Barnett

Algebra 1
Honors

Packets 11-16

Distance Formula Notes

Find the value of a if the points with the given coordinates are the indicated distance apart.

	① $(7,-3)(a,-3)$ $d=13$	② $(-8,-5)(-8,a)$ $d=9$
Distance Formula	$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$	$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
Plug in info	$13=\sqrt{(a-7)^2+(-3+3)^2}$	$9=\sqrt{(-8+8)^2+(a+5)^2}$
Simplify	$13=\sqrt{(a-7)^2+0}$	$9=\sqrt{0+(a+5)^2}$
	$13=\sqrt{(a-7)^2}$	$9=\sqrt{(a+5)^2}$
Square both sides	$13^2=\left(\sqrt{(a-7)^2}\right)^2$	$9^2=\left(\sqrt{(a+5)^2}\right)^2$
	$169=(a-7)^2$	$81=(a+5)^2$
Square root both sides	$\sqrt{169}=\sqrt{(a-7)^2}$	$\sqrt{81}=\sqrt{(a+5)^2}$
Seperate into 2 problems	$13=a-7$ or $-13=a-7$	$9=a+5$ or $-9=a+5$
	$\boxed{20=a}$	$\boxed{4=a}$
	$\boxed{-6=a}$	$\boxed{-14=a}$

Distance Formula Notes Continued

	③ $(-6,a)\ (-7,-6)\ d=\sqrt{5}$	④ $(a,-8)\ (2,-1)\ d=\sqrt{74}$
Distance Formula	$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$	$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
Plug in info	$\sqrt{5}=\sqrt{(-7+6)^2+(-6-a)^2}$	$\sqrt{74}=\sqrt{(2-a)^2+(-1+8)^2}$
Simplify	$\sqrt{5}=\sqrt{1+(-6-a)^2}$	$\sqrt{74}=\sqrt{(2-a)^2+49}$
Square both sides	$(\sqrt{5})^2=(\sqrt{1+(-6-a)^2})^2$	$(\sqrt{74})^2=(\sqrt{(2-a)^2+49})^2$
Move 1 to the left	$5=1+(-6-a)^2$	$74=(2-a)^2+49$
	$4=(-6-a)^2$	$25=(2-a)^2$
Square root both sides	$\sqrt{4}=\sqrt{(-6-a)^2}$	$\sqrt{25}=\sqrt{(2-a)^2}$
Split into 2 problems	$2=-6-a$ or $-2=-6-a$	$5=2-a$ or $-5=2-a$
	$\boxed{a=-8}$ $\boxed{a=-4}$	$\boxed{a=-3}$ $\boxed{a=7}$

Instructional Packet #11 Show all work.

13-5

NAME _____ DATE _____

Practice

Student Edition
Pages 737–741

Integration: Geometry
The Distance Formula

Find the distance between each pair of points whose coordinates are given. Express answers in simplest radical form and as decimal approximations rounded to the nearest hundredth.

1. $(9, 7), (1, 1)$

2. $(5, 2), (8, -2)$

3. $(1, -3), (1, 4)$

4. $(7, 2), (-5, 7)$

5. $(5, 2), (3, 10)$

6. $(-1, -4), (-6, 0)$

7. $(-3, -1), (-11, 3)$

8. $(-3, -8), (-7, 2)$

9. $(0, -4), (3, 2)$

10. $(-6, 3), (10, 3)$

11. $\left(2, -\frac{1}{2}\right), \left(1, \frac{1}{2}\right)$

12. $\left(\frac{2}{3}, -1\right), \left(2, \frac{1}{3}\right)$

13. $(\sqrt{3}, 3), (2\sqrt{3}, 5)$

14. $(2\sqrt{2}, -1), (3\sqrt{2}, 4)$

Find the value of a if the points with the given coordinates are the indicated distance apart.

