Secondary Math 2 HONORS

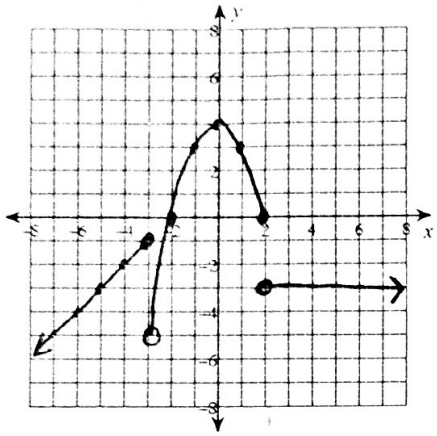
Name Key

Term 2 Final Review

Date _____ Period ____

Sketch the graph of each function.

1) $f(x) = \begin{cases} x + 2, & x \le -3 \\ 4 - x^2, & -3 < x \le 2 \\ -3, & x > 2 \end{cases}$



2) Evaluate the function for the following values:

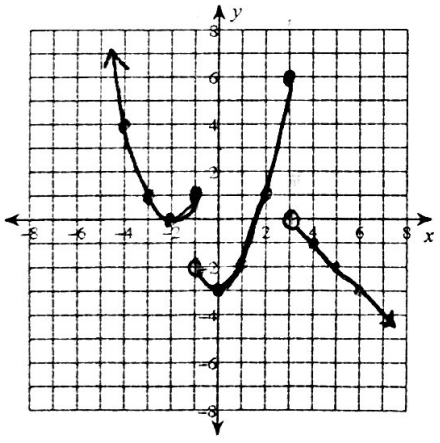
a. $f(4) = -3$

b. $f(2) = 0$

c. $f(-3) = -1$

Sketch the graph of each function.

3) $f(x) = \begin{cases} (x + 2)^2, & x \le -1 \\ x^2 - 3, & -1 < x \le 3 \\ -x + 3, & x > 3 \end{cases}$



4) Evaluate the function for the following values:

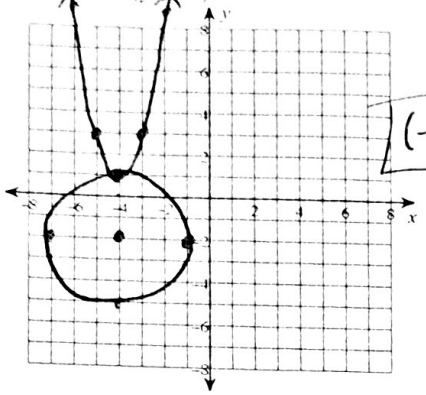
a. $f(-5) = 9$

b. $f(0) = -3$

c. $f(3) = 6$

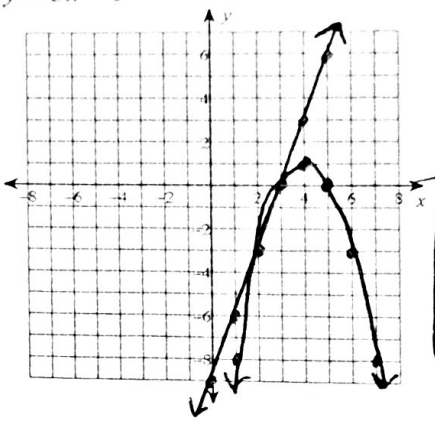
Solve each system graphically.

5) $y = 2(x + 4)^2 + 1$
$(x + 4)^2 + (y + 2)^2 = 9$



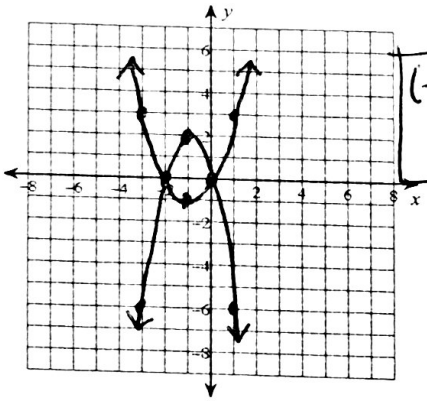
(-4,1)

