by 16 feet and walls that are 8-feet tall. For simplicity, assume all the walls are blank (no doors or windows) and need to be covered completely with the paint (twice).

Possibilities:

- (a) 7 gallon containers of paint
 - (b) 45 gallon containers of paint
 - (c) 3 gallon containers of paint
 - (d) 280 gallon containers of paint
 - (e) 1 gallon containers of paint
-

3. Harriet's cousin Raberta is running a half-marathon that is 13.11 miles long. She plans to run using Harriet's strategy: run for one hour, nap for 45 minutes (0.75 hours) and then run the rest. However, Raberta's running pace is 6.05 miles per hour, so her time will be different from Harriet's. If Raberta uses this strategy what will her average speed be for the entire race, including nap time?

Possibilities:

- (a) About 4.72 mph
 - (b) About 2.91 mph
 - (c) About 7.93 mph
 - (d) About 4.49 mph
 - (e) About 2.35 mph
-

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4. Let $f(x) = |x|$ be the absolute value function. Which of these functions is obtained when the graph of $y = f(x)$ is shifted left 2 units and down 7 units?

Possibilities:

- (a) $g(x) = |x - 2| + 7$
- (b) $g(x) = |x + 2| - 7$
- (c) $g(x) = \frac{2}{7}|x|$
- (d) $g(x) = |x + 7| + 2$
- (e) $g(x) = |x - 7| - 2$

-
5. Let $f(x) = 2x^2 + 7x + 9$. If the graph of $y = f(x)$ is both reflected vertically over the x -axis, and reflected horizontally over the y -axis, the result is the graph of $y = g(x)$. Which of the following gives the formula for $g(x)$?

Possibilities:

- (a) $g(x) = -2x^2 + 7x - 9$
- (b) $g(x) = -\frac{7}{4} + \frac{1}{4}\sqrt{-23 + 8x}$
- (c) $g(x) = 2x^2 - 7x + 9$
- (d) $g(x) = 2(x - 1)^2 + 7x + 2$
- (e) $g(x) = -2x^2 - 7x - 9$

-
6. Let $f(x) = mx + b$ be a linear function. If the graph of $y = f(x)$ is shifted down by 10 the result is the graph of $y = g(x)$. Find the slope and y -intercept of g .

Possibilities:

- (a) Slope: $\frac{1}{10}m$ y -intercept: b
- (b) Slope: m y -intercept: $b - 10$
- (c) Slope: m y -intercept: $b + 10m$
- (d) Slope: $-10m$ y -intercept: b
- (e) Slope: $-10m + b$ y -intercept: m

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7. Let $f(x) = x^2 + 3x + 4$. Let $g(x) = 5(x + 7)^2 + 15(x + 7) + 29$.
 What graph transformations take f to g ?

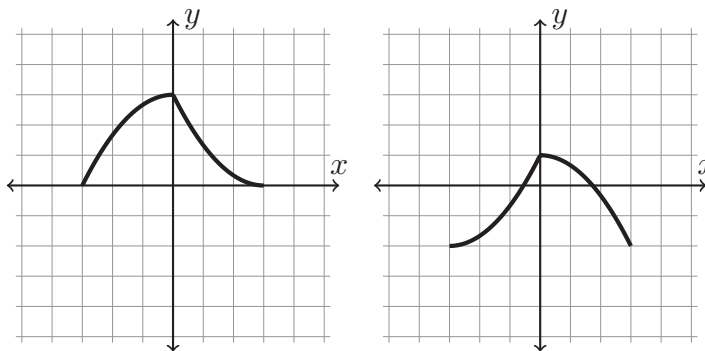
Possibilities:

- (a) Shift left 7, then vertically scale by 5, then shift up 9.
- (b) Shift left 7, then vertically scale by $\frac{1}{5}$, then shift down 9.
- (c) Shift right 7, then vertically scale by 5, then shift down 9.
- (d) Shift right 7, then vertically scale by $\frac{1}{5}$, then shift up 9.
- (e) Shift right 5, then vertically scale by 3, then shift up 4.

8. Let $f(x)$ be given by the left hand graph. Which of the following is the equation for the right hand graph?

Possibilities:

- (a) $y = f(-x) - 2$
- (b) $y = f^{-1}(x + 2) - 2$
- (c) $y = f(x) + 2$
- (d) $y = -f(x) + 2$
- (e) $y = f(-x) + 2$



9. Let $f(x) = x - 6$, and $g(x) = 3x^2 + 4x + 5$.
 Which of these is the formula for $(f \circ g)(x)$, that is, $f(g(x))$?

