UCS JH Algebra I **SEM 2 REVIEW GUIDE #2**

Key

1 Mike invests $2500 at 3% compounded monthly. How much will he have after 16 years?

A $4011.77

B $88817.84

C $4037.77

D $728932.22

$P = 2500$

$r = 3\% = .25\%$

$\frac{r}{12} = .0025$

$X = 16(12) = 192$

$2500(1.0025)^{192}$

$\$4037.77$

2 Is the following a growth or decay function? How can you tell? $f(x) = 0.5\left(\frac{3}{2}\right)^x$

$\frac{3}{2} \rightarrow 1.5 \rightarrow b > 1$

A Growth. The growth factor is greater than one.

B Growth. The growth factor is less than one.

C Decay. The growth factor is greater than one.

D Decay. The growth factor is less than one.

3 A small business owner takes out a loan with an annual interest rate. Shown below is the expression the owner can use to determine the total amount of his loan.

$$P(1+r)^t$$

If the owner wants to change this expression so the interest is compounded quarterly, which expression would he use?

A $P\left(1+\frac{r}{4}\right)^t$

B $P\left(1+\frac{r}{4}\right)^{4t}$

A $P(1+4r)^{\frac{t}{4}}$

B $P(1+r)^{4t}$

4 The value of a new car decreases exponentially. Suppose your mom buys a new car for $25,000. The value of the car decreases by 18% each year. Write an equation to model the value of the car x years after she buys it.

100%
− 18%
82% =
.82

A $Y = 25{,}000(1.18)^x$

B $Y = 25{,}000(0.18)^x$

C $Y = 25{,}000(0.82x)$

D $Y = 25{,}000(0.82)^x$

5 After the expression below is simplified, what is the coefficient of n^2 ?

$$(n^2 - 3) - (7 - n + 3n^2) - (4n + 1 - 8n^2)$$

$n^2 - 3n^2 + +8n^2$
$6n^2$

A -4

B -3

C 3

D 6

6 What is the complete factorization of $64a^2 - 25b^4$?

A $(8a - 5b^2)(8a + 5b^2)$

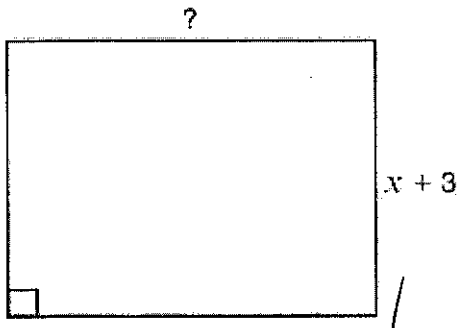
B $(8a - 5b^2)(8a - 5b^2)$

C $(8a^2 - 5b^2)(8a^2 + 5b^2)$

D Cannot be determined

$(8a - 5b^2)(8a + 5b^2)$

7 Mrs. Kim drew this figure on the blackboard and said, "The area of this rectangle is $2x^2 + 7x + 3$. What is the length of this rectangle?"



A	$x + 7$
B	$2x + 1$
C	$2x + 7$
D	$2x^2 + 62$

$2x^2(3)$
$6x^2$
$(1x, 6x)$

$2x^2 + x + 6x + 3$
$x(2x+1) + 3(2x+1)$
$(x+3)(2x+1)$

8 What is the sum of the x-intercepts of the function:

$$f(x) = 2x^2 + 3x - 5$$

A 3

B $\frac{3}{2}$

C $-\frac{3}{2}$

D -3

$2x^2(-5) = -10x^2$
$-2x, 5x$
$2x^2 - 2x + 5x - 5 = 0$
$2x(x-1) + 5(x-1) = 0$
$(2x+5)(x-1) = 0$

$-\frac{5}{2} + 1 \rightarrow -\frac{5}{2} + \frac{2}{2} = \left(-\frac{3}{2}\right)$