6) $y = -(x - 3)(x - 5)$
$y = 3x - 9$



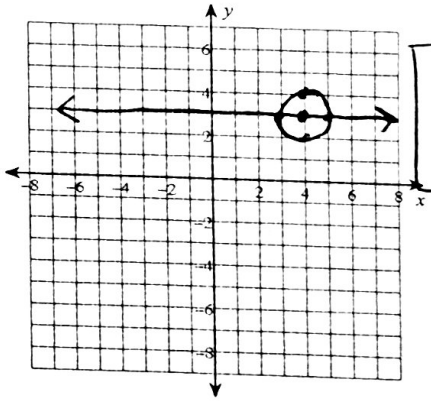
(2,-3),
(3,0)

7) $y = x^2 + 2x$
$y = -2x^2 - 4x$



(-2,0),
(0,0)

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



(3,3),
(5,3)

Solve each system algebraically.

9) $y = (x - 1)^2 + 5$
$y = 2x + 4$

$(2 - \sqrt{2}, 8 - 2\sqrt{2})$,
$(2 + \sqrt{2}, 8 + 2\sqrt{2})$

10) $x^2 + (y - 3)^2 = 4$
$y = x - 5$

No Solution

11) $y = x - 1$
$y = -(x - 1)^2 - 2$

No Solution

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

$(-4 - \sqrt{2}, 1 + \sqrt{2})$,
$(-4 + \sqrt{2}, 1 - \sqrt{2})$

Find the inverse of each matrix.

13) $\begin{bmatrix} 2 & -5 \\ -8 & -8 \end{bmatrix}$

$\begin{bmatrix} \frac{1}{7} & -\frac{5}{56} \\ -\frac{1}{7} & -\frac{1}{28} \end{bmatrix}$

14) $\begin{bmatrix} -8 & 10 \\ 8 & -5 \end{bmatrix}$

$\begin{bmatrix} \frac{1}{8} & \frac{1}{4} \\ \frac{1}{5} & \frac{1}{5} \end{bmatrix}$

Simplify. Write "undefined" for expressions that are undefined.

15) $\begin{bmatrix} 1 & 6 \\ -2 & -2 \end{bmatrix} \cdot \begin{bmatrix} 3 & 6 & -5 \\ -6 & 4 & -4 \end{bmatrix}$

$\begin{bmatrix} -33 & 20 & -29 \\ 6 & -20 & 18 \end{bmatrix}$

16) $\begin{bmatrix} 1 & -6 \\ -4 & 6 \\ -3 & 6 \end{bmatrix} \cdot \begin{bmatrix} 3 & 6 \\ -6 & 3 \end{bmatrix}$

$\begin{bmatrix} 39 & -12 \\ -48 & -6 \\ -45 & 0 \end{bmatrix}$

Solve each system using matrices.

17) $x + 6y = -3$
$10x - 12y = -30$

$(-3, 0)$

18) $-14x + 5y = 19$
$7x - y = -8$

$(-1, 1)$

For each sequence, state if it is arithmetic, geometric, or neither.

19) 3, 6, 11, 18, 27, ...

Neither

20) −1, −5, −25, −125, −625, ...

Geometric

21) −38, −30, −22, −14, −6, ...

Arithmetic

22) −1, −2, −6, −24, −120, ...

Neither

Find the explicit formula and the recursive formula.

23) 9, 0, −9, −18, ...

Explicit: $a_n = -9n + 18$

Recursive: $a_n = a_{n-1} - 9$, $a_1 = 9$

24) −37, −33, −29, −25, ...

Explicit: $a_n = 4n - 41$

Recursive: $a_n = a_{n-1} + 4$, $a_1 = -37$

25) −34, −40, −46, −52, ...

Explicit: $a_n = -6n - 28$

Recursive: $a_n = a_{n-1} - 6$, $a_1 = -34$

26) −2, 12, −72, 432, ...

Explicit: $a_n = -2(-6)^{n-1}$

Recursive: $a_n = -6a_{n-1}$, $a_1 = -2$

27) 2, 10, 50, 250, ...

