ALGEBRA 1
June 2017

17. Which statement is true about the quadratic functions $g(x)$, shown in the table, and $f(x) = (x - 3)^2 + 2$?

(1) They have the same vertex.
(2) They have the same zeros.
(3) They have the same axis of symmetry.
(4) They intersect at two points.

x	g(x)
0	4
1	−1
2	−4
3	−5
4	−4
5	−1
6	4

vertex

x	f(x)
0	11
1	6
2	3
3	2
4	3

vertex

17 3

18. Given the function $f(n)$ defined by the following: $f(1) = 2$
$f(n) = -5f(n - 1) + 2$
Which set could represent the range of the function?

(1) {2, 4, 6, 8, ... }
(2) {2, −8, 42, −208, ... }
(3) {−8, −42, −208, 1042, ... }
(4) {−10, 50, −250, 1250, ... }

18 2

19. An equation is given. $4(x - 7) = 0.3(x + 2) + 2.11$
The solution to the equation is

(1) 8.3 (2) 8.7 (3) 3 (4) −3

19 1

20. A construction worker needs to move 120 ft³ of dirt by using a wheelbarrow. One wheelbarrow load holds 8 ft³ of dirt and each load takes him 10 minutes to complete. One correct way to figure out the number of hours he would need to complete this job is

? hrs

(1) $\frac{120\,\text{ft}^3}{1} \cdot \frac{10\,\text{min}}{1\,\text{load}} \cdot \frac{60\,\text{min}}{1\,\text{hr}} \cdot \frac{1\,\text{load}}{8\,\text{ft}^3}$

(2) $\frac{120\,\text{ft}^3}{1} \cdot \frac{60\,\text{min}}{1\,\text{hr}} \cdot \frac{8\,\text{ft}^3}{10\,\text{min}} \cdot \frac{1}{1\,\text{load}}$

(3) $\frac{120\,\text{ft}^3}{1} \cdot \frac{1\,\text{load}}{10\,\text{min}} \cdot \frac{8\,\text{ft}^3}{1\,\text{load}} \cdot \frac{1\,\text{hr}}{60\,\text{min}}$

(4) $\frac{120\,\text{ft}^3}{1} \cdot \frac{1\,\text{load}}{8\,\text{ft}^3} \cdot \frac{10\,\text{min}}{1\,\text{load}} \cdot \frac{1\,\text{hr}}{60\,\text{min}}$

20 4

21. One characteristic of all linear functions is that they change by

(1) equal factors over equal intervals
(2) unequal factors over equal intervals
(3) equal differences over equal intervals
(4) unequal differences over equal intervals

constant rate of change

21 3

22. What are the solutions to the equation $x^2 - 8x = 10$?

(1) $4 \pm \sqrt{10}$ (2) $4 \pm \sqrt{26}$ (3) $-4 \pm \sqrt{10}$ (4) $-4 \pm \sqrt{26}$

22 2

23. The formula for blood flow rate is given by $F = \frac{p_1 - p_2}{r}$, where F is the flow rate, p_1 the initial pressure, p_2 the final pressure, and r the resistance created by blood vessel size. Which formula can *not* be derived from the given formula?

(1) $p_1 = Fr + p_2$ (2) $p_2 = p_1 - Fr$ (3) $r = F(p_2 - p_1)$ (4) $r = \frac{p_1 - p_2}{F}$

23 3

24. Morgan throws a ball up into the air. The height of the ball above the ground, in feet, is modeled by the function $h(t) = -16t^2 + 24t$, where t represents the time, in seconds, since the ball was thrown. What is the appropriate domain for this situation?

(1) $0 \le t \le 1.5$ (2) $0 \le t \le 9$ (3) $0 \le h(t) \le 1.5$ (4) $0 \le h(t) \le 9$

24 1

use p. 63

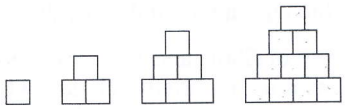
13. Which value of x satisfies the equation $\frac{5}{6}\left(\frac{3}{8} - x\right) = 16$?

(1) –19.575 (2) –18.825 (3) –16.3125 (4) –15.6875 13 2

14. If a population of 100 cells triples every hour, which function represents $p(t)$, the population after t hours?

(1) $p(t) = 3(100)^t$ (3) $p(t) = 3t + 100$
(2) $p(t) = 100(3)^t$ (4) $p(t) = 100t + 3$ 14 2

15. A sequence of blocks is shown in the diagram.



This sequence can be defined by the recursive function $a_1 = 1$ and $a_n = a_{n-1} + n$. Assuming the pattern continues, how many blocks will there be when $n = 7$?

(1) 13 (2) 21 (3) 28 (4) 36 15 3

16. Mario's \$15,000 car depreciates in value at a rate of 19% per year. The value, V, after t years can be modeled by the function $V = 15{,}000(0.81)^t$. Which function is equivalent to the original function?

calc, use table to compare

(1) $v = 15{,}000(0.9)^{9t}$ (3) $v = 15{,}000(0.9)^{\frac{t}{9}}$
(2) $v = 15{,}000(0.9)^{2t}$ (4) $v = 15{,}000(0.9)^{\frac{t}{2}}$ 16 2

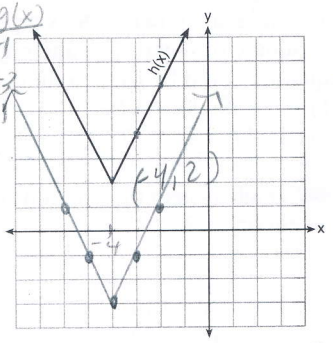
17. The highest possible grade for a book report is 100. The teacher deducts 10 points for each day the report is late. Which kind of function describes this situation?