$2x+5=0 \quad x-1=0$
$x = -\frac{5}{2} \quad x = 1$

9 What is the minimum point for the following equation

$$y = x^2 + 2x - 3$$

A $(1, 0)$ because an equivalent equation is $y = (x-1)^2$

B $(-3, 0)$ because an equivalent equation is $y = (x+3)^2$

C $(1, 4)$ because an equivalent equation is $y = (x-1)^2 - 3$

D $(-1, -4)$ because an equivalent equation is $y = (x+1)^2 - 4$

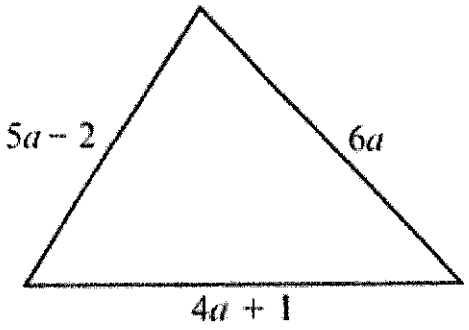
$x = \frac{-2}{2(1)} = \frac{-2}{2} = -1$

$y = (-1)^2 + 2(-1) - 3 = -4$

$(-1, -4)$

10 What is the perimeter of this triangle?

A	$15a - 1$
B	$29a - 2$
C	$24a^2 + 11a - 1$
D	$34a^2 - 8a + 1$



15a-1

11 A rectangular box has a volume of 280 in^3. Its dimensions are 4 in, $(n + 2)$ in, and $(n + 5)$ in. Find n. Use the formula $V = lwh$.

A -12

B -5

C 5

D 12

$\frac{4(n+2)(n+5)}{4} = \frac{280}{4}$

$(n+2)(n+5) = 70$

$n^2 + 7n + 10 = 70$

$-70 \quad -70$

$n^2 + 7n - 60 = 0$

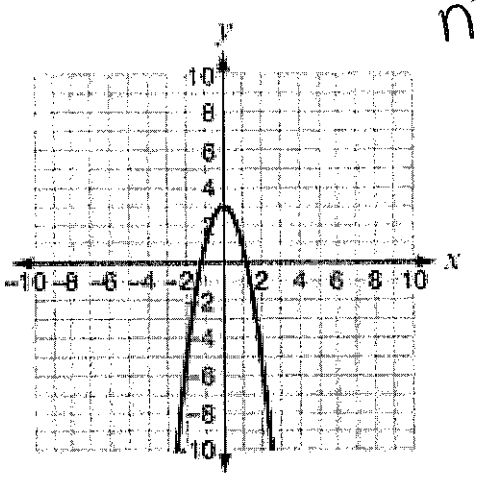
$(n + 12)(n - 5) = 0$

$n = -12 \quad n = 5$

12 Which equation represents the following graph?

a is neg;

y-int = 3



~~**A** $y = 2x^2 - 3$~~

B $y = -2x^2 - 3$

~~**C** $y = 2x^2 + 3$~~

D $y = -2x^2 + 3$

13 Find the roots.

$0 = -16x^2 + 64$

$-64 \quad -64$

$-64 = -16x^2$

$\frac{-64}{-16} = \frac{-16x^2}{-16}$

$\sqrt{4} = \sqrt{x^2}$

$x = \pm 2$

A $x = \pm 2$

B $x = 2$

C $x = -2$

D $x = \pm 2i$

14 What is the solution of $x^2 + 64 = 0$?

$-64 \quad -64$

$x^2 = -64$

$x = \pm 8i$

A -8 only

B 8 only

C -8 and 8

D No real solution

15 Rewrite the following quadratic in vertex form:

$y = x^2 + 6x + 15$

$a = 1$

$x = \frac{-6}{2(1)} = \frac{-6}{2} = -3$

$y = (-3)^2 + 6(-3) + 15$

$y = 6$

$(-3, 6)$

A $y = (x - 3)^2 + 6$

B $y = (x + 3)^2 - 6$

C $y = (x + 3)^2 + 6$

D $y = (x - 3)^2 - 6$

16 Solve: $-2(x + 4)^2 - 3 = 21$

$+3 \quad +3$

$\frac{-2(x+4)^2}{-2} = \frac{24}{-2}$

$\sqrt{(x+4)^2} = \sqrt{-12}$

$x + 4 = \pm\sqrt{12i^2}$

$x + 4 = \pm 2i\sqrt{3}$

$x = -4 \pm 2i\sqrt{3}$

A $4 \pm 2i\sqrt{3}$

B $\pm 2i\sqrt{7}$

C $-4 \pm 2i\sqrt{3}$

D $-2 \pm 2i\sqrt{3}$

17 The path that an eagle drops a newly caught salmon back into the river can be modeled by the equation $y = -16x^2 + vx + c$, where v is the initial velocity, and c is the initial height. When will the fish hit the water if the initial velocity is 0 ft/s and the initial height is 100 ft.