Explicit: $a_n = 2 \cdot 5^{n-1}$

Recursive: $a_n = 5a_{n-1}$, $a_1 = 2$

28) −4, −24, −144, −864, ...

Explicit: $a_n = -4 \cdot 6^{n-1}$

Recursive: $a_n = 6a_{n-1}$, $a_1 = -4$

Evaluate each series described.

29) $\sum_{k=1}^{30} (5k - 9)$

2055

30) $\sum_{m=1}^{5} (10m - 18)$

60

31) $\sum_{m=1}^{9} -(-2)^{m-1}$

−171

32) $\sum_{k=1}^{8} -6^{k-1}$

−335,923

Write the following series in summation notation.

33) $18 + 24 + 30 + 36\ldots$, $n = 14$

$\sum_{n=1}^{14} 6n + 12$

34) $(-28) + (-36) + (-44) + (-52)\ldots$, $n = 18$

$\sum_{n=1}^{18} -8n - 20$

Write the following series in summation notation.

35) $1 + 5 + 25 + 125..., \ n = 9$

$\sum_{n=1}^{9} 5^{n-1}$

36) $-3 + 12 - 48 + 192..., \ n = 6$

$\sum_{n=1}^{6} -3(-4)^{n-1}$

Evaluate each arithmetic series described.

37) $28 + 37 + 46 + 55..., \ n = 7$

385

38) $12 + 20 + 28 + 36..., \ n = 19$

1,596

Evaluate each geometric series described.

39) $4 - 12 + 36 - 108..., \ n = 6$

-728

40) $3 + 9 + 27 + 81..., \ n = 8$

9,840

41) A marching band formation consists of 9 rows. The first row has 4 musicians, the second has 7, the third has 10 and so on. How many musicians are in the last row and how many musicians are there in all?

Last row: 28

Total: 144

42) This month, your friend deposits $500 to save for a vacation. She plans to deposit 10% more each successive month for the next 11 months. How much will she have saved after the 12 deposits?

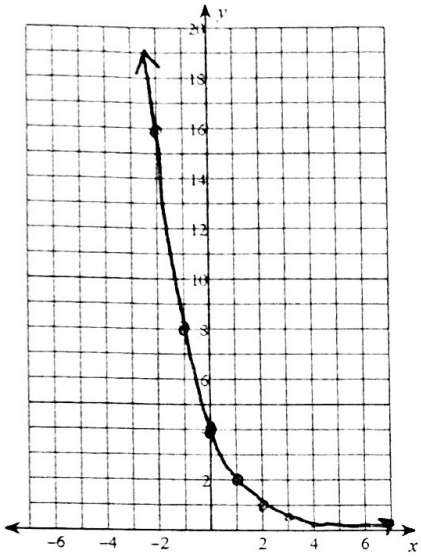
$1,426.56

43) A colony of bacteria doubles every minute. If there are 10 bacteria to begin with, how much bacterial will there be after 15 minutes?

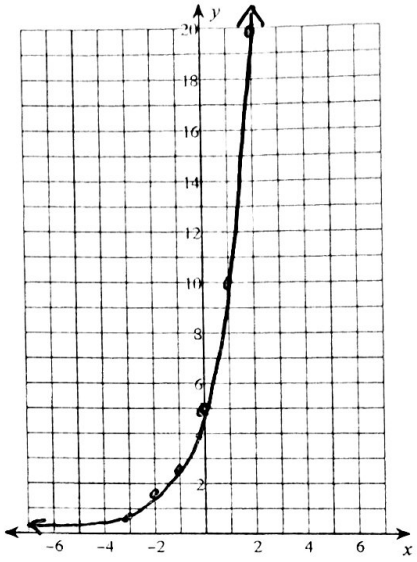
327,680

Sketch the graph of each function.