15. $(-2, -5), (a, 7); d = 13$

16. $(8, -2), (5, a); d = 3$

17. $(4, a), (1, 6); d = 5$

18. $(a, 4), (-3, -2); d = \sqrt{61}$

Midpoint Formula Notes

A is an endpoint. P is the midpoint. Find other endpoint.

① $A(1, -10)$ $P\left(\frac{9}{2}, -6\right)$

Midpoint Formula $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

$\left(\frac{x_1 + x_2}{2}\right) = x \quad \left(\frac{1 + x_2}{2}\right) = \frac{9}{2}$

$\boxed{x_2 = 8}$

$\left(\frac{y_2 + y_1}{2}\right) = y \quad \left(\frac{-10 + y_2}{2}\right) = -6$

$\left(\frac{-10 + y_2}{2}\right) = \frac{-12}{2}$

$\boxed{y_2 = -2}$

$\boxed{(8, -2)}$

② $A(7, -4)$ $P\left(8, \frac{-13}{2}\right)$

$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

$\left(\frac{7 + x_2}{2}\right) = 8$

$\left(\frac{7 + x_2}{2}\right) = \frac{16}{2}$

$\boxed{x_2 = 9}$

$\left(\frac{-4 + y_2}{2}\right) = \frac{-13}{2}$

$\boxed{y_2 = -9}$

$\boxed{(9, -9)}$

Midpoint Formula Notes Continued

③ $A(10,7)$ $P(1,1)$

Midpoint Formula $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$\left(\frac{x_1+x_2}{2}\right)=x$ $\left(\frac{10+x_2}{2}\right)=1$

$\left(\frac{10+x_2}{2}\right)=\frac{2}{2}$

$\boxed{x^2=-8}$

$\left(\frac{y_1+y_2}{2}\right)=y$ $\left(\frac{7+y_2}{2}\right)=1$

$\left(\frac{7+y_2}{2}\right)=\frac{2}{2}$

$\boxed{y_2=-5}$

$\boxed{(-8,-5)}$

④ $A(-1,-10)$ $P\left(-\frac{9}{2},-\frac{1}{2}\right)$

$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$\left(\frac{-1+x_2}{2}\right)=-\frac{9}{2}$

$\boxed{x_2=-8}$

$\left(\frac{-10+y_2}{2}\right)=-\frac{1}{2}$

$\boxed{y_2=9}$

$\boxed{(-8,9)}$

Packet #12 Show all work.

6-7

NAME _____ DATE _____

Practice

Student Edition
Pages 369–374

Integration: Geometry
Midpoint of a Line Segment

Find the coordinates of the midpoint of the segment with each pair of endpoints.

1. $L(2, 4), P(6, 8)$

2. $W(6, 4), Z(2, 10)$

3. $U(-3, 2), V(-3, -4)$

4. $M(-2, 6), N(8, 6)$

5. $J(12, 3), K(-3, 1)$

6. $A(1, -1), B(5, 2)$

7. $Q(3, 0), R(0, 4)$

8. $G(0, 0), H(3, -4)$

9. $X(-1, 4), Y(5, -4)$

10. $S(-4, -7), T(2, 1)$

11. $C(8, -3), D(5, 4)$

12. $E\left(3, \frac{3}{2}\right), F\left(1, \frac{1}{2}\right)$

If P is the midpoint of line segment AB, find the coordinates of the missing point.

13. $A(6, 3), P\left(1, -\frac{1}{2}\right)$

14. $B\left(\frac{2}{5}, \frac{1}{10}\right), P\left(\frac{3}{5}, \frac{9}{10}\right)$

15. $A(1, 5), P(3, 7)$

16. $B(2, 11), P(5, 7)$

17. $A(4, -1), B(7, -3)$

18. $P(-2, -1), A(-3, -5)$

Packet #13 Show all work.

What does a fish without eyes look like?

To figure out the joke, cross out the letter that matches the answer to each problem.

Find the distance between the two given points.