Possibilities:

- (a) $f(g(x)) = \frac{2 \pm \sqrt{7}}{3}$
- (b) $f(g(x)) = 3x^2 - 6 + 4x - 6 + 5$
- (c) $f(g(x)) = 3x^2 + 4x + 5 - 6$
- (d) $f(g(x)) = 137$
- (e) $f(g(x)) = 3(x - 6)^2 + 4(x - 6) + 5$

10. Let $f(x)$ and $g(x)$ be defined by the following tables:

x	f(x)
1	4
2	7
3	8

x	g(x)
1	9
2	5
3	2

What number is $f(g(3))$?

Possibilities:

- (a) $f(g(3)) = 8$
- (b) $f(g(3)) = 7$
- (c) $f(g(3)) = 4$
- (d) $f(g(3)) = 9$
- (e) $f(g(3)) = 5$

11. Refer to the tables in the previous problem. What number is $f^{-1}(8)$?

Possibilities:

- (a) $f^{-1}(8) = -8$
- (b) $f^{-1}(8) = \frac{1}{8}$
- (c) $f^{-1}(8) = 3$
- (d) $f^{-1}(8) = -3$
- (e) $f^{-1}(8)$ cannot be determined from the table

12. Refer to the same tables as the previous problem. Additionally, let $h(x) = 10x + 100$.

What number is $(h \circ g)(2)$?

Possibilities:

- (a) $h(g(2)) = 20$
- (b) $h(g(2)) = 150$
- (c) $h(g(2)) = 110$
- (d) $h(g(2)) = 109$
- (e) $h(g(2)) = 102$

-
13. Let $f(x) = \frac{3}{2x+11}$ and $g(x) = \frac{x}{5}$. Find a simplified formula for $f \circ g$.

Possibilities:

- (a) $f(g(x)) = \frac{3x}{2x+16}$
- (b) $f(g(x)) = \frac{6x+33}{22x+127}$
- (c) $f(g(x)) = x$
- (d) $f(g(x)) = \frac{3-11x}{2x}$
- (e) $f(g(x)) = \frac{15}{2x+55}$

-
14. Let $g(x) = 2x + 9$. What is $g^{-1}(19)$?

Possibilities:

- (a) $g^{-1}(19) = 19$
- (b) $g^{-1}(19) = 4$
- (c) $g^{-1}(19) = x$
- (d) $g^{-1}(19) = 5$
- (e) $g^{-1}(19) = 47$

-
15. Suppose the point $(-2, 13)$ is on the graph of $y = f(x)$. Which point must be on the graph of $y = f^{-1}(x)$?

Possibilities:

- (a) $(-13, \frac{1}{2})$ must be on the graph of $y = f^{-1}(x)$
- (b) $(-2, -13)$ must be on the graph of $y = f^{-1}(x)$
- (c) $(13, -2)$ must be on the graph of $y = f^{-1}(x)$
- (d) $(2, 13)$ must be on the graph of $y = f^{-1}(x)$
- (e) $(-\frac{1}{2}, \frac{1}{13})$ must be on the graph of $y = f^{-1}(x)$
-

16. Solve $x^2 - 9 = 91$.

Possibilities:

- (a) $x = \pm 3$
- (b) $x = \pm\sqrt{91}$
- (c) No real solutions
- (d) $x = \pm 10$
- (e) $x = \pm 91$

17. Solve $x^2 - 9 = K$.

Possibilities:

- (a) $x = K \pm 3$
- (b) $x = \frac{3}{2} \pm \sqrt{K}$
- (c) $x = 3 \pm \sqrt{K}$
- (d) $x = 3 \pm \sqrt{K + 6}$
- (e) $x = \pm\sqrt{9 + K}$

18. What is the x -coordinate of the vertex of $f(x) = x^2 - 6x - 112$?

Possibilities:

- (a) $x = -8$ and $x = 14$
 - (b) $x = -6$ only
 - (c) $x = -112$ only
 - (d) $x = 3$ only
 - (e) $x = 56$ only
-

19. Which quadratic function has vertex $(18, -5)$ and y -intercept 31?

Possibilities:

(a) $f(x) = \frac{1}{9}(x - 18)^2 - 5$

(b) $f(x) = 31x^2 + 18x - 5$

(c) $f(x) = (x - 18)^2 + 5$

(d) $f(x) = 2(x + 5)^2 + 18$

(e) $f(x) = 18x^2 - 5x + 31$

20. Given the function $f(x) = 3x^2 + 8x - 4$ find the average rate of change of f on the closed interval $[x, h + x]$

Possibilities:

(a) $-\frac{4}{3} + \frac{2}{3}\sqrt{7}$

(b) $3h + 6x + 1$

(c) 1

(d) $16x - 7$

(e) $3h + 6x + 8$

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20	100	0
19	95	1
18	90	2
17	85	3
16	80	4
15	75	5
14	70	6
13	65	7
12	60	8
11	55	9
10	50	10
9	45	11
8	40	12
7	35	13
6	30	14
5	25	15
4	20	16
3	15	17
2	10	18
1	5	19
0	0	20

GOOD LUCK!

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Total	
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