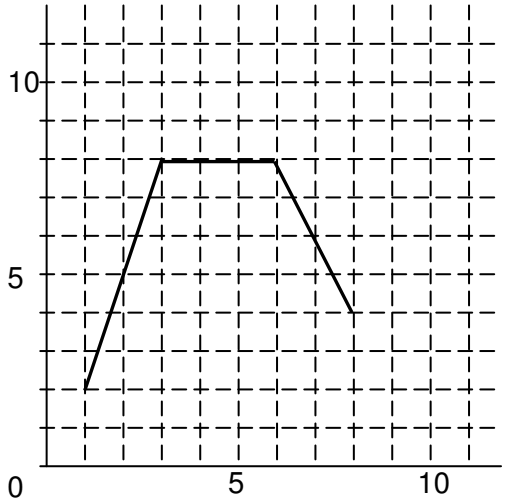
MAC 1105 *Test 1* *Instr: Jamieson*

2012 Spring *Form A, B, C Solutions*

Answers to the multiple choice questions are at the end of the test.

There are 29 points on this test. Answer #1 – 17 on your scantron.

1. Evaluate f(4) – f(2) using the graph at the right.



a. 1 b. 2 c. 3 d. 4

ae. 5 be. 6 ce. 7 de. 8

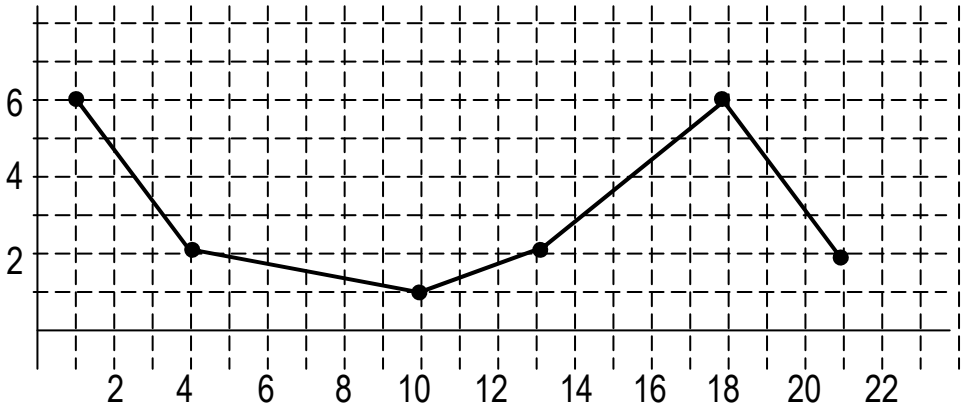
2. For the linear function tabulated below, find the slope-intercept equation.

x	5	10	15	20	25	30	35	40	45
y	20	18	16	14	12	10	8	6	4

a. y = 30 – 2x **b**. y = 28 – 2x **c**. y = 26 – 5x **d**. y = 24 – 5x

ae. y = 22 – 0.4x **be**. y = 20 – 0.4x **ce**. y = 18 – 2.5x **de**. y = 16 – 2.5x

3. Give the domain of the function shown.



a. [1,21] **b**. [6,2]

c. [1,6] **d**. [2,6]

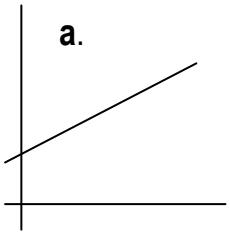
4. Give the range of the function shown.

a. [1,21] **b**. [6,2]

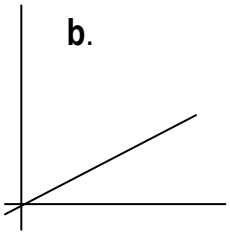
c. [1,6] **d**. [2,6]

5. Select the best graph to represent the total cost of buying x square yards of tile at $4.50 per square foot. (Each box contains a single square foot tile.)

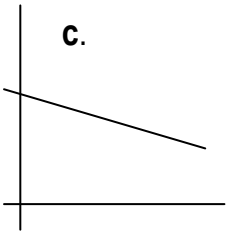
a.