44) $y = 4 \cdot \left(\frac{1}{2}\right)^x$

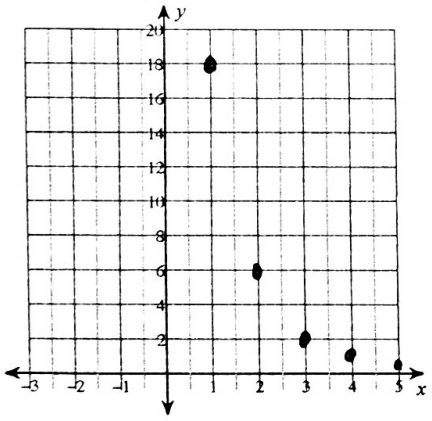


45) $y = 5 \cdot 2^x$

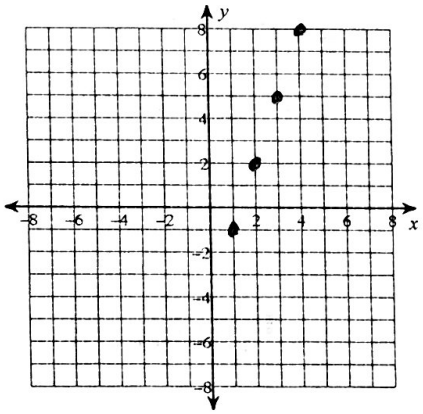


Represent each sequence graphically.

46) $a_n = 18 \cdot \left(\frac{1}{3}\right)^{n-1}$



47) $a_n = 3n - 4$



Determine the initial value, growth/decay factor, and growth/decary rate.

48) $y = 200 \cdot 1.21^x$

I: 200
GF: 1.21
GR: 21%

49) $y = 1800 \cdot 1.08^{6x}$

I: 1800
GF: 1.59
GR: 59%

50) $y = 540 \cdot 0.75^x$

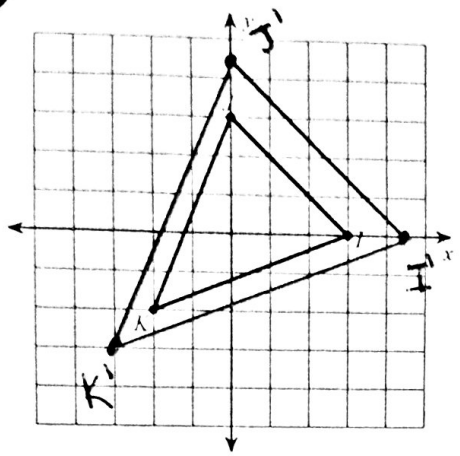
I: 540
DF: 0.75
DR: 25%

51) $y = 500 \cdot 0.94^{2x}$

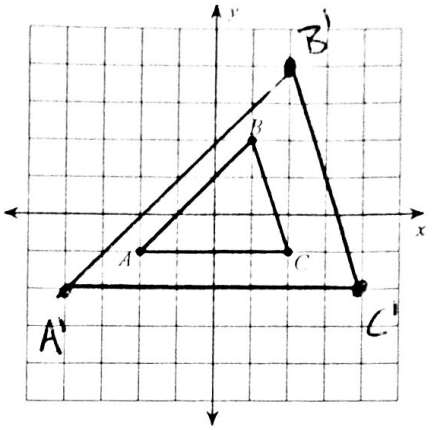
I: 500
DF: 0.88
DR: 12%

Graph the image of the figure using the transformation given.

52) dilation of $\frac{3}{2}$ about the origin

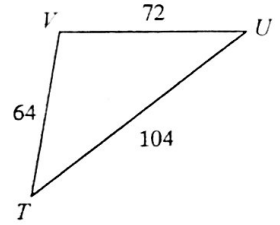


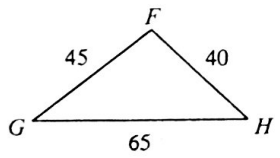
53) dilation of 2 about the origin



Find the scale factor from the first triangle listed to the second. Then state if it is a reduction or an enlargement.