1. (3,5) and (6,8)
2. (4,-3) and (-1,0)
3. (5,-4) and (-1,-2)
4. (-2,0) and (0,-4)
5. (-3, -4) and (3,4)
6. (-2,1) and (1,2)

Find the midpoint of each segment with these endpoints.

7. (2,4) and (6,10)
8. (-3,4) and (4,-7)
9. (0,-3) and (5,0)
10. (-7, -3) and (-9,1)

Given the midpoint and one of the endpoints, find the other endpoint of the segment.

11. M(3,2) and E(6,8)
12. M(-3,7) and E(0,2)
13. M(-2,4) and E(5,-5)
14. M(0,0) and E(-2,2)

A	S	T	R	F	A	I	W	E
(0,-4)	$\left(\frac{5}{2},-\frac{3}{2}\right)$	$\sqrt{34}$	(-9,13)	$2\sqrt{2}$	10	(4,7)	$2\sqrt{5}$	$\left(\frac{1}{2},-\frac{3}{2}\right)$

S	C	K	Y	H	U	R	L
$\left(\frac{1}{2},3\right)$	$3\sqrt{2}$	(-6,12)	$\sqrt{10}$	(4,1)	$2\sqrt{10}$	(-8,-1)	(2,-2)

ANSWER: _____

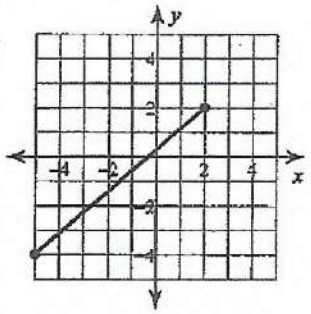
Packet #14
Show all work.

Name_____

Quiz - Distance and Midpoint

Find the distance between each pair of points.

1)



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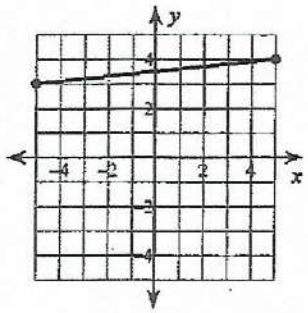

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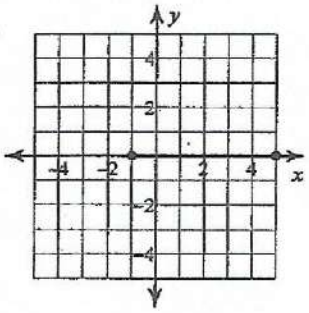

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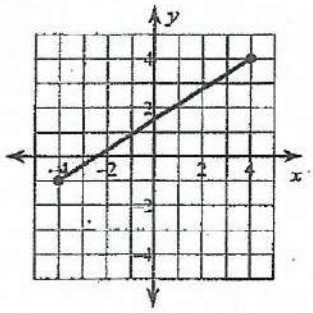


5) (8, –8), (–8, –1)

6) (–6, –4), (6, –2)

7) (–2, 0), (–6, 7)

8) (1, –4), (–8, 6)

9) (4, 0), (–3, 5)

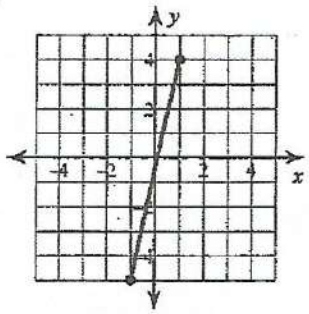
10) (7, 5), (–6, –3)

Packet #15 Show all work.

Quiz-page 2

Find the midpoint of each line segment.