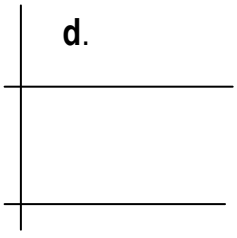
b.



c.



d.



6. A 500-gallon tank initially contains 400 gallons of fuel oil. A pump is filling the tank at a rate of 4 gallons per minute. Write a formula for the linear function that models the number of gallons of fuel oil in the tank after x minutes.

a. f(x) = 4x + 500 **b**. f(x) = 400x + 500 **c**. f(x) = 4x – 500 **d**. f(x) = 400x – 500

ae. f(x) = 4x + 400 **be**. f(x) = 500x + 400 **ce**. f(x) = 4x – 400 **de**. f(x) = 500x – 400

7. Find the equation of the line through (7,3) perpendicular to y = 9.

a. x = 7 **b**. x = 3 **c**. x = 9

ae. y = 7 **be.** y = 3 **ce.** y = 9

8. Find the equation of the line through (7,3) parallel to y = 9.

a. x = 7 **b**. x = 3 **c**. x = 9

ae. y = 7 **be.** y = 3 **ce.** y = 9

9. Solve $\frac{2}{3}\left(\frac{3}{5}x+1\right)+1=x-\frac{3}{5}(x-1)$

a. $\frac{21}{5}$ **b**. $\frac{22}{5}$ **c**. $\frac{23}{5}$ **d**. $\frac{24}{5}$

ae. $\frac{5}{21}$ **be**. $\frac{5}{23}$ **ce**. all reals **de**. no solutions

10. Solve $9.8-0.8x<\frac{1}{5}(7+6x)-2\left(\frac{3}{4}+\frac{x}{10}\right)+\frac{3}{10}+\frac{1}{5}x$ given that the left side is $L(x)=9.8-0.8x$ and the right side is $R(x)=\frac{1}{5}(7+6x)-2\left(\frac{3}{4}+\frac{x}{10}\right)+\frac{3}{10}+\frac{1}{5}x$

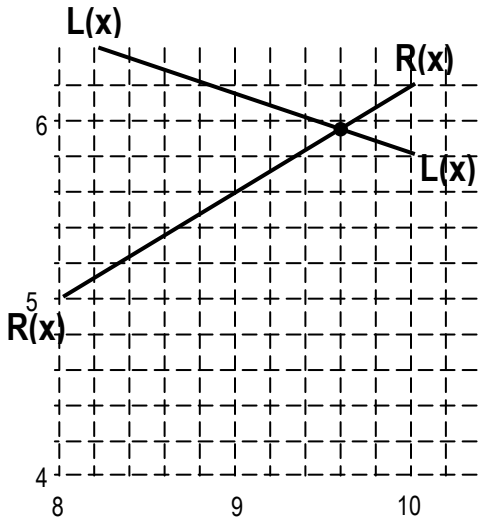
x	L(x)	R(x)
4	6.6	5
4.2	6.44	5.24
4.4	6.28	5.48
4.6	6.12	5.72
4.8	5.96	5.96
5	5.8	6.2
5.2	5.64	6.44

a. (-∞,4.8) **b**. (-∞,4.8] **c**. (4.8, ∞) **d**. [4.8, ∞)

ae. (∞,5.96) **be**. (∞,5.96] **ce**. (5.96, ∞) **de**. [5.96, ∞)

11. Solve $9.8-0.4x\geq\frac{1}{5}(7+6x)-2\left(\frac{3}{4}+\frac{x}{10}\right)+\frac{3}{10}-\frac{2}{5}x$

given that the left side is $L(x)=9.8-0.4x$ and the right side is $R(x)=\frac{1}{5}(7+6x)-2\left(\frac{3}{4}+\frac{x}{10}\right)+\frac{3}{10}-\frac{2}{5}x$



