Integrated Math 1 End of the year Exam Review **Name** ________________________________
Period _____

1. Suppose your parents started a savings account for you with \$1000.00. This account earns 2.5% interest each year.

   a. Write the NEXT-NOW equation that describes this savings account.

   NEXT = Now (1.025) 1st NOW = \$1000

   b. What will be the value of your account after one year? After 2 years? After 5 years? After 18 years when you are ready to go to college? Fill in the table with this information.

YEARS	DOLLARS
1	\$1025.00
2	\$1050.63
5	\$1131.41
18	\$1559.66

2. This table gives the average height in feet of boys in the US at the given ages.

Age (years)	2	4	6	8	10	12	14
Average height (inches)	34	40	46	50	54	58	63

   a. Assume this data is linear. Use your calculator to find the linear regression equation. $y = 2.34x + 30.57$

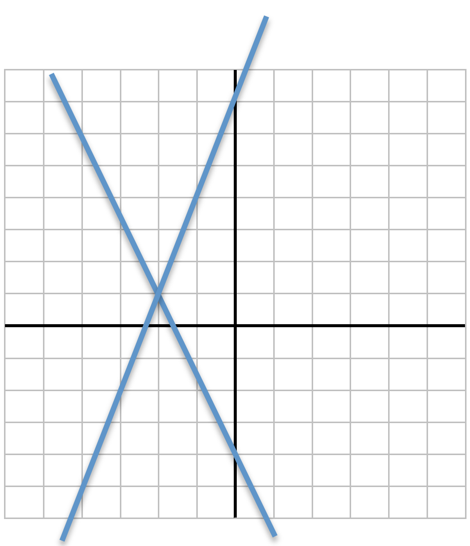
   b. What is the slope of the line you found in part b?

   slope = 2.34

   c. What does the slope mean in the context of the age, height data?
   On average boys in the USA between the ages of 2 and 14 grow 2.34 inches per year

____________________3. Solve the equation $-2x - 3 = 3x + 7$ using the following methods.

a. graphically



b. using tables

x	Y_1	Y_2
-4	5	-5
-3	3	-2
-2	1	1
-1	-1	4
0	-3	7
1	-5	10

c. Symbolically.

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

$$-3 = 5x + 7$$

$$-10 = 5x$$

$$-2 = x$$

4. If a tennis ball is lobbed into the air with upward velocity of 14 meters per second, its velocity (V) and height (H) will be functions of time in flight described by the following rules.

$$V = 14 - 9.8T$$

$$H = 1 + 14T - 4.9T^2$$

H= ____11______ T= ___1.43_ a. Find the maximum height of that tennis ball and the time it takes to reach the height.

_0 m/s or -0.014_________ b. What is the velocity of the ball at its maximum height?

_______2.9 sec___________ c. Find when the ball will hit the ground. Round your answer to the nearest **tenth** of a second.

___-14.7 m/s___________ d. What is the velocity of the ball when it hits the ground?

5. Solve the following by using symbol manipulation or the quadratic formula. Show work!

_____ $-\frac{21}{8} = 2.625$ _____ a. $3x + 5 = -16 - 5x$

_____30_____ b. $5(x - 4) = 4x + 10$

___-2 , -3____ c. $-6 = x^2 + 5x$

6. Write in shorter form. Simplify completely.

_______7x +7y + 6___ a. $9x + 4y - 2x + 3(y + 2)$

___8x - 9________ b. $4(-2) + 6x - 3 + 2(x + 1)$

7. Write in expanded form.

$x^2 - 5x - 14$ a) $(x + 2)(x - 7)$ $x^2 - 6x + 9$ b. $(x - 3)^2$ $4x^2 + 8x$ c) $4x(x + 2)$

8. Write in factored form.

___3x(x – 4)_ a) $3x^2 - 12x$

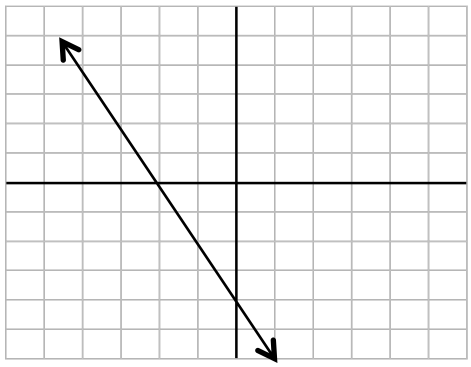
_-5(x + 5) or 5(-x – 5) b) $-5x - 25$

9. Find the equation of a line given the following information: Show work!

_ $y = \frac{2}{5}x + 3$ *or* $y = 0.4x + 3$ ________________________ a. the line contains the points (10, 7) and (-5, 1)

$y = \frac{1}{2}x + 10$ *or* $y = 0.5x + 10$ _________________________ b. The line contains the point (-4, 8) and has slope 0.5.