54) $\triangle TUV \sim \triangle HGF$

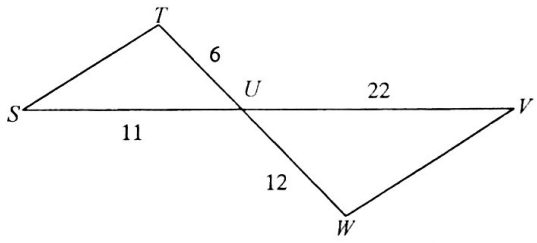




k = .625

Reduction

55) $\triangle UVW \sim \triangle UST$

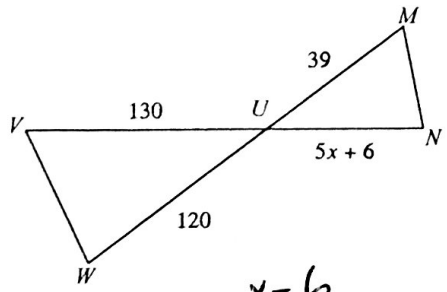


k = .5

Reduction

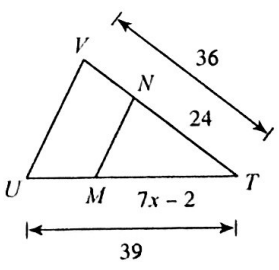
Solve for *x*. The triangles in each pair are similar.

56) $\triangle UVW \sim \triangle UMN$



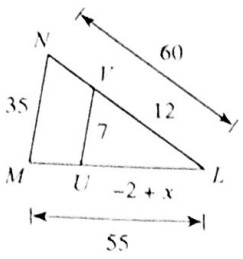
x = 6

57)



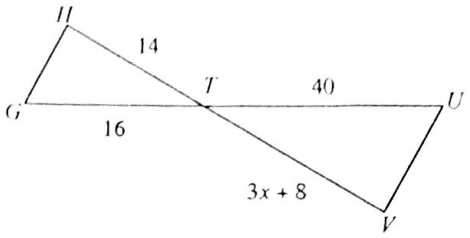
x = 4

58)



$x = 13$

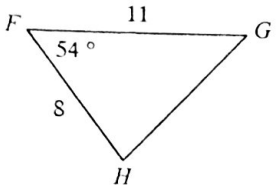
59) $\triangle TUV \sim \triangle TGH$

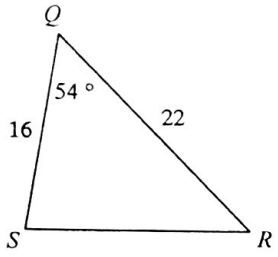


$x = 9$

State if the triangles in each pair are similar. If so, state how you know they are similar and complete the similarity statement.

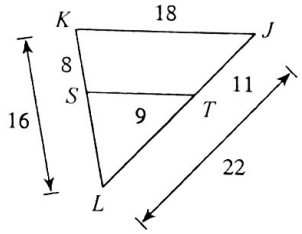
60)





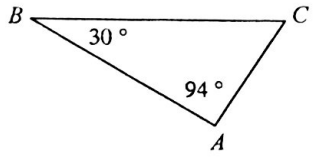
$\triangle QRS \sim$ $\triangle FGH$ by SAS

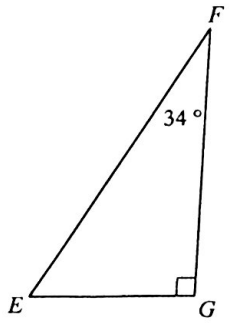
61)



$\triangle LKJ \sim$ $\triangle LST$ by SSS (or SAS)

62)

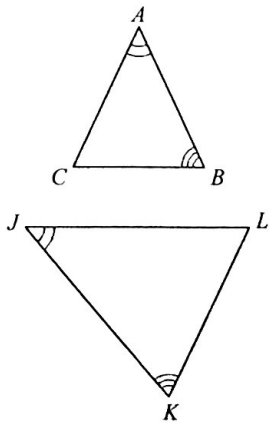




$\triangle GFE \sim$ _____

Not similar

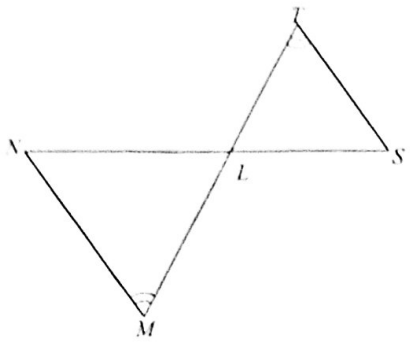
63)



$\triangle JKL \sim$ $\triangle ABC$ by AA

Write a two-column proof to determine if the two triangles are similar.