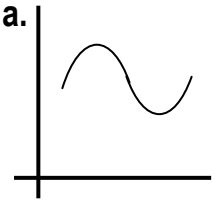
The lines intersect at (9.6, 5.96)

a. (-∞,9.6) **b**. (-∞,9.6] **c**. (9.6, ∞) **d**. [9.6, ∞)

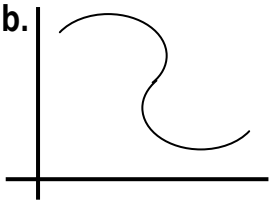
ae. (∞,5.96) **be**. (∞,5.96] **ce**. (5.96, ∞) **de**. [5.96, ∞)

12. Select ***all*** the relations below which represent a function y of x.

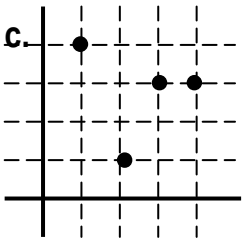
a.



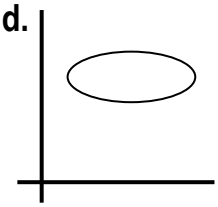
b.



c.



d.



13. Select ***all*** of the relations at the right which represent a function y of x.

a.

x	y
2	1
4	2
3	3
2	4

b.

x	y
5	1
3	1
4	1
2	1

c.

x	y
5	2
3	4
4	3
3	5

d.

x	y
2	3
3	2
4	4
1	3

14. Select ***all*** of the completely tabulated functions at the right which are ***linear***.

a.

x	y
1	5
2	10
3	15
4	20

b.

x	y
5	2
10	4
15	6
20	0

c.

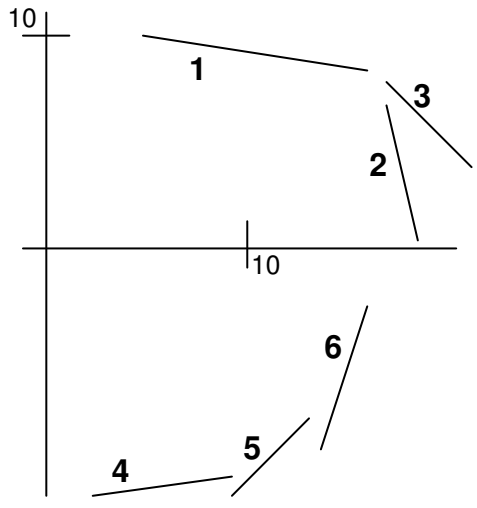
x	y
2	2
4	4
6	8
8	16

d.

x	y
1	10
2	8
3	6
4	4

For each slope indicated in #15 – 17, pick the best estimate of its slope from

a. 0.2	**b** 0.9	**c**. 5	**d**. 0
ae. -0.2	**be**. -0.9	**ce**. -5	**de**. Undefined



15. Estimate the slope of line segment **2**.

16. Estimate the slope of line segment **6**.

17. Estimate the slope of line segment **4**.

18. Find the slope-intercept equation of the line through (7,3) parallel to 2x + 5y = 9.

Ans: $y = \frac{-2x+29}{5}$

$y = \frac{9-2x}{5}$ $\qquad$ $m = \frac{-2}{5}$

$y-3 = \frac{-2}{5}(x-7) = \frac{-2}{5}x + \frac{14}{5}$

$y-3 = \frac{-2}{5}(x-7) = \frac{-2}{5}x + \frac{14}{5} + 3\cdot\frac{5}{5} = \frac{-2x+29}{5}$

19. (3 points) For $f(x) = 2x^2 - 3x + 5$ write the difference quotient $\frac{f(x+h)-f(x)}{h}$ and simplify it until you have divided the h out of the denominator. Show all three important steps.