10. Use the graph of a linear equation to answer the following.



_____-2_________ a. What is the slope of the line?

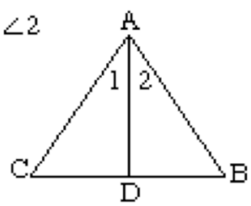
______-4________ b. What is the y-intercept?

___y = -2x - 4_____ c. Write the equation of the line.

11. Write two column proofs

a.

GIVEN: $\angle ADB \cong \angle ADC; \angle 1 \cong \angle 2$
PROVE: $\triangle ABD \cong \triangle ACD$

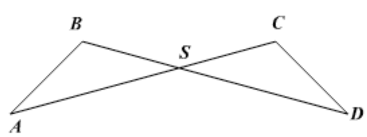


1. $\angle ADB \cong \angle ADC$ 1. *Given*
2. $\angle 1 \cong \angle 2$ 2. *Given*
3. $\overline{AD} \cong \overline{AD}$ 3. *A side is conruent to itself* (Re *flexive*)
4. $\triangle ABD \cong \triangle ABD$ 4. *ASA*

b.

Given: $\overline{AS} \cong \overline{DS}; \overline{BS} \cong \overline{CS}$

Prove: $\angle A \cong \angle D$



1. $\overline{AS} \cong \overline{DS}; \overline{BS} \cong \overline{CS}$ 1. *Given*
2. $\angle ASB \cong \angle DSC$ 2. *Vertical Angles are congruent*
3. $\triangle ABD \cong \triangle ABD$ 3. *SAS*
4. $\angle A \cong \angle D$ 4. *C.P.C.T.C*

Circle the correct answer for the following multiple-choice questions.

C12. Solve the inequality $-2x + 3 < 11$.

(A) $x < -4$
(B) $x < 4$
(C) $x > -4$
(D) $x > 4$

B13. Which of the following is equal to $n^{-4} \cdot n^{4}$?

(A) 0
(B) 1
(C) n
(D) n^{-16}

D14. Which of the following is equal to $(x^2y)^3$?

(A) x^2y^3
(B) x^5y^3
(C) x^5y^4
(D) x^6y^3

A15. Which of the following is equivalent to $\left(5a^2b^{-3}c^{-4}\right)^2$ if it is expressed using positive exponents?

(A) $\dfrac{25a^4}{b^6c^8}$
(B) $\dfrac{5a^4}{b^6c^8}$
(C) $\dfrac{25a^4}{b^9c^{16}}$
(D) $\dfrac{10a^2}{bc^2}$

B16. Which of the following equations is the same as **y = 54 – 8(x + 3)** ?

A. y = 51 – 8x
B. y = 30 – 8x
C. y = 78 – 8x
D. y = 57 – 8x
E. y = 30 – x

B17. Which of the following is a solution of this equation $\mathbf{x^2 + x - 6 = 6 + 2x}$?

A. x = -5
B. x = -3
C. x = 0
D. x = 3
E. x = 5

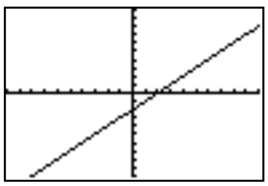
C18. Which of the following is a solution of this equation: **45 = 34 + 4x** ?

A. x = 19.25
B. x = 44
C. x = 2.75
D. x = -19.25
E. x = -2.75

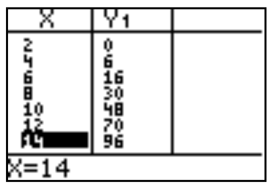
B19. Which of the following is a solution of this inequality: **5x – 2 < 3x + 8** ?

A. x > 5
B. x < 5
C. x < 1.25
D. x > 1.25
E. x < 3

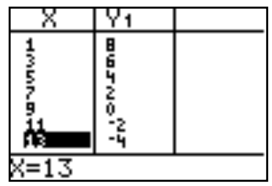
C20. Which of the following tables goes with this graph?



