Optional additional practice

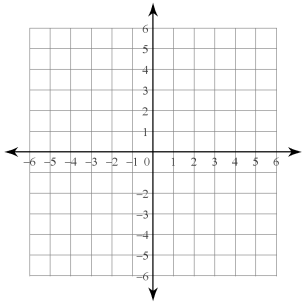
1. Given the points A(-1, 2) and B(7, 8):
   a) find the length of AB
   b) find the midpoint of AB
   c) find the coordinates of the point P on the directed line segment $\overline{AB}$ that partitions $\overline{AB}$ in the ratio 1:3.

2. Given line segment AB, such that A(2, 4) and B(8, 10):
   a) find the length of AB
   b) find the midpoint of AB
   c) Find the coordinates of P so that P partitions $\overline{AB}$ in the ratio 5:1

3. Find the coordinates of P so that P partitions $\overline{AB}$ in the ratio 3:4 with A(-9, -9) and B(5, -2).

4. Find the coordinates of P so that P partitions $\overline{AB}$ in the ratio $\frac{2}{5}$ if A(-8, -2) and B(6, 19).

5. Now we are going to explore if the order in which you to multiple transformations matters.

Translate ΔALT if A(-5,-1), L(-3,-2), T(-3,2) by the rule (x,y)→(x + 3, y + 2), then reflect the image over the y-axis.	Reflect ΔALT if A(-5,-1), L(-3,-2), T(-3,2) over the y-axis, then translate the image by the rule (x,y)→(x + 3, y + 2).
A′ (____,____) L′ (____,____) T′ (____,____)	 Did the order you did the transformations change the final image?
A′ (____,____) L′ (____,____) T′ (____,____)	
Rotate ΔTAB if T(2,3), A(1,1), B(4,-3) 90^o clockwise about the origin, then reflect the image over the line x-axis.	Reflect ΔTAB if T(2,3), A(1,1), and B(4,-3) over the x-axis, then rotate the image 90^o clockwise about the origin.

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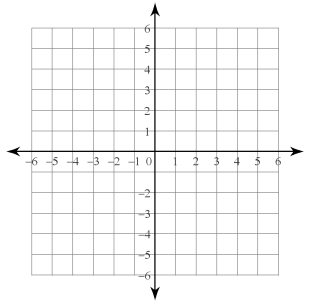
		T′ (____,____) A′ (____,____) B′ (____,____)	 Did the order you did the transformations change the final image?	T′ (____,____) A′ (____,____) B′ (____,____)

6. Show that r follows from p, $p \rightarrow q$ and $(p \wedge q) \rightarrow r$.

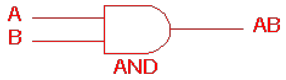
1. p	Given
2. $p \rightarrow q$	Given
3. $(p \wedge q) \rightarrow r$	Given
4.	
5.	
6.	

7. Prove that $\neg r$ follows from $p \wedge s$, $q \rightarrow \neg r$, and $\neg s \vee q$.

1. $p \wedge s$	Given
2. $q \rightarrow \neg r$	Given
3. $\neg s \vee q$	Given
4.	
5.	
6.	
7. $\neg r$	

8. Logic gates

Digital systems are said to be constructed by using logic gates. The basic gates are the AND, OR, NOT gates. Help to describe the basic operations by completing the following truth tables using logic rules.



The AND gate is an electronic circuit that gives a high output (1) only if all its inputs are high. A dot (.) is used to show the AND operation i.e. A.B.

Bear in mind that this dot is sometimes omitted i.e. AB

Z=A.B

Switch realisation of AND:

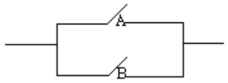
Continuity occurs only when both A AND B are closed.

A	B	A.B
0	0	
0	1	
1	0	
1	1	

The OR gate is an electronic circuit that gives a high output (1) if one or more of its inputs are high. A plus (+) is used to show the OR operation.

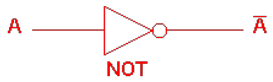
Z=A+B

Switch realisation of OR:



Continuity if A or B or both are closed.

A	B	A+B
0	0	
0	1	
1	0	
1	1	



The NOT gate is an electronic circuit that produces an inverted version of the input at its output. It is also known as an *inverter*. If the input variable is A, the inverted output is known as NOT A. This is also shown as A', or A with a bar over the top, as shown at the outputs.

NOT gate	
A	$\overline{A}$
0	1
1	0

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