Name _____ Date _____

LESSON 3.4

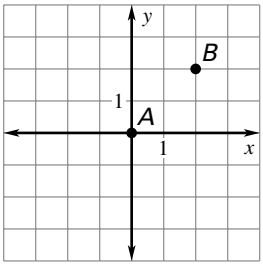
LESSON 3.4

Practice A

For use with pages 177–185

Find the slope of the line that passes through the points.

1.



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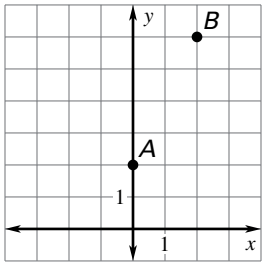

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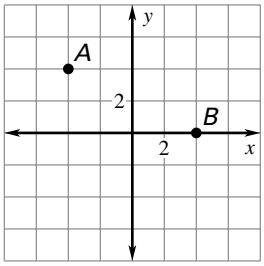
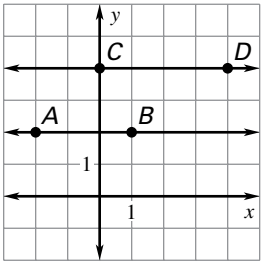


Find the slope of each line. Are the lines parallel?

4.



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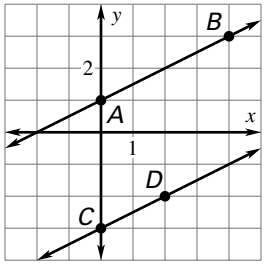

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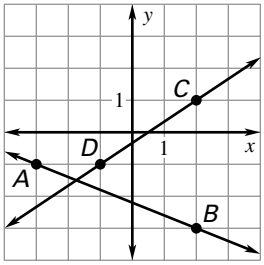
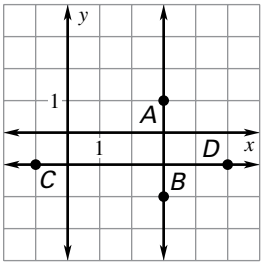


Find the slope of each line. Are the lines perpendicular?

7.



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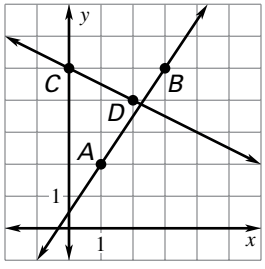

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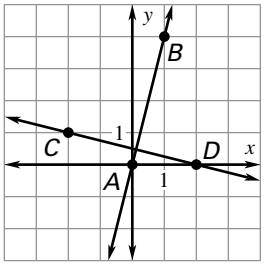


Tell whether the lines through the given points are *parallel*, *perpendicular*, or *neither*.

10. Line 1: (−1, 3), (−1, 5)
Line 2: (0, 0), (0, 6)

11. Line 1: (1, 1), (3, 3)
Line 2: (2, 2), (0, 4)

12. Line 1: (−5, 2), (−3, 5)
Line 2: (−2, 2), (1, 0)

13. Line 1: (−2, 3), (−5, 2)
Line 2: (4, 1), (5, 3)

14. Line 1: (−3, −2), (1, 2)
Line 2: (1, 3), (4, 6)

15. Line 1: (−3, 4), (1, 2)
Line 2: (6, 2), (8, 1)

Quadrilateral *ABCD* has the given vertices. Find the slopes of the sides and the lengths of the sides. What can you prove about quadrilateral *ABCD*?

16. $A(3, 5), B(4, 2), C(1, 1), D(0, 4)$

17. $A(1, 3), B(2, 5), C(5, 3), D(4, 1)$

18. $A(3, 6), B(6, 5), C(5, 1), D(2, 2)$

19. $A(-1, 1), B(1, 3), C(3, 1), D(1, -1)$

Name _____ Date _____

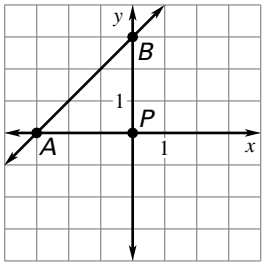
LESSON 3.4

Practice A *continued*

For use with pages 177–185

Graph the line parallel to line *AB* that passes through point *P*.