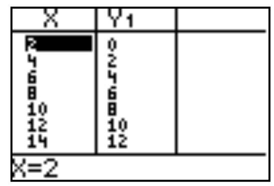
A.



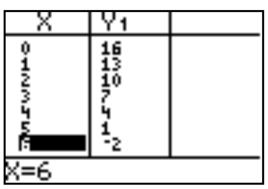
B.



C.



C21. Which of the following NEXT-NOW equations goes with this table?



A.	B.	C.
1st NOW = 16 NEXT = NOW + 3	1st NOW = 16 NEXT = NOW*3	1st NOW = 16 NEXT = NOW - 3

22. Rather than being given a set allowance for each week, Isabella draws money from two bags. In Bag A, her father places one 1-dollar bill, one 5-dollar bill, and one 10-dollar bill. In Bag B, he places one 5-dollar bill, one 10-dollar bill, and one 20-dollar bill. She draws *one bill from **each** bag* and that is her allowance for the week.

a. Make a sample space of the possible amounts of Isabella's weekly allowance.

1, 5	1, 10	1, 20
5, 5	5, 10	5, 20
10, 5	10, 10	10, 20

b. Make a probability distribution table for Isabella's weekly allowance.

Allowance	probability
6	$\frac{1}{9}$
10	$\frac{1}{9}$
11	$\frac{1}{9}$
15	$\frac{2}{9}$
20	$\frac{1}{9}$
21	$\frac{1}{9}$
25	$\frac{1}{9}$
30	$\frac{1}{9}$

c. What is the probability that she will get less than $20 for her allowance?

$$P(6 \text{ or } 10 \text{ or } 11 \text{ or } 15) = \frac{1}{9}+\frac{1}{9}+\frac{1}{9}+\frac{2}{9}=\frac{5}{9}$$

23. Mr. Stein surveyed students in his two ninth-grade English classes. He asked if they had read the book To Kill a Mockingbird or if they had seen the movie. The survey results are summarized in the table at the right. Suppose that you randomly pick one of these students.

	Saw Movie	Did Not See Movie	Total
Read Book	23	15	38
Did Not Read Book	12	10	22
Total	35	25	60

a. What is the probability that the student has read the book? $\frac{38}{60}$

b. What is the probability that the student has read the book and seen the movie? $\frac{23}{60}$

c. What is the probability that the student has read the book or seen the movie? Show work.

$\frac{38}{60}+\frac{35}{60}-\frac{23}{60}=\frac{50}{60}$

24. Match the equations with the appropriate calculator screen. Write the letter of the matching equation next to the screen.

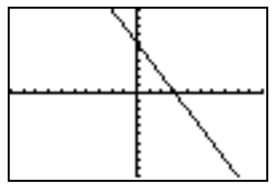
D I.

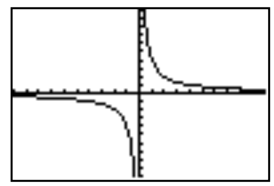
C II.

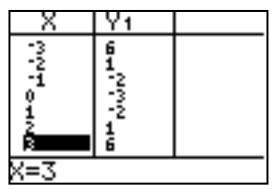
E III.

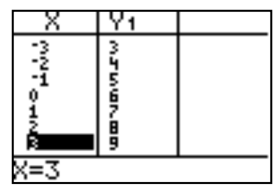
F IV.

a. $y = 2x - 6$
b. $y = x^2 + 8$
c. $y = \frac{4}{x}$
d. $y = 6 - 2x$
e. $y = x^2 - 3$
f. $y = 6 + x$
g. $y = -\frac{4}{x}$

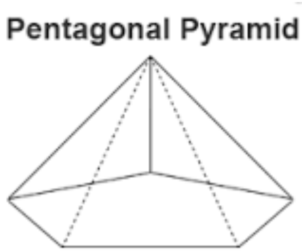

I.

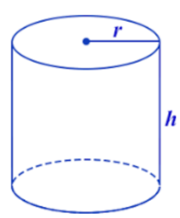

II.

III.


IV.


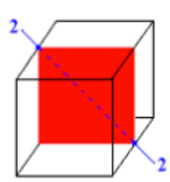
25. Draw the following space-shapes.

a. Pentagonal Pyramid


b. Cylinder


c. Kite Prism


26. Draw a cube with a plane of symmetry.



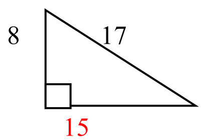
One possibility(ignore the number 2)

27. Draw the three views (top, front, right) for the following space-shape.

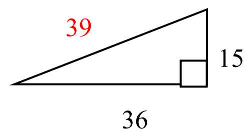
front

28. Find the missing sides in these right triangles.

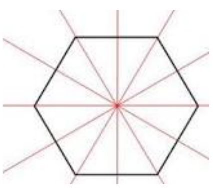
a.



b.