$y = -16x^2 + 100$

$0 = -16x^2 + 100$

$-100 \quad -100$

$\frac{-100}{-16} = \frac{-16x^2}{-16}$

$\frac{25}{4} = x^2$

$x = 5/2$

A -2.5 seconds

B 2.5 seconds

C 6.25 seconds

D .625 seconds

18 Which is a solution for the system of equations?

$y = x^2$

$y = -2x + 15$

(-5,25) (3,9)

A (-3,9)

B (5,25)

C (3,9)

D (-5,3)

$x^2 = -2x + 15$

$+2x - 15 \quad +2x - 15$

$x^2 + 2x - 15 = 0$

$(x+5)(x-3) = 0$

$x = -5$

$x = 3$

19 Which function contains the ordered pair $(-1, -6)$?

A $y = -x^2 + 3x + 5$

B $y = 3x^2 - 6$

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

D $y = -2x^2 + x - 5$

use graphing calc?

A) $-(-1)^2 + 3(-1) + 5 = 1$

B) $3(-1)^2 - 6 = -3$

C) $-3(-1)^2 + 2(-1) - 1 = -6$ ✓

20 What is the minimum value of the function:

vertex

$f(x) = x^2 + 4x + 6$

$x = \frac{-4}{2(1)} = \frac{-4}{2} = -2$

A 6

B 2

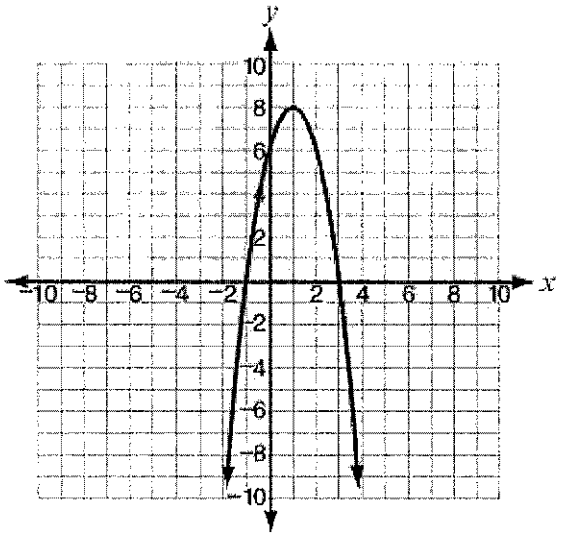
C 4

D -6

$f(-2) = (-2)^2 + 4(-2) + 6$

$f(-2) = 2$

21 Which of these is the domain and range of this graph?



A Domain = all real numbers
Range = all real numbers

B Domain = all real numbers
Range = $-\infty < y \leq 8$

C ~~Domain = $-1 \leq x \leq 3$~~
Range = $-9 \leq y \leq 8$

D ~~Domain = all~~ real numbers
Range = $8 \leq y < \infty$

22 What are the coordinates of the maximum point of a parabola whose equation is $y = -x^2 - 5$?

$x = \frac{0}{2(-1)} = 0 \qquad -(0)^2 - 5 = -5$

$(0, -5)$

A (0, -5)

B (0, 5)

C (0,-2.5)

D (-5, 0)

23 What are the coordinates for the vertex of the parabola $g(x) = x^2 - 8x + 13$.

$X = \frac{8}{2(1)} = \frac{8}{2} = 4$

$(4)^2 - 8(4) + 13 = -3$

A $(-4, -3)$

B $(4, -3)$

C $(-3, 4)$

D $(4, 0)$

24 Which statement describes the effect on the graph of $f(x) = x^2$, if it is changed to $f(x) = \frac{1}{2}x^2$?

$a > 1 \rightarrow$ narrow

$0 < a < 1$ wide

A The graph will be reflected across the *x*-axis.