20.



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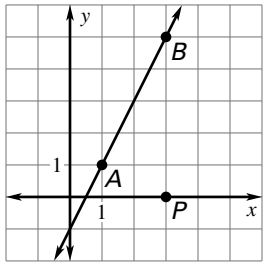
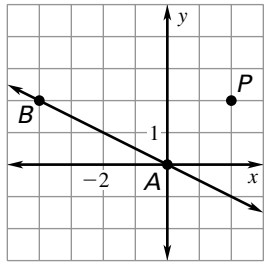
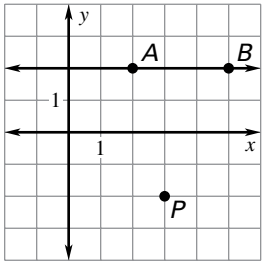


22.



Graph the line perpendicular to line *AB* that passes through point *P*.

23.



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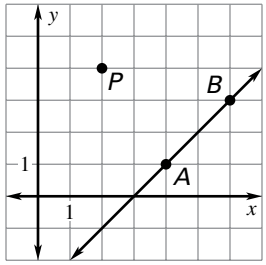

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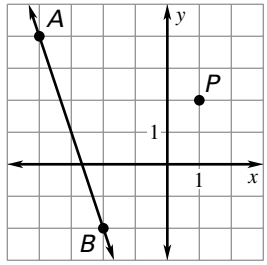


In Exercises 26 and 27, consider the three given lines.

Line *a*: through the point (2, 0) with a *y*-intercept of (0, 2)

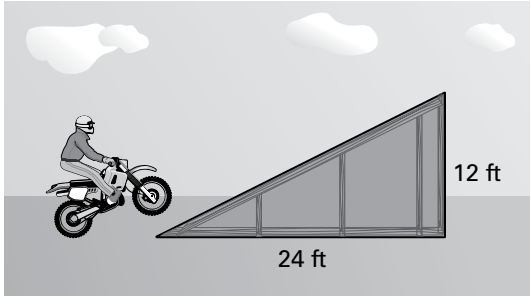
Line *b*: through the point (2, 0) with a *y*-intercept of (0, 4)

Line *c*: through the point (2, 0) with a *y*-intercept of (0, 6)

26. Which line is most steep?

27. Which line is least steep?

28. **Motocross Ramp** A motocross ramp is 12 feet tall and 24 feet long.



a. What is the slope of the ramp?

b. If the motocross ramp was 16 feet tall, would the ramp be more steep or less steep than the 12-foot tall ramp?

Lesson 3.3, continued

5.

Statements	Reasons
1. $j \parallel k, \angle 1 \cong \angle 2$	**1.** Given
2. $\angle 1 \cong \angle 4$	**2.** Vertical Angles Theorem
3. $\angle 4 \cong \angle 5$	**3.** Alternate Interior Angles Theoerem
4. $\angle 5 \cong \angle 3$	**4.** Vertical Angles Theorem
5. $\angle 1 \cong \angle 5$	**5.** Transitive Property of Congruence
6. $\angle 1 \cong \angle 3$	**6.** Transitive Property of Congruence
7. $\angle 2 \cong \angle 3$	**7.** Transitive Property of Congruence
8. $s \parallel r$	**8.** Corresponding Angles Converse

6.

Statements	Reasons
1. $\overrightarrow{CA} \parallel \overrightarrow{ED}$, $m\angle FED = 45°$	**1.** Given
2. $\angle ABE$ and $\angle DEB$ are supplementary.	**2.** Consecutive Interior Angles Theorem
3. $m\angle ABE + m\angle DEB = 180°$	**3.** Definition of supp. angles
4. $m\angle ABE + 45° = 180°$	**4.** Substitution Property of Equality
5. $m\angle ABE = 135°$	**5.** Subtraction Property of Equality
6. $m\angle FBC = 135°$	**6.** Vertical Angles Theorem
7. $m\angle GCA = 45°$	**7.** Given
8. $135° + 45° = 180°$	**8.** Addition
9. $m\angle FBC + m\angle GCA = 180°$	**9.** Substitution Property of Equality
10. $\angle FBC$ and $\angle GCA$ are supplementary.	**10.** Definition of supp. angles
11. $\overrightarrow{EF} \parallel \overrightarrow{CG}$	**11.** Consecutive Interior Angles Converse

7.