29. Draw a regular hexagon and all of its lines showing reflection symmetry.



30. ~~At the end of a daily television game show, the contestant who has won the most money is given a chance to win a grand prize. The grand prize is placed randomly behind one of three doors. A substantial cash prize is placed behind a second door and a "clunker" behind the third. The contestant chooses one of the doors and wins the prize that is behind it.~~

~~a. Explain how you can use a table of random digits to simulate the door a contestant chooses on this game show.~~

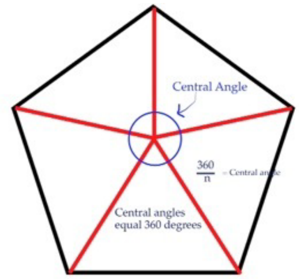
~~b. Describe a simulation model that uses your calculator's random integer generator to estimate the mean number of shows needed for someone to win a grand prize. (On each show, the winning contestant has three equally likely doors to choose from.)~~

~~c. Run the simulation in Part b 10 times. Record the results in the table to the right, making new rows as needed.~~

~~d. From your 10 runs, compute the mean number of shows until someone wins the grand prize. Explain or show how you obtained your mean.~~

Number of Shows Needed to Win Grand Prize	Frequency
1	
2	
3	
4	
5	
6	
7	

31. Draw a regular pentagon and list all of its angles for *rotational* symmetry.



72°, 144°, 216°, 288°

32. a . Find the total measure of all the interior angles in a regular octagon.

(n – 2)(180) = sum   sum = 1080°

b. Find the measure of each interior angle as well.

135°

33. What is translational symmetry? Describe and then draw an example.

A sliding of the figure so that it coincides with the original tiling.
Can slide in various directions and the horses match up.

34. Suppose 10 bacteria cells get into a cut on your leg. These cells triple every 20 minutes.

a. Make a chart showing the number of bacteria in your cut at 20 minute intervals for 2 hours.

time	0	20	40	60	80	100	120
bacteria	10	30	90	270	810	2430	7290

b. Write a NOW-NEXT and y = equations for this situation.

Next = Now(3) starting at 10 $y = 10\left(3^x\right)$

35. A Jeep decreases in value by 15% each year. Assume someone bought a new Jeep in 2002 for a price of $25,000.

a. Write NOW-NEXT and y= equations for the value of the Jeep that remains after each year.

Next = Now(0.85) Starting at $25000

$y = 25000\left(0.85^x\right)$

b. Make a chart showing the value of the Jeep for each of the next 5 years.

# of year	value of jeep
0	$25,000
1	$21,250.00
2	$18,062.50
3	$15,353.13
4	$13,050.16
5	$11,092.63

c. To the nearest tenth of a year, when will the value of the Jeep first be below $5,000?

In 10.0 years or in 2012

9	$5,790.42
10	$4,921.86
11	$4,183.58
12	$3,556.04

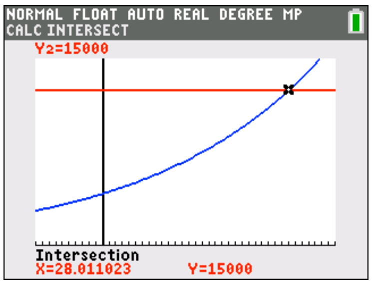
36. Brent starts an account with \$5,000 that earns 4% interest compounded annually.

a. Write NOW-NEXT and y= equations for this situation.

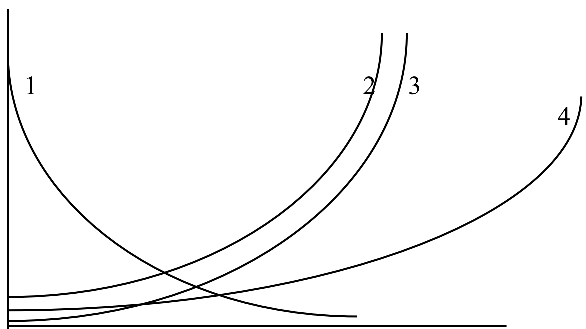
Next = Now(1.04) starting at \$5000

$y = 5000\left(1.04^{x}\right)$

b. How long will it take the account to triple in value?