B The graph will be reflected across the *y*-axis.

C The graph will be narrower.

D The graph will be wider.

25 Tyler writes a complex number whose real part is 7 and imaginary part is $\sqrt{-16}$. Which of these correctly represents this complex number?

$7 + \sqrt{-16}$

$7 + \sqrt{16 \cdot i^2}$

$7 + 4i$

A 7 – 4i

B 7 + 4i

C 4 + 7i

D -4 + 7i

26 If the given expression is represented in the form of *a + bi*, what are the values of ***a*** and ***b***?

a b

$-9 + 9i$

(-2 + 5i) – (7 – 4i)

A *a* = -9, *b* = 9

B *a* = 9, *b* = -9

C *a* = 5, *b* = 1

D *a* = -9, *b* = 1

27 Which of the following is a cubic polynomial with coefficients of 4, 3, and 1.

A $y = 7x^4 + 6x^3 + 4x + 2$

B $y = 3x^3 + 4x^2 - x + 2$

C $y = 3x^3 + 4x^2 + x + 2$

D $y = 7x^3 + 6x^2 + 4x$

28 Factor the expression **completely**: $100x^2 - 25w^2$

GCF!!

$25(4x^2 - w^2)$

$25(2x+w)(2x-w)$

A $(10x + 5w)(10x - 5w)$

B $25(2x + w)(2x - w)$

C $25(10x + 5w)(10x - 5w)$

D $25(2x + w)^2$

29 How could you solve this system of equations by graphing.

$$\begin{cases} f(x) = 3x^2 + 2x - 6 \\ g(x) = \frac{1}{4}x + 2 \end{cases}$$

A Examine the y-intercepts

B Examine the x-intercepts

C Examine the points of intersection

D Add the vertex coordinates

30 Which statement describes the range of $y = x^2 + 3x - 10$?

$x = \frac{-3}{2(1)} = \frac{-3}{2} = -1.5$

$y = (-1.5)^2 + 3(-1.5) - 10$

-12.25

A The range is all real numbers.

B The range is all real numbers between -5 and 2.

C The range is all real numbers greater than or equal to -1.5.

D The range is all real numbers greater than or equal to -12.25.

$-12.25 \leq y < \infty$

31 The path of a ball follows the following equation:

$$h(t) = -4.9t^2 + 15t + 3$$

where h(t) is the height of an object in meters and t is time in seconds.
How high is the ball at 1 second?

