

Name _____ Date _____

The Plane!
Modeling Linear Situations

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Vocabulary

Define each term in your own words.

1. first differences
2. solution
3. intersection point

Problem Set

Identify the independent and dependent quantities in each problem situation. Then write a function to represent the problem situation.

1. Nathan is riding his scooter to school at a rate of 6 miles per hour.
The distance Nathan travels depends on the time. Distance, D , is the dependent quantity and time, t , is the independent quantity.
 $D(t) = 6t$
2. Sophia is walking to the mall at a rate of 3 miles per hour.
3. Mario is stuffing envelopes with invitations to the school's Spring Carnival. He stuffs 5 envelopes each minute.

4. Shanise plays on the varsity soccer team. She averages 4 goals per game.

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5. The football booster club sells hot chocolate during the varsity football games. Each cup of hot chocolate costs \$2.

6. The basketball booster club sells t-shirts at the varsity basketball games. Each t-shirt costs \$12.

Use each scenario to complete the table of values and calculate the unit rate of change.

7. Miguel is riding his bike to lacrosse practice at a rate of 7 miles per hour.

	Independent Quantity	Dependent Quantity
Quantity	Time	Distance
Units	hours	miles
Expression	t	$7t$
	0	0
	0.5	3.5
	1	7
	1.5	10.5
	2	14

$(0.5, 3.5)$ and $(1, 7)$

$$\frac{7 - 3.5}{1 - 0.5} = \frac{3.5}{0.5}$$

$$= \frac{7}{1}$$

The unit rate of change is 7.

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8. Jada is walking to school at a rate of 2 miles per hour.

	Independent Quantity	Dependent Quantity
Quantity		
Units		
Expression		
	0.25	
	0.5	
	1	
	1.25	
	1.5	



9. Noah is stuffing envelopes with invitations to the school's Harvest Festival. He stuffs 4 envelopes each minute.

	Independent Quantity	Dependent Quantity
Quantity		
Units		
Expression		
	5	
	10	
	15	
	20	
	25	

10. Terrell plays on the varsity basketball team. He averages 12 points per game.

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	Independent Quantity	Dependent Quantity
Quantity		
Units		
Expression		
	1	
	3	
	5	
	7	
	9	

11. The volleyball boosters sell bags of popcorn during the varsity matches to raise money for new uniforms. Each bag of popcorn costs \$3.

	Independent Quantity	Dependent Quantity
Quantity		
Units		
Expression		
	5	
	10	
	15	
	20	
	25	

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12. The football boosters sell hooded sweatshirts to raise money for new equipment. Each sweatshirt costs \$18.



	Independent Quantity	Dependent Quantity
Quantity		
Units		
Expression		
	5	
	10	
	20	
	30	
	40	

Identify the input value, the output value, and the rate of change for each function.

13. Belinda is making greeting cards. She makes 4 cards per hour. The function $C(t) = 4t$ represents the total number of cards Belinda makes as a function of time.

The input value is t .

The output value is $4t$.

The rate of change is 4.

14. Owen is riding his bike to his friend's house at a rate of 6 miles per hour. The function $D(t) = 6t$ represents the distance Owen rides as a function of time.

15. Rochelle is shopping for earrings. Each pair of earrings costs \$15 dollars. The function $C(e) = 15e$ represents the total cost of the earrings as a function of the number of pairs of earrings Rochelle buys.

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16. Lavon is driving to visit a college campus. He is traveling 65 miles per hour. The function $D(t) = 65t$ represents the total distance he travels as a function of time.

17. Kiana is selling coupon books to raise money for her school. Each coupon book cost \$35. The function $M(b) = 35b$ represents the total amount of money raised as a function of the number of coupon books sold.

18. Cisco mows lawns in his neighborhood to earn money. He earns \$16 for each lawn. The function $A(m) = 16m$ represents the total amount of money earned as a function of the number of lawns mowed.

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Solve each function for the given input value. The function $A(t) = 7t$ represents the total amount of money in dollars Carmen earns babysitting as a function of time in hours.

19. $A(3) = \underline{\hspace{2cm}}$

$$A(3) = 7(3)$$

$$= 21$$

Carmen earns \$21 when she babysits for 3 hours.

20. $A(2) = \underline{\hspace{2cm}}$

21. $A(5) = \underline{\hspace{2cm}}$

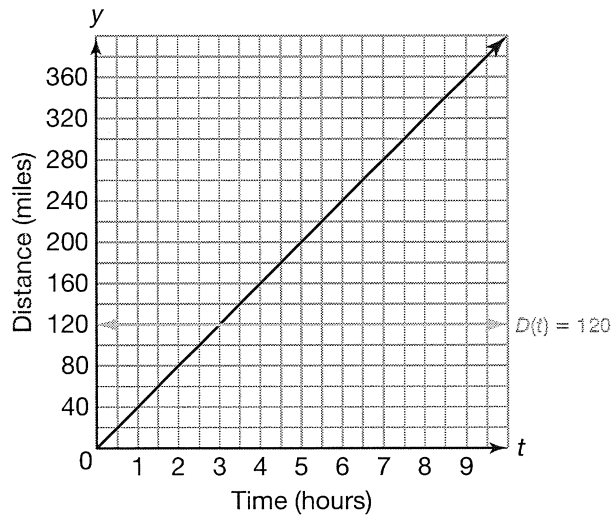
22. $A(4.5) = \underline{\hspace{2cm}}$

23. $A(3.5) = \underline{\hspace{2cm}}$

24. $A(6) = \underline{\hspace{2cm}}$

Use the graph to determine the input value for each given output value. The function $D(t) = 40t$ represents the total distance traveled in miles as a function of time in hours.

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25. $D(t) = 120$
 $t = 3$

26. $D(t) = 320$

27. $D(t) = 240$

28. $D(t) = 160$

29. $D(t) = 80$

30. $D(t) = 400$