



The graph shows the total cost of renting a car from two different companies.

What is the same about each company?

Slope

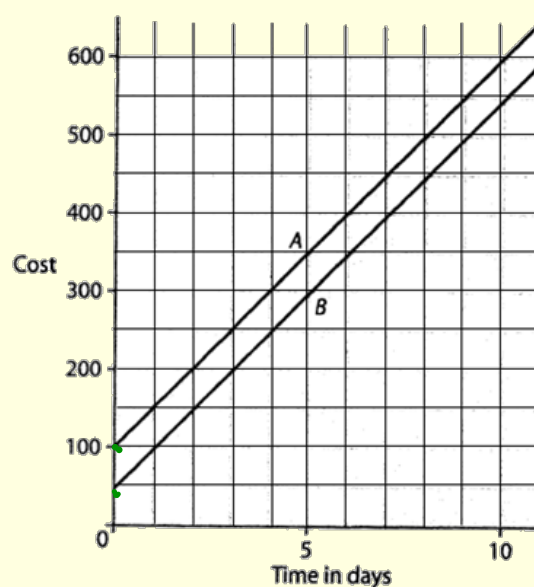
What is different?

Starting point (y-int)

Write an equation for the total cost of each company:

Company A total cost:  $y = 50x + 100$

Company B total cost:  $y = 50x + 50$



Are these lines parallel?  $y = \frac{1}{4}x + 1$   $\rightarrow m = \frac{1}{4}$   
 $2x - 8y + 3 = 0$

$\frac{2x}{8} + \frac{3}{8} = \frac{y}{1}$   $\rightarrow m = \frac{1}{4}$  **Yes!**

Are these lines parallel?  $y - 3 = 2x$   
 $2y - 5 = 3x$

$y = 2x + 3$   $\rightarrow 2y = \frac{3x}{2} + \frac{5}{2}$

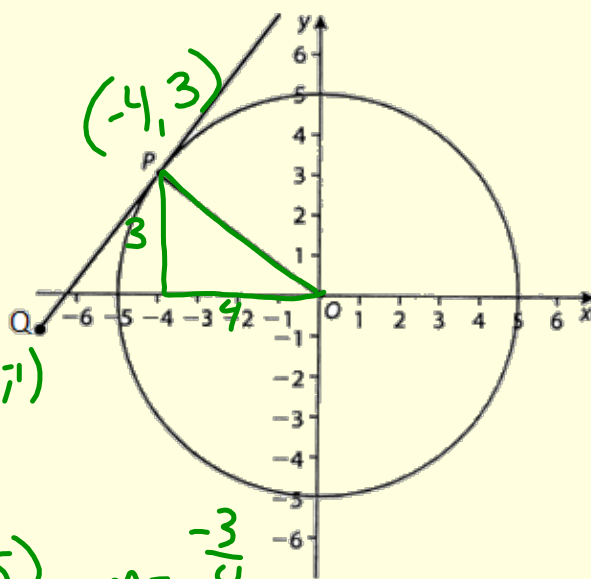
$m = 2$   $y = \frac{3}{2}x + \frac{5}{2}$   
 $m = \frac{3}{2}$  **No!**

A circle is drawn with  $[OP]$  as a radius of the circle. Another line is drawn such that it touches the circle exactly once at  $P$  and makes a  $90^\circ$  angle with  $[OP]$ .

$(6, 0)$   $(-4, 3)$

$$\left( \frac{0 + (-4)}{2}, \frac{0 + 3}{2} \right)$$

$(-2, 1.5)$



- Find the length of  $[OP]$ .  $5$
- Find the midpoint of  $[OP]$ .  $(-2, 1.5)$
- Find the gradient of the line through  $[OP]$ .  $m = \frac{-3}{4}$
- Find the gradient of the line that is at a  $90^\circ$  angle with  $[OP]$ .
- What do you notice about the two gradients?

$$\frac{-1 \cdot 3}{-7 \cdot 4} = \frac{4}{3}$$

Opposite reciprocals.

Are these lines perpendicular?  $y = -3x - 2$   $\rightarrow m = -\frac{3}{1}$   
 $x - 3y = -12$

$\frac{-3y}{-3} = \frac{-x - 12}{-3}$

$y = \frac{1}{3}x + 4$   $m = \frac{1}{3}$

yes!

Are these lines perpendicular?  $y + 5x = 0$   
 $10x + 2y = 3$

$y = -5x$   $m = -5$

$\frac{2y}{2} = \frac{-10x + 3}{2}$

$y = -5x + \frac{3}{2}$   $m = -5$

No!  
 (parallel)

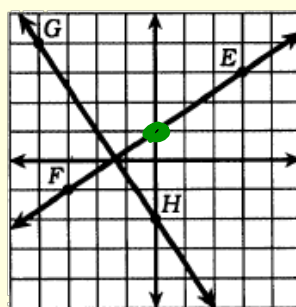
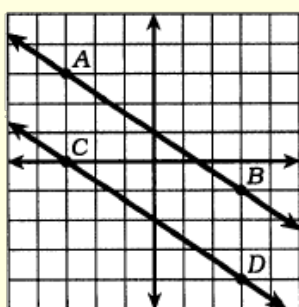
Part 1. Write the equation of the line indicated.