(1) linear (3) exponential growth
(2) quadratic (4) exponential decay 17 1

18. The function $h(x)$, which is graphed, and the function $g(x) = 2|x + 4| - 3$ are given.

h	$h(x)$
–5	4
–4	2
–3	4

g	$g(x)$
–5	1
–4	–3
–3	1



Which statements about these functions are true?

I. $g(x)$ has a lower minimum value than $h(x)$.
II. For all values of x, $h(x) < g(x)$.
III. For any value of x, $g(x) \neq h(x)$.

(1) I and II, only
(2) I and III, only
(3) II and III, only
(4) I, II, and III 18 2

19. The zeros of the function $f(x) = 2x^3 + 12x - 10x^2$ are

(1) {2, 3} (2) {–1, 6} (3) {0, 2, 3} (4) {0, –1, 6} 19 3

ALGEBRA 1
August 2017
Part II

Answer all 8 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

25. A teacher wrote the following set of numbers on the board:

$$a = \sqrt{20} \quad b = 2.5 \quad c = \sqrt{225}$$

Explain why $a + b$ is irrational, but $b + c$ is rational.

$\sqrt{20} + 2.5 = 6.9721\ldots$, b/c $\sqrt{20}$ is irrational; Any irrational # plus a rational # is equal to an irrational.

$2.5 + 15 = 17.5$, rational b/c it can be written as a fraction.

26. Determine and state whether the sequence 1, 3, 9, 27, ... displays exponential behavior. Explain how you arrived at your decision.

$r = 3$ $\quad a_n = 1(3)^{(n-1)}$

The sequence displays exponential behavior b/c each # is a power of 3.

$3^0 = 1,\ 3^1 = 3,\ 3^2 = 9,\ 3^3 = 27, \ldots$

27. Using the formula for the volume of a cone, express r in terms of V, h, and π.

$3\left[V = \frac{1}{3}\pi r^2 h\right]$

$\frac{3V}{\pi h} = \frac{\pi r^2 h}{\pi h}$ $\quad r = \sqrt{\frac{3V}{\pi h}}$

$\sqrt{\frac{3V}{\pi h}} = \sqrt{r^2}$

U2 HW green regents review questions 5/21

p. 4, p. 13, p. 15 #26

18.) $f(1) = 2$ (1st term)

$f(n) = -5(n-1)+2$

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

$f(2) = -10+2$

$f(2) = -8$

$a_1 = 2$

$a_2 = -8$

24.)

t	$h(t)$
0	0
1	8
1.5	0
2	-16

19.) $4(x-7) = 0.3(x+2)+2.11$

$4x-28 = 0.3x+0.6+2.11$

10 $4x-28 = 0.3x+2.71$

$400x-2800 = 30x+271$

$-30x \quad -30x$

$370x-2800 = 271$

$+2800 \quad +2800$

$\frac{370x}{370} = \frac{3071}{370}$

$x = 8.3$

22.) $x^2-8x = 10$

$\left(\frac{-8}{2}\right)^2 = (-4)^2$

$+16$

$x^2-8x+16 = 10+16$

$\sqrt{(x-4)^2} = \sqrt{26}$

$x-4 = \pm\sqrt{26}$

$+4 \quad +4$

$x = 4 \pm \sqrt{26}$

23.) $F = \frac{P_1-P_2}{r}(r)$

yes (4) ✓ $\frac{rF}{F} = \frac{P_1-P_2}{F}$

NOT yes (1) ✓ $rF = P_1-P_2$

$+P_2 \quad +P_2$

P. 13

13) $\frac{5}{6}\left(\frac{3}{8}-x\right)=16$

$\frac{5}{16}-\frac{5}{6}x=16$

$\frac{-5}{16}\qquad\frac{-5}{16}$

$-\frac{5}{6}x=\frac{251}{16}$

$-\frac{5}{6}\qquad-\frac{5}{6}$

$x=-18.\overline{8}25$

19) $0=2x^3+12x-10x^2$

$0=2x^3-10x^2+12x$

3 roots, use calc

$x=0,\ x=2,\ x=3$

14) started w/ 100...

exponential growth

$y=ab^x$

↑ y-intercept triples

$P(t)=100\left(\frac{1}{3}\right)^x$

15) $1,\overset{+2}{3},\overset{+3}{6},\overset{+4}{10},\overset{+5}{15},\overset{+6}{\ },\overset{+7}{\ }$ $n=7$

$a_n=a_{n-1}+n$

$a_n=a_{n-1}+7$

$a_7=21+7$

$a_7=28$

17) $y=100-10x$

18) $g(x)=2|x+4|-3$

vertex $(-4,-3)$