11)



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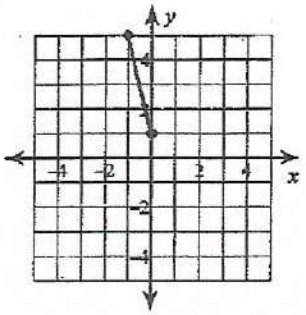

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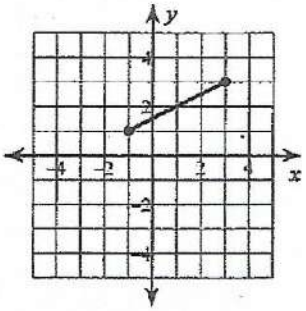

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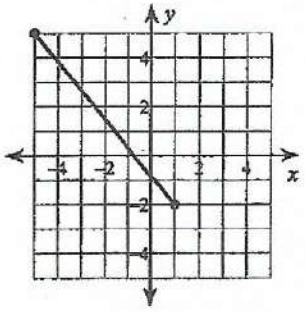


Find the midpoint of the line segment with the given endpoints.

15) (1, –9), (9, 6)

16) (–3, –6), (3, –4)

17) (–9, 9), (3, 9)

18) (4, 8), (–6, –4)

19) (–6, 6), (9, –1)

20) (9, –8), (10, –1)

Packet #16

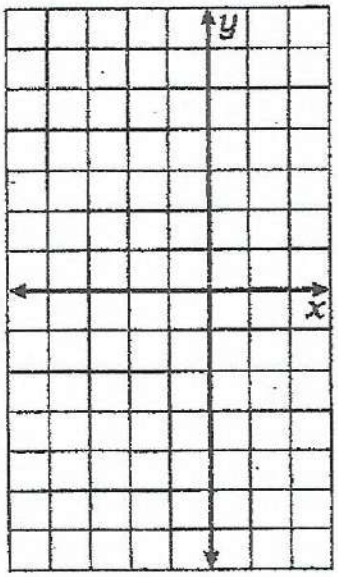
LINEAR to QUADRATIC

Linear function: $y = mx + b$ ➡ **Quadratic function:** $y = ax^2 + bx + c$

1 For a linear function, if $m = 2$ and $b = 4$, then $y =$

a. Complete the table below, then graph this function.

x	y
0	
1	
−3	



b. For your graph, find:
- The slope of the line.
- The y-intercept.
- The x-intercept.

c. Every point in the _____ represents a _____ of the equation.

2 For a quadratic function, if $a = 1$, $b = 2$, and $c = -5$, then $y =$

a. Complete the table below, then graph this function.

x	y
−4	
−3	
−2	
−1	
0	
1	
2	

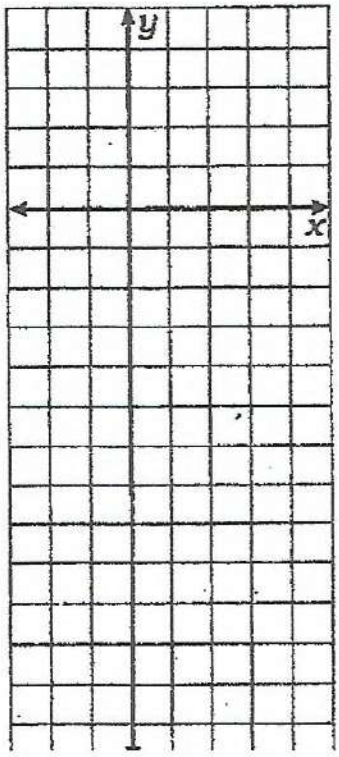
b. If $x = \frac{-b}{2a}$, find x.

c. What is the connection between this value of x and your graph?

3 For a linear function, if $m = \frac{2}{3}$ and $b = -1$, then $y =$

a. Complete the table below, then graph this function.

x	y
0	
3	
−3	



b. For your graph, find:
- The slope of the line.
- The y-intercept.

c. For what value of x does $y = 0$?

4 For a quadratic function, if $a = -2$, $b = 4$, and $c = 3$, then $y =$

a. Complete the table below, then graph this function.

x	y
−2	
−1	
0	
1	
2	
3	
4	

b. *Estimate from the graph:* For what values of x does $y = 0$?