$h(1) = -4.9(1)^2 + 15(1) + 3$

A 13.1 meters

B 22.9 meters

C 10.1 meters

D 3 meters

32 Solve using the Quadratic Formula:

$$0 = 2x^2 - 8x + 5$$

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(2)(5)}}{2(2)}$$

$$x = \frac{8 \pm \sqrt{24}}{4}$$

$$x = \frac{8 \pm 2\sqrt{6}}{4}$$

$$x = \frac{4 \pm \sqrt{6}}{2}$$

$$x = 2 \pm \frac{\sqrt{6}}{2}$$

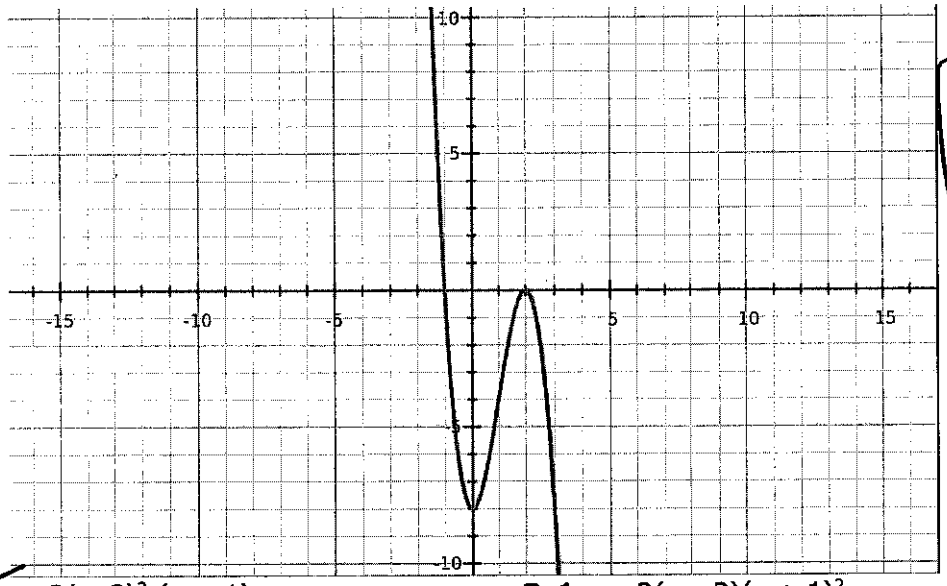
A $x = 2 \pm \frac{\sqrt{6}}{2}$

B $x = -2 \pm \frac{\sqrt{6}}{2}$

C $x = -2 \pm \frac{\sqrt{26}}{2}$

D $x = 2 \pm \frac{\sqrt{26}}{2}$

33 Which is the correct equation for the graph?



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

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

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

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

neg odd

34 State the crossing zeros, touching zeros, and y-intercept for the function:

$y = \frac{1}{25}(x + 5)^2(x + 1)(x - 2)(x - 4)$

$\frac{1}{25}(0+5)^2(0+1)(0-2)(0-4)$

$y = 8$

touch @ -5

A Crossing: -5; touching: -1, 2, 4; y-intercept: 200

B Crossing: -5; touching: -1, 2, 4; y-intercept: 8

C Crossing: -1, 2, 4; touching: -5; y-intercept: 200

D Crossing: -1, 2, 4; touching: -5; y-intercept: 8

35 State the end behavior for the following polynomial function:

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

pos odd

↓ ↑

A (↑, ↑) as $x \to -\infty$, $f(x) \to +\infty$ and as $x \to +\infty$, $f(x) \to +\infty$.

B (↓, ↓) as $x \to -\infty$, $f(x) \to -\infty$ and as $x \to +\infty$, $f(x) \to -\infty$.

C (↑, ↓) as $x \to -\infty$, $f(x) \to +\infty$ and as $x \to +\infty$, $f(x) \to -\infty$.

D (↓, ↑) as $x \to -\infty$, $f(x) \to -\infty$ and as $x \to +\infty$, $f(x) \to +\infty$.

36 The table below shows how the number of bacteria on a kitchen counter changes over time.

Day	Number of Bacteria
0	100
1	200
2	400
3	800
4	1,600

Which equation represents the relationship between the day *(x)* and the number of bacteria *(y)*?

$a = 100$

$b = 2$

A $y = 200(2)^x$

B $y = 100(2)^x$

C $y = 100(2x)$

D $y = 200(x)^2$

37 Ms. Ricks, the principal of a new school, kept track of the school's enrollment for the first four years. The results, which show an exponential relationship, are shown in the table below.

Year (f)	Number of Pupils (P)
0	230
1	248
2	268
3	290
4	313

$a = 230$ $\frac{248}{230} = 1.078$

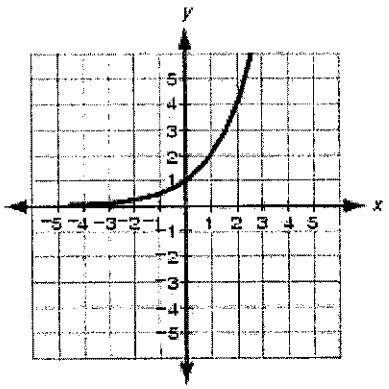
A $P = 230(0.008)^t$

B $P = 230(1.08)^t$

C $P = 248(0.008)^t$

D $P = 248(1.008)^t$

38 Which equation BEST describes the graph below?



A $f(x) = x$ linear

B $f(x) = x^2$ Quadratic

C $f(x) = 2^x$ Growth

D $f(x) = \left(\frac{1}{2}\right)^x$ decay

39 Solve the following quadratic equation using the quadratic formula. Leave your answer in simplest radical form.

$3x^2 - 2x + 8 = 0$

A	$\frac{2 \pm 2i\sqrt{23}}{6}$
B	$\frac{1 \pm i\sqrt{23}}{3}$
C	$2, -\frac{4}{3}$
D	$\frac{1 \pm 2i\sqrt{23}}{3}$

$x = \frac{2 \pm \sqrt{(-2)^2 - 4(3)(8)}}{2(3)}$

$x = \frac{2 \pm \sqrt{-92}}{6}$ $\frac{2 \pm \sqrt{92}i^2}{6}$

$x = \frac{2 \pm 2i\sqrt{23}}{6}$ $x = \frac{1 \pm i\sqrt{23}}{3}$

40 Simplify the radical.

$\frac{5}{\sqrt{200}}\sqrt{2}$ $\frac{5\sqrt{2}}{\sqrt{400}}$ $\frac{5\sqrt{2}}{20}$ $\frac{\sqrt{2}}{4}$

A $\frac{\sqrt{2}}{4}$

B $\frac{5\sqrt{2}}{20}$

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

D $\frac{\sqrt{10}}{4}$

41 If the correlation coefficient for a data set is 0.92, which statement describes the relationship of the values in the data set?

A The numbers are strongly correlated where both sets of values increase.

B The numbers are strongly correlated where one set of values increases and the other set decreases.

C The numbers are random.

D The numbers are correlated perfectly.

42 This table shows the number of hours each employee at Menchie's worked and the amount of money each earned.

Employee's Name	Hours Worked	Amount Earned
Agatha	6	$35.10
Casper	16	$93.60
Dwight	8	$46.80
Georgina	15	$87.75
Manuel	12	$70.20
Xavier	9	$52.65

If the information in this table is graphed on a coordinate plane and the slope of the line is calculated, which statement is false?

A Each employee earned $5.85 per hour.

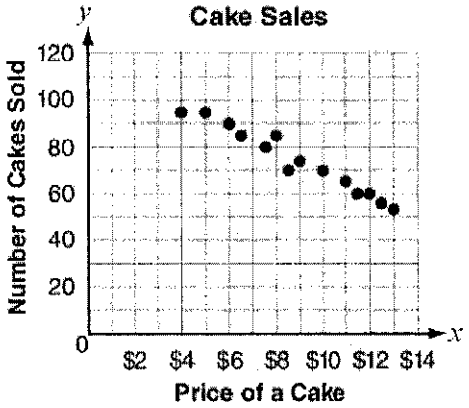
B The y-intercept would be $0.

C If Renee worked 10 hours, she would earn $58.50.

D The y-intercept would be $5.85.

work 0 hours, you don't make $5.85

43 The Cake Baker is a bakery that specializes in cakes. During a recent month, the owner created the graph below comparing the number of cakes sold with the price of a cake. Which statement BEST describes the relationship between the price of a cake and the number of cakes sold?



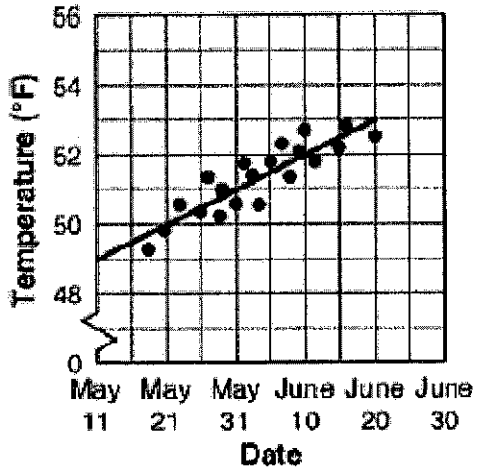
A There is no correlation between the price of a cake and the number of cakes sold, and a higher cake price does not cause a decrease in the number of cakes sold.

B There is no correlation between the price of a cake and the number of cakes sold, but a higher cake price most likely will cause a decrease in the number of cakes sold.

C There is a correlation between the price of a cake and the number of cakes sold, but a higher cake price does not cause a decrease in the number of cakes sold.

D There is a correlation between the price of a cake and the number of cakes sold, and a higher cake price most likely will cause a decrease in the number of cakes sold.

44 The water temperature in a lake was tested on 20 different dates. The scatterplot shows the results and the line of best fit for the data.



According to the data, what is the best prediction for the water temperature on June 30?

A 53°

B 54°

C 55°

D 56°