U Equation of  $\overleftrightarrow{AB}$

O Equation of  $\overleftrightarrow{CD}$

I Equation of  $\overleftrightarrow{EF}$

S Equation of  $\overleftrightarrow{GH}$



Part 1 Answers

11  $y = \frac{2}{3}x + 1$

17  $y = -\frac{2}{3}x + 1$

24  $y = -\frac{3}{2}x - 2$

20  $y = -\frac{3}{2}x + 1$

2  $y = -\frac{2}{3}x - 2$

$$b = 1$$

$$m = \frac{2}{3}$$

$$y = \frac{2}{3}x + 1$$

Part 2. Write the slope of a line parallel to the given line.

T  $y = \frac{7}{4}x - 2$

U  $y = 8 - 3x$

O  $-5x + y = 12$

A  $4x + 7y = 21$

18  $\frac{12}{5}$

8  $\frac{7}{4}$

10  $-\frac{7}{4}$

6 5

21  $-\frac{4}{7}$

26 -3

Part 2 Answers

$$\frac{7y}{7} = \frac{-4x}{7} + \frac{21}{7}$$

$$y = \left(\frac{-4}{7}\right)x + 3$$

Part 4. Write an equation for the line that is parallel to the given line and that contains the given point.

Part 4 Answers

W  $y = 3x - 4$ ; (2, 7)  $m = 3$

1  $y = -4x + 1$

18  $y = \frac{5}{3}x - 3$

Y  $y = -\frac{1}{2}x + 5$ ; (4, -5)

12  $y = -\frac{1}{2}x - 1$

10  $y = 3x + 1$

C  $4x + y = -9$ ; (-2, 9)

9  $y = -x + 2$

19  $y = -4x - 7$

R  $-5x + 3y = 6$ ; (-3, -8)

15  $y = -\frac{1}{2}x - 3$

27  $y = -x - 4$

P  $x + y = 7$ ; (-4, 0)

7  $y = 3x - 2$

14  $y = \frac{5}{3}x - 8$

1 2 3 4  
C O M E

6 7 8  
O U T

10 11 12 13  
W I T H

15 16 17 18  
Y O U R

20 21 22 23 24  
P A N T S

26 27  
U P

$$y - 7 = 3(x - 2)$$

$$\begin{array}{r} y - 7 = 3x - 6 \\ \quad \quad \quad + 7 \\ \hline \end{array}$$

$$y = 3x + 1$$



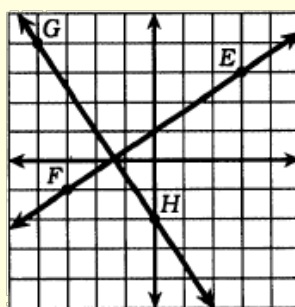
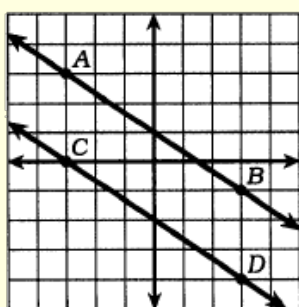
**Part 1. Write the equation of the line indicated.**

**U** Equation of  $\overleftrightarrow{AB}$

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**Part 1 Answers**

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**2**  $y = -\frac{2}{3}x - 2$

Part 3. Write the slope of a line perpendicular to the given line.

E  $y = -\frac{5}{4}x + 1$

H  $y = 6x + 11$

O  $2x + 5y = 40$

T  $8x - 3y = 15$

3  $\frac{5}{4}$

23  $-\frac{3}{8}$

16  $\frac{5}{2}$

4  $\frac{4}{5}$

15  $-\frac{8}{3}$

Part 3 Answers

13  $-\frac{1}{6}$

$$m = 6$$

$$m = -\frac{1}{6}$$

Part 5. Write an equation for the line that is perpendicular to the given line and that contains the given point.

U  $y = -\frac{1}{3}x + 4; (2, 5)$

T  $y = \frac{2}{5}x - 3; (2, -3)$

P  $y = \frac{x}{4} + 15; (-3, 7)$

M  $3x + 2y = -10; (-9, -2)$

N  $5x - y = 16; (0, 0)$

14  $y = -\frac{5}{2}x + 7$

20  $y = -4x - 5$

9  $y = -\frac{1}{5}x + 5$

19  $y = -4x - 3$

22  $y = -\frac{1}{5}x$

Part 5 Answers  
3  $y = \frac{2}{3}x + 4$

25  $y = 3x - 5$

12  $y = -\frac{5}{2}x + 2$

7  $y = 3x - 1$

5  $y = \frac{2}{3}x + 6$

$$5x - y = 16$$

$$y = \frac{-5x + 16}{-1}$$

$$y = \boxed{5}x - 16$$

$$m = -\frac{1}{5} \quad (0, 0)$$

$$y - 0 = -\frac{1}{5}(x - 0)$$

$$y = -\frac{1}{5}x$$

**Homework:**

pages 95-100 3E (5-6), 3F (5-8)