37.



Match the graph to its equation.

a. $y = 4\ (2)^x$ ______4_____

b. $y = 4\ (5)^x$ ______3_____

c. $y = 6\ (5)^x$ ______2_____

d. $y = 25\ (.5)^x$ ______1_____

38. a. Complete the following table so that the first row represents linear growth and the second row represents exponential growth.

X	0	1	2	3	4	5	6
Linear	4	12	20	20	36	44	52
Exponential	4	12	36	108	324	972	2916

b. Write NOW-NEXT and y= equations for both the linear and exponential growth.

Linear: Next = Now + 8 starting at 4

Exponential: Next = Now(3) Starting at 4

39. Use the laws of exponents and the relationship between exponential and radical expressions to rewrite the following expressions in an equivalent simpler form.

a. $16^{\frac{1}{2}} = 4$

b. $\sqrt{\frac{9}{16}} = \frac{3}{4}$

c. $4x^{-1} = \frac{4}{x}$

d. $(2x^3)^3(4x^5) = 32x^{14}$

e. $\sqrt{20} = 2\sqrt{5}$

f. $\dfrac{6x^3y^8}{2y^2} = 3x^3y^6$

g. $\left(4a^3b\right)\left(a^{-2}b^3\right) = 4ab^4$

h. $(3ab)^{-1} = \dfrac{1}{3ab}$

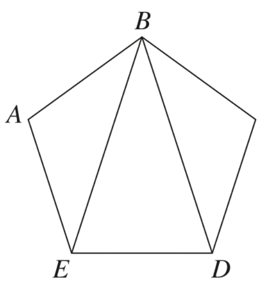
i. $\dfrac{3a^4}{9a^5} = \dfrac{1}{3a}$

j. $\left(\dfrac{2}{3}\right)^{-3} = \dfrac{27}{8}$

k. $\dfrac{6x^2yz^5}{14xy^4z^3} = \dfrac{3xz^2}{7y^3}$

l $\dfrac{1}{g^{-2}} = g^2$

40. Polygon *ABCDE* below is a regular pentagon.



a. Find the measure of $\angle A$. 108°

b. Identify two congruent triangles in the figure above. How do you know that they are congruent? $\triangle ABE \cong \triangle CBD$ by SAS This is because $\overline{AB} \cong \overline{CB}$ and $\overline{AE} \cong \overline{CD}$ and $\angle A \cong \angle C$ because of the definition of a regular polygon-all sides and angles are equal

c. We know an equilateral triangle, a regular hexagon, and a square are the only regular polygons that tile the plane. Explain why a regular pentagon *ABCDE* does not tile the plane? In order to tile the plain th interior angles must be a factor of 360°. The interior angle of a regular pentagon is 108°. 108° is not a factor of 360°. 108° does not divide into 360° evenly therefore it cannot tile the plane.

41. Rewrite each of the following expressions in equivalent standard form $ax^2 + bx + c$.

a. $2x(x - 7) + 15$
$2x^2 - 14x + 15$

b. $x(100 + 5x) + 2(x + 1) + 25$
$x^2 + 9x + 14$

c. $(x - 3)(x + 9)$
$x^2 + 6x - 27$

d. $(x + 7)(x + 2)$
$x^2 + 9x + 14$

e. $(x - 7)^2$
$x^2 + 9x + 14$

f. $(x - 8)(x + 8)$
$x^2 - 64$

42. Rewrite each expression in equivalent form as a product of two linear factors.

a. $16x^2 + x$

x(16x + 1)

b. $5x^2 - 6x$

x(5x-6)

c. $3x^2 + 12x$

3x(x + 4)

43. Solve each equation by reasoning without the use of calculator graphs, tables, or symbol manipulation tools.

a. $x^2 = 18$

$\pm\sqrt{18} = \pm 3\sqrt{2}$

b. $5x^2 - 30 = 70$

$x = \pm\sqrt{20}\ or\ \pm 2\sqrt{5}$ (could give decimal answers)

c. $8x^2 - 4x = 0$

$x = 0, \quad x = \frac{1}{2}$

d. $8x + 6x^2 = 0$

$x = 0, \quad x = -\frac{4}{3}$

e. $x^2 + 10x + 20 = 0$

$-5 \pm \sqrt{5}$ (could give decimal answers)

f. $9x - 2x^2 = -5$

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