64)



$\triangle LMN \sim$ _____

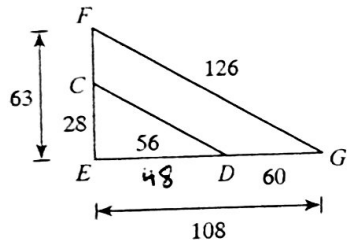
Statement	Reason
$\angle M \cong \angle T$	Given
$\angle MLN \cong \angle TLS$	Vertical angles
$\triangle LMN \sim \triangle LTS$	AA Similarity

65) Use the two-column proof to write a paragraph proof.

It is given that $\angle M \cong \angle T$. Since $\angle MLN \cong \angle TLS$ by vertical angles, $\triangle LMN \sim \triangle LTS$ by AA Similarity.

Write a two-column proof to determine if the two triangles are similar.

66)



$\triangle EFG \sim$ _____

* Can also be shown with SSS, but diagram was weird to decipher so I did SAS

Statement	Reason
$\angle FED \cong \angle CED$	Reflexive property
$ED = 48$	Subtraction property
$\frac{63}{28} = \frac{108}{48}$	Division property
$\frac{FE}{CE} = \frac{EG}{ED}$	Substitution
$\triangle EFG \sim \triangle ECD$	SAS Similarity

67) Use the two-column proof to write a paragraph proof.

We knew $\angle FED \cong \angle CED$ by the reflexive property and $ED = 48$ by the subtraction property. Since $\frac{63}{28} = \frac{108}{48}$ by the division property, $\frac{FE}{CE} = \frac{EG}{ED}$ by substitution and $\triangle EFG \sim \triangle ECD$ by SAS Similarity.

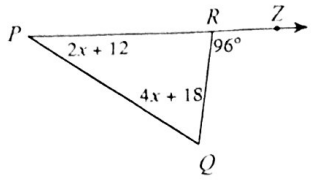
State if the three numbers can be the measures of the sides of a triangle.

68) 8, 9, 3 Yes

69) 9, 10, 18 Yes

Find the measure of the angle indicated.

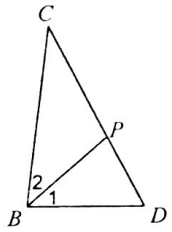
70) Find $m\angle P$.



34°

Each figure shows a triangle with one of its angle bisectors.

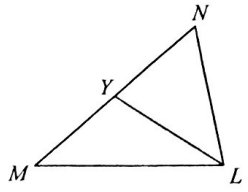
71) $m\angle 2 = 8x + 2$ and $m\angle DBC = 17x - 1$.
Find $m\angle 1$.



42°

Each figure shows a triangle with one or more of its medians.

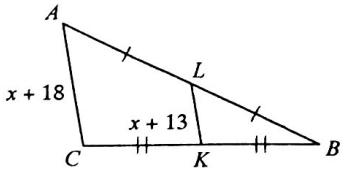
72) Find YN if $NM = 2x - 7$ and $YM = \frac{1}{2}x - 1$



$\frac{3}{2}$

Find the missing length indicated.

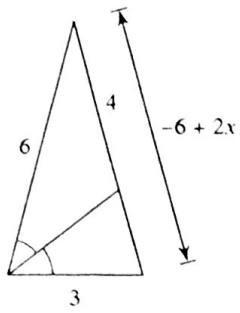
73) Find AC



10

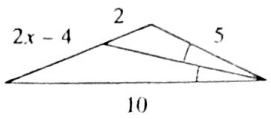
solve for x.

74)



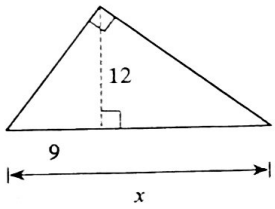
X=6

75)



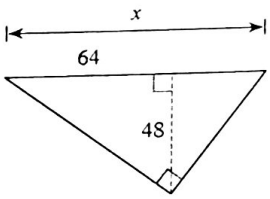
X=4

76)



X=25

77)



X=100