$$\frac{2(x+h)^2 - 3(x+h) + 5 - (2x^2 - 3x + 5)}{h}$$

$$\frac{2(x^2 + 2xh + h^2) - 3x - 3h + 5 - 2x^2 + 3x - 5}{h}$$

$$\frac{2x^2 + 4xh + 2h^2 - 3x - 3h + 5 - 2x^2 + 3x - 5}{h}$$

$$\frac{4xh + 2h^2 - 3h}{h}$$

$$4x + 2h - 3$$

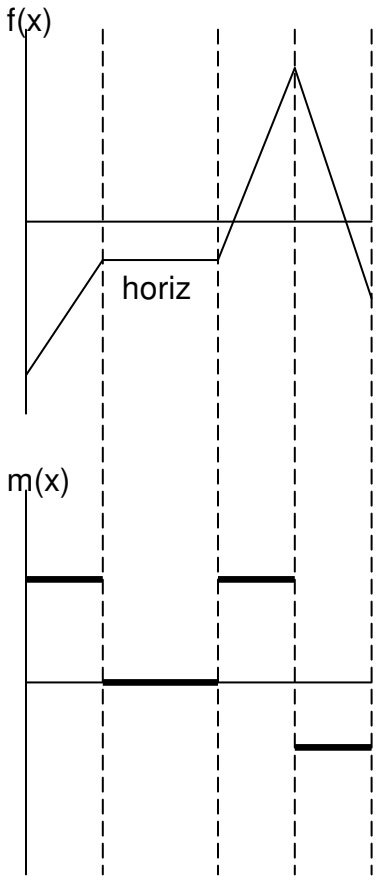
20. Solve $y = \frac{7x-2}{3x-4} + 1$ for x. **Ans**: $x = \frac{4y-6}{3y-10}$

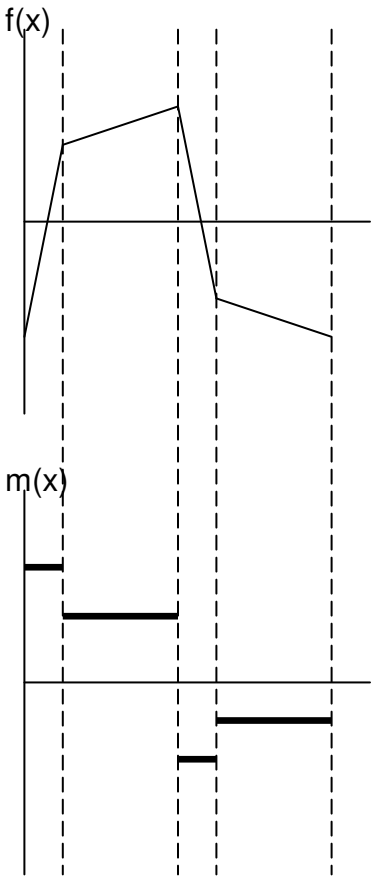
$(3x-4)y = 7x-2+1\cdot(3x-4) = 10x-6$

$3xy-10x = 4y-6$

$x(3y-10) = 4y-6$

21. (4 points) Sketch the slope function m(x) for each function f(x). Clearly indicate in your sketch where m(x) is positive, negative, zero, increasing or decreasing.





22. Given the function $f(x) = x^2 - 4x + 7$, find $f(-3)$ **Ans**: 28

$(-3)^2 - 4(-3) + 7 =$

23. Given the function $f(x) = x^3 - 3x^2 + 4x - 8$, find $f(-2)$ **Ans**: -36

$(-2)^3 - 3(-2)^2 + 4(-2) - 8 =$

24. Use the quadratic formula to solve the equation: $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$4x^2 - 3x - 2 = 0$

$a = 4, b = -3, c = -2$ **Ans**: $\frac{3 \pm \sqrt{41}}{8}$

$$\frac{-(-3) \pm \sqrt{(-3)^2 - 4 \cdot 4 \cdot (-2)}}{2 \cdot 4}$$

Answer for multiple choice questions #1 – 17:

1 – 5: c, ae, a, c, b

6 – 10: ae, a, be, de, c

11 – 15: b, ac, bd, ad, ce

16 – 17: c, a