Statements	Reasons
1. $\overrightarrow{CB}$ bisects $\angle ACE$, $\overrightarrow{JF}$ bisects $\angle AJH$.	**1.** Given
2. $\angle 1 \cong \angle 2, \angle 3 \cong \angle 4$	**2.** Def. of angle bisector
3. $\overline{DE} \parallel \overline{GH}$	**3.** Given
4. $\angle ACE \cong \angle AJH$	**4.** Corr. Angles Postulate
5. $m\angle ACE = m\angle AJH$	**5.** Def. of congruent angles
6. $m\angle ACE = m\angle 1 + m\angle 2$, $m\angle AJH = m\angle 3 + m\angle 4$	**6.** Angle Addition Postulate
7. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	**7.** Substitution Prop. of Equality
8. $m\angle 1 = m\angle 2$, $m\angle 3 = m\angle 4$	**8.** Def. of congruent angles
9. $m\angle 1 + m\angle 1 = m\angle 3 + m\angle 3$	**9.** Substitution Prop of Equality
10. $2m\angle 1 = 2m\angle 3$	**10.** Addition
11. $m\angle 1 = m\angle 3$	**11.** Division Prop. of Equality
12. $\angle 1 \cong \angle 3$	**12.** Def. of congruent angles
13. $\overrightarrow{CB} \parallel \overrightarrow{JF}$	**13.** Corr. Angles Converse

Lesson 3.4

Practice Level A

1. 1 **2.** 2 **3.** $-\frac{1}{2}$ **4.** $m_{\overleftrightarrow{AB}} = 0, m_{\overleftrightarrow{CD}} = 0$; yes

5. $m_{\overleftrightarrow{AB}} = \frac{1}{2}, m_{\overleftrightarrow{CD}} = \frac{1}{2}$; yes

6. $m_{\overleftrightarrow{AB}} = -\frac{2}{5}, m_{\overleftrightarrow{CD}} = \frac{2}{3}$; no

7. $m_{\overleftrightarrow{AB}}$ = undefined, $m_{\overleftrightarrow{CD}} = 0$; yes

8. $m_{\overleftrightarrow{AB}} = \frac{3}{2}, m_{\overleftrightarrow{CD}} = -\frac{1}{2}$; no

9. $m_{\overleftrightarrow{AB}} = 4, m_{\overleftrightarrow{CD}} = -\frac{1}{4}$; yes

10. parallel **11.** perpendicular

12. perpendicular **13.** neither **14.** parallel

15. parallel

16. slope of $\overline{AB} = -3$, slope of $\overline{BC} = \frac{1}{3}$, slope of $\overline{CD} = -3$, slope of $\overline{DA} = \frac{1}{3}$; $AB = BC = CD = DA = \sqrt{10}$; $ABCD$ is a square.

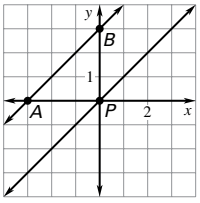
Lesson 3.4, continued

17. slope of $\overline{AB} = 2$, slope of $\overline{BC} = -\frac{2}{3}$, slope of $\overline{CD} = 2$, slope of $\overline{DA} = -\frac{2}{3}$; $AB = CD = \sqrt{5}$; $BC = DA = \sqrt{13}$; $ABCD$ has two pairs of parallel congruent sides, but it has no right angles. So, $ABCD$ is a parallelogram, but not a rectangle.

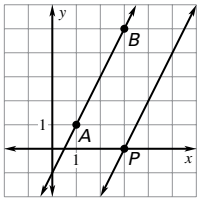
18. slope of $\overline{AB} = -\frac{1}{3}$, slope of $\overline{BC} = 4$, slope of $\overline{CD} = -\frac{1}{3}$, slope of $\overline{DA} = 4$; $AB = CD = \sqrt{10}$; $BC = DA = \sqrt{17}$; $ABCD$ has two pairs of parallel congruent sides, but it has no right angles. So, $ABCD$ is a parallelogