NAME Pre-Algebra Key DATE _____ PERIOD _____ Midterm Review (1)

Course 3 Benchmark Test – First Quarter (Chapters 1–2)

1. The average distance from the Earth to the moon is about 384,000 kilometers. What is this number written in scientific notation?

A. 384×10^5

B. 384×10^3

C. 3.84×10^6

***D.** 3.84×10^5

$384{,}000 = 3.84 \times 10^5$

2. SHORT ANSWER Marc is finding the product of the monomials $3c^2d^4$ and $-4c^3d$. His work is shown below. What error did he make?

Marc

$3c^2d^4(-4c^3d)$

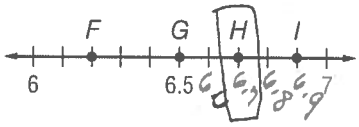
$= 3(-4)(c^2c^3)(d^4d)$

$= -12c^6d^4$

He multiplied the exponents instead of adding them.

$3c^2d^4(-4c^3d^1) = -12c^5d^5$

3. Which point on the number line shows $\sqrt{45}$? $\sqrt{45} \approx 6.7$



F. point F

G. point G

***H.** point H

I. point I

4. A moving company charges $40 plus $0.25 per mile to rent a van. Another company charges $25 plus $0.35 per mile to rent the same van. For what number of miles will the rental cost be the same for both companies? 4 B

***A.** 150 miles

B. 180 miles

C. 260 miles

D. 650 miles

Company A: $40 + .25m$ | Company B: $25 + .35m$

*When will miles be equal?

*Set equations equal to each other and solve for m

*See attached

5. A taxicab service charges $3.75 plus $0.40 per mile. Molly takes a taxicab from the hotel to the airport. If the total charge was $10.95, which equation could be used to determine the number of miles from the hotel to the airport?

F. $3.75m + 0.4 = 10.95$ *See attached

***G.** $3.75 + 0.4m = 10.95$

H. $4.15m = 10.95$

I. $3.35m = 10.95$

6. Which value is equivalent to 4^{-3}?

A. -12

B. -1

C. $-\frac{1}{64}$

***D.** $\frac{1}{64}$

*See attached

NAME _____ DATE _____ PERIOD _____

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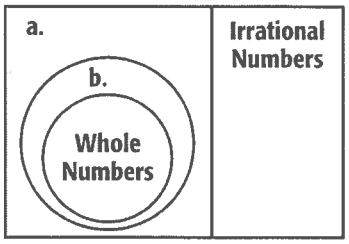
Course 3 Benchmark Test – First Quarter *(continued)*

7. SHORT ANSWER The Venn diagram shows the real number system. Write the names of the missing sets of numbers.



a. Rational Numbers; b. Integers

8. Which of the following does *not* represent a rational number?

F. -250

G. $\frac{11}{39}$

***H.** $\sqrt{60}$

I. $12.0\overline{982}$

* See attached

9. The school marching band has 36 members. The band director wants to arrange the band members into a square formation. How many band members should be in each row?

A. 8

***B.** 6

C. 5

D. 4

$\sqrt{36} = 6$

6 members in 6 rows = 36

10. Which expression is equivalent to the expression below?

$$a \cdot a \cdot a \cdot b \cdot a \cdot b \cdot b \cdot a \cdot b \cdot a$$

***F.** $a^6 b^4$

G. $a^{-6} b^{-4}$

H. $(ab)^{10}$

I. $(ab)^2$

11. What is the solution to the equation below?

$$-\frac{2}{3}p + \frac{1}{6} = \frac{7}{10}$$

A. $-\frac{13}{10}$

***B.** $-\frac{4}{5}$

C. $-\frac{26}{45}$

D. $-\frac{16}{45}$

* see attached

12. Solve the equation below for t.

$$3t - 5 = -21 + t$$

F. -52

G. -32

H. -13

***I.** -8

* see attached

NAME _____ DATE _____ PERIOD _____

Course 3 Benchmark Test – First Quarter *(continued)*

13. The distance from the Sun to Earth is about 1.5×10^{11} meters. Suppose light travels at a speed of 3×10^8 meters per second. About how long does it take light from the Sun to reach Earth?

A. 4.5×10^{19} seconds

B. 1.503×10^{11} seconds

C. 5×10^3 seconds

***D.** 5×10^2 seconds

$\frac{1.5 \times 10^{11}}{3 \times 10^8} = 0.5 \times 10^3 = 5 \times 10^2$

14. What is the value of b in the equation below?

$$4(b - 1) = 2b + 10$$

F. 4

G. 5.5

***H.** 7

I. 11.5

$4b - 4 = 2b + 10$
$-2b \quad -2b$
$2b - 4 = 10$
$+4 \quad +4$
$\frac{2b}{2} = \frac{14}{2}$
$b = 7$

15. The table shows the populations of several states. What is the population of Ohio written in scientific notation?

State	Population
Georgia	9,400,000
Illinois	12,900,000
Ohio	11,500,000
California	36,900,000

A. 1.15×10^{-8} 11,500,000

B. 1.15×10^{-7} 1.15×10^7

***C.** 1.15×10^7

D. 1.15×10^8

the number of decimal places you move to have 1 digit to the [illegible] of the decimal

16. Which of the expressions below is *not* equivalent to the other three?

F. 0.015625 $\frac{015625}{1000000} = \frac{1}{64}$

***G.** 15.625%

H. 4^{-3} $= \frac{1}{4^3} = \frac{1}{64}$

I. $\frac{1}{64}$

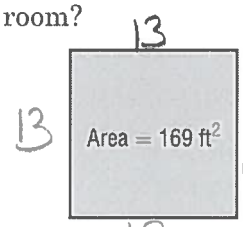
17. SHORT ANSWER What is the result when the monomial $-5x^3y^2z$ is raised to the third power?

$-125x^9y^6z^3$

$(-5x^3y^2z)^3$
$-5^3(x^3)^3(y^2)^3z^3$
$-125x^9y^6z^3$

* each term must be cubed

18. The area of a square living room is 169 square feet. What is the perimeter of the room?



$\sqrt{169} = 13$

A. 13 ft

B. 17 ft

***C.** 52 ft

D. 68 ft

- Find the length of each side by finding the square root of 169 ($\sqrt{169} = 13$)
- Perimeter = Add all sides

$P = 13(4) = 52$

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Course 3 Benchmark Test – First Quarter *(continued)*

19. Between which two integers does $\sqrt{88}$ lie on the number line?

F. between 6 and 7

G. between 7 and 8

H. between 8 and 9

***I.** between 9 and 10

$\sqrt{88}$ is not a perfect square

$\sqrt{88}$ is between $\sqrt{81}$ & $\sqrt{100}$

$\sqrt{81} = 9$ $\sqrt{88}$ $\sqrt{100} = 10$

20. Which of the following symbols results in a true number sentence when placed in the blank?

$\sqrt{12.96}$ ___ $3\frac{3}{5}$

***A.** =

B. >

C. <

D. ×

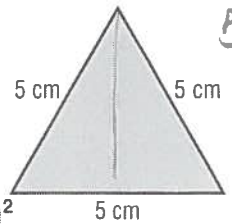
$\sqrt{12.96} = 3.6$

$3.6 = 3\frac{6}{10} = 3\frac{3}{5}$

$\sqrt{12.96} = 3\frac{3}{5}$

21. SHORT ANSWER The area of an equilateral triangle is given by the expression $\frac{s^2\sqrt{3}}{4}$, where s is the side length of the triangle. What is the area of triangle below? Round to the nearest tenth.

Substitute 5 for s



10.8 cm²

$\frac{5^2\sqrt{3}}{4} = \frac{25(1.73)}{4}$

$\approx 10.8\ cm^2$

22. Which of the following numbers has the least absolute value?

F. 3.5×10^{-5}

***G.** 8.75×10^{-7} ← Smallest exponent

H. 5.62×10^{3}

I. 1.002×10^{12}

23. Which equation shows the following relationship?

Seven less than four times a number is equal to 5.

A. $7 - 4n = 5$

***B.** $4n - 7 = 5$

C. $7n - 4 = 5$

D. $4 - 7n = 5$

24. Which equation is equivalent to the equation below?

$5(n + 6) = 2(n - 3) + 4$

F. $5n + 6 = 2n + 1$

G. $5n + 6 = 2n - 2$

H. $5n + 30 = 2n + 1$

***I.** $5n + 30 = 2n - 2$

$5(n+6) = 2(n-3) + 4$

$5n + 30 = 2n - 6 + 4$

$5n + 30 = 2n - 2$

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Course 3 Benchmark Test – First Quarter *(continued)*

25. SHORT ANSWER Juanita has saved $65 for vacation. She plans to save an additional $5 per week. How many weeks will it take for Juanita to save a total of $125? Write and solve an equation.

65 + 5*n* = 125; 12 weeks

has + $5 per week to save total

$65 + 5w = 125$

Equation $65 + 5w = 125$

$65 + 5w = 125$

$-65 \quad -65$

$\frac{5w}{5} = \frac{60}{5}$

$w = 12$

12 weeks

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Pre-Algebra Midterm Practice Test
First Quarter (Chapters 1-2)

4. $40 + .25m = 25 + .35m$

$40 + .25m = 25 + .35m$

$-25 \quad\quad -25$

$15 = .35m$

$-.25m \quad -.25m$

$15 = .10m$

$.10 \quad\quad .10$

$150 = m$ — 150 miles

5. Fee for taxi plus $.40 per mile = total

$3.75 + .40m = \$10.95$

6. $4^{-3} = \frac{1}{4^3} = \frac{1}{4 \cdot 4 \cdot 4} = \frac{1}{64}$

8. Rational numbers can be written as a decimal that terminates or repeats or can be written as a fraction.

A. $-250 = \frac{-250}{1}$ ✓

B. $\frac{11}{39}$ ✓ (already a fraction)

C. $\sqrt{60} = 7.745966692\ldots$ * irrational because it will not repeat or terminate

D. $12.09\overline{82}$ ✓ (repeating decimal)

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11. $-\frac{2}{3}p + \frac{1}{6} = \frac{7}{10}$

$-\frac{2}{3}p + \frac{1}{6} = \frac{7}{10} \cdot \frac{3}{3} = \frac{21}{30}$

$-\frac{1}{6} \cdot \frac{5}{5} = -\frac{5}{30}$

$-\frac{2}{3}p = \frac{16}{30}$

$\left(-\frac{3}{2}\right)\left(-\frac{2}{3}p\right) = \frac{8}{10}\frac{16}{30}\left(-\frac{3}{2}\right)$

$p = -\frac{8}{10} = \left(-\frac{4}{5}\right)$

* you need a common denominator to subtract
* to solve for "p" multiply both sides by the reciprocal of $-\frac{2}{3}$

12. $3t - 5 = -21 + t$

$3t - 5 = -21 + t$

$-t \quad\quad -t$

$2t - 5 = -21$

$+5 \quad +5$

$\frac{2t}{2} = \frac{-16}{2}$

$t = -8$

Pre-Algebra

NAME Key Mrs. Branson DATE _____ PERIOD _____

Course 3 Benchmark Test – Second Quarter

1. The table shows how much Addison earns for working various numbers of hours at a part-time job.

Hours, x	Earnings ($), y
10	72.50
15	108.75
20	145.00

Which of the following describes the constant rate of change?

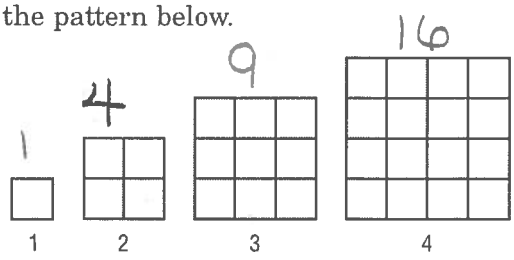
A. 5 hours per dollar

B. $5.00 per hour

C. 7.25 hours per dollar

***D.** $7.25 per hour

2. Let n represent the figure number in the pattern below.



Which function represents the number of squares in each figure?

***F.** $f(n) = n^2$

G. $f(n) = 2n$

H. $f(n) = n^3$

I. $f(n) = 4n$

3. Which systems of linear equations has a solution of $(-2, 1)$?

***A.** $2x + 3y = -1$
$x - y = -3$

B. $2x + 3y = 1$
$x - y = 3$

C. $2x + 3y = -1$
$x - y = 3$

D. $2x + 3y = 1$
$x - y = -3$

4. What is the solution to the system of equations below?

$$3x - 2y = 7$$
$$-3x + 5y = 5$$

F. (3, 1)

G. (0, 1)

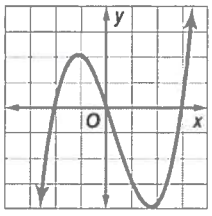
***H.** (5, 4)

I. no solution

5. **SHORT ANSWER** Missy walked around the school track to warm up. Then she ran several laps before walking to cool down. Sketch a graph to represent Missy's distance run over time.

Sample answer:

6. Which term describes the function shown below?



A. constant

B. linear

***C.** nonlinear

D. quadratic

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Pre-Algebra

Midterm Practice - Chapters 3 + 4 (Second Quarter)

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1. * Rate of Change is the same as the Slope

$$\frac{\text{Change in } y}{\text{Change in } x} = \frac{36.25}{5} = 7.25$$

2.

n	
1	$1^2 = 1$
2	$2^2 = 4$
3	$3^2 = 9$
4	$4^2 = 16$

Each value for "n" is being squared

$F(n) = n^2$

3. $(-2, 1)$ (x, y) * Substitute for x + y to see for which equation -2 and 1 make both equations true

A. $2x + 3y = -1$

$2(-2) + 3(1) = -1$

$-4 + 3 = -1$

$-1 = -1$ ✓

$x - y = -3$

$-2 - (1) = -3$

$-3 = -3$ ✓

B. $2x + 3y = 1$

D. $2(-2) + 3(1) = 1$

$-4 + 3 = 1$

$-1 \neq 1$

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4. $3x - 2y = 7$
$-3x + 5y = 5$

* You can substitute each choice for x and to see which point makes <u>both</u> equations true.

H. $(5, 4)$

$3(5) - 2(4) = 7$
$15 - 8 = 7$ ✓

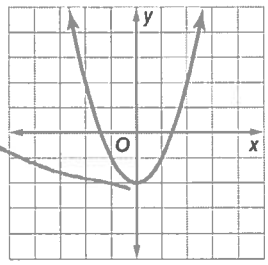
$-3(5) + 5(4) = 5$
$-15 + 20 = 5$ ✓

NAME Mrs. Branson DATE _____ PERIOD 4

Course 3 Benchmark Test – Second Quarter *(continued)*

7. What is the equation of the quadratic function shown in the graph?

* look at the y-intercept −2



F $y = x^2 + 2$

***G** $y = x^2 - 2$

H $y = 2x^2$

I $y = \frac{1}{2}x^2$

8. SHORT ANSWER Find the x- and y-intercepts of the linear equation below.

$$4x - 5y = 20$$

(5, 0), (0, −4)

9. What is the slope of the line that passes through $M(-6, 1)$ and $N(2, 5)$?

A 2

***B** $\frac{1}{2}$

C $-\frac{1}{2}$

D -2

10. What is the domain of the function shown in the table?

x	−4	−2	0	2	4
y	−3	7	5	0	−1

→ Domain
→ Range

F. all real numbers

G. all even integers

H. {−3, −1, 0, 5, 7}

***I.** {−4, −2, 0, 2, 4} → the x-coordinates

11. What are the slope and y-intercept of the linear equation below?

$$y = -5x + 2$$

A. slope: 2, y-intercept: (0, −5)

B. slope: 2, y-intercept: (−5, 0)

***C.** slope: −5, y-intercept: (0, 2)

D. slope: −5, y-intercept: (2, 0)

* the equation is in slope-intercept form
$y = mx + b$ ← y-intercept
m = slope

12. A tank contains 550 gallons of water. When the valve is opened, the tank drains at a rate of 12 gallons per minute. Which function shows the relationship between the time t the valve is opened and the amount of water in the tank?

"per" is a key word for multiplication

***F.** $A(t) = -12t + 550$

G. $A(t) = 12t + 550$

H. $A(t) = 12 + 550t$

I. $A(t) = -12 + 550t$

8. **x-intercept**: where the line crosses the x-axis
   - where $y = 0$

y-intercept: where the line crosses the y-axis
   - where $x = 0$

$$4x - 5y = 20$$

x-int.

$y = 0$

$4x - 5(0) = 20$

$\frac{4x}{4} = \frac{20}{4}$

$x = 5$

$(5, 0)$

y-int.

$x = 0$

$4(0) - 5y = 20$

$\frac{-5y}{-5} = \frac{20}{-5}$

$y = -4$

$(-4, 0)$

9. Slope $m = \frac{y_2 - y_1}{x_2 - x_1}$

$(-6, 1)$ $(2, 5)$
$x_1\ y_1$ $x_2\ y_2$

$$\frac{5-1}{2--6} = \frac{4}{2+6} = \frac{4}{8} = \boxed{\frac{1}{2}}$$

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12. Amount of water = A

t = time

(water going down)

negative

Amount of water is 550 gal and drains 12 gal per min.

$A = 550 - 12t$

$A(t) = 550 - 12t$ ← written in function notation

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Course 3 Benchmark Test – Second Quarter *(continued)*

13. Which relation is *not* a function?

A.

x	−2	0	2	4	6
y	3	3	3	3	3

***B.**

x	−3	0	2	−3	1
y	−5	4	2	0	−1

C.

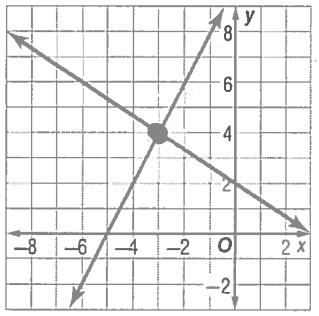
x	1	2	3	4	5
y	1	2	3	4	5

D

x	−4	1	2	−3	4
y	0	3	−1	−2	3

Function: each x-value can be paired with only one y-value
In B. −3 is paired with −5 & 0 so it is not a function

14. What is the solution to the system of linear equations shown below?



F. (4, −3)

G. (−4, 3)

***H.** (−3, 4)

I. (3, −4)

The solution is the point where the lines intersect

15. SHORT ANSWER What is the equation in slope-intercept form of the line that passes through (−2, 17) and (3, −13)?

$y = -6x + 5$

16. Which linear function has the steepest slope?

The steepest slope has the greatest absolute value

A. $y = \frac{1}{2}x - 5$

B. $y = -\frac{2}{5}x + 3$

C. $y = 4x - 2$

***D.** $y = -6x + 1$

17. The table shows the cost of renting a van from a moving company for different numbers of miles driven.

Miles, *m*	Cost, *C*
50	$42.50
100	$65.00
150	$87.50
200	$110.00

+50 +22.50

Construct a function that relates the cost of renting a van to the number of miles driven.

F. $C(m) = 0.85m$

G. $C(m) = 0.85m + 10$

H. $C(m) = 0.45m$

***I.** $C(m) = 0.45m + 20$

18. Which two points form a line that has a slope of −3?

A. (−5, 3) and (2, 4)

***B.** (1, −6) and (−4, 9)

C. (−4, −3) and (5, 0)

D. (2, 8) and (−1, −1)

15. $(-2, 17)$ $(3, -13)$
x_1 y_1 x_2 y_2

Slope-intercept form $y = mx + b$

1. Find the slope of the points
$$\frac{-13-17}{3--2} = \frac{-30}{3+2} = \frac{-30}{5} = -6$$
$$m = -6$$

2. Choose a point to substitute into $y=mx+b$ and solve for b

$y = mx + b$
$17 = -6(-2) + b$
$17 = 12 + b$
$-12 \quad -12$
$5 = b$

3. Write the equation using the slope & y-int.

$$y = -6x + 5$$

16. Write an equation from the table by finding the slope and solving for the y-intercept

Slope = rate of change in y / change in x $\quad \frac{22.50}{50} = .45$

Choose a point to substitute for x and y in $y = mx + b$ and solve for b

miles → x, cost → y

$y = .45x + 20$

in function notation → $C(m) = .45m + 20$

$42.50 = .45(50) + b$
$42.50 = 22.50 + b$
$-22.50 \quad -22.50$
$20.00 = b$

18. $m = -3$

Substitute into the slope formula to see which points have a -3 slope

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

A. $(-5, 3)$ $(2, 4)$ (x_1 y_1 x_2 y_2)

$$m = \frac{4-3}{2--5} = \frac{1}{7}$$

$\frac{1}{7} \neq -3$

B. $(1, -6)$ $(-4, 9)$ (x_1 y_1 x_2 y_2)

$$m = \frac{9--6}{-4-1} = \frac{9+6}{-5} = \frac{15}{-5} = -3$$

$-3 = -3$ ✓

C. $(-4, -3)$ $(5, 0)$ (x_1 y_1 x_2 y_2)

$$\frac{0--3}{5--4} = \frac{0+3}{5+4} = \frac{3}{9}$$

D. $(2, 8)$ $(-1, -1)$ (x_1 y_1 x_2 y_2)

$$\frac{-1-8}{-1-2} = \frac{-9}{-3} = 3$$

19. $6x - 2y = 12$

x-int

$y = 0$

$6x - 2(0) = 12$

$\frac{6x}{6} = \frac{12}{6}$

$x = 2$

$(2, 0)$

y-int

$x = 0$

$6(0) - 2y = 12$

$\frac{-2y}{-2} = \frac{12}{-2}$

$y = -6$

$(0, -6)$

$(2, 0)$ and $(0, -6)$

20. $h(t) = -16t^2 + 120$

$h(t)$ ↙ height; t ↑ time

Substitute 1.5 for time

$h(t) = -16(1.5)^2 + 120$

$-16(2.25) + 120$

$-36 + 120$

height = 84

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Course 3 Benchmark Test – Second Quarter *(continued)*

19. What are the x– and y–intercepts of the linear equation below?

$$6x - 2y = 12$$

***F.** (2, 0) and (0, −6)

G. (0, 2) and (−6, 0)

H. (−6, 0) and (2, 0)

I. (0, 2) and (0, −6)

20. The quadratic function $h(t) = -16t^2 + 120$ represents the height of an object in feet t seconds after when it falls from a height of 120 feet. What is the height of the object after 1.5 seconds?

A. 58 ft

***B.** 84 ft

C. 92 ft

D. 156 ft

21. **SHORT ANSWER** The table below shows the number of teams remaining in each round of a tournament. Is the number of teams a linear function of the number of rounds? Explain.

Round	Teams
1	32
2	16
3	8
4	4
5	2

+1 ; -16, -8, -4, -2

No; Sample answer: there is not a constant rate of change.

22. What is the constant rate of change of the function represented in the table below?

x	y
−5	23
−1	7
3	−9
7	−25

+4, +4, +4 ; -16, -16, -16

F. 16

G. 4

***H.** −4

I. −16

$$\frac{\text{change in } y}{\text{change in } x} = \frac{-16}{4} = -4$$

23. The slope of a line is $-\frac{1}{5}$ and the y-intercept is (0, 6). What is the equation of the line in slope-intercept form?

m = $-\frac{1}{5}$; b

A. $x + 5y = 30$

B. $x - 5y = 30$

C. $y = -\frac{1}{5}x - 6$

***D.** $y = -\frac{1}{5}x + 6$

$y = mx + b$ (slope, y-intercept)

$y = mx + b$

$y = -\frac{1}{5}x + 6$

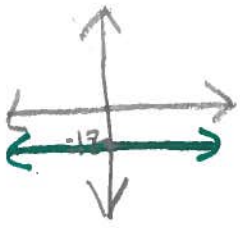
24. Which of the following equations represents a horizontal line?

F. $y = x$

G. $y = -x + 1$

***H.** $y = -12$

I. $x = 5$



y will always be -12

"y =" lines are horizontal

"x =" lines are vertical

* To be linear there must be a constant rate of change in y and x

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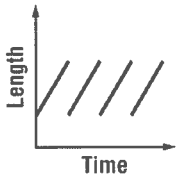
Course 3 Benchmark Test – Second Quarter *(continued)*

25. SHORT ANSWER The graph below shows the length of Michael's hair as a function of time. Describe the change in the length of Michael's hair over time.



Michael's hair grows at a steady rate until he gets it cut. This cycle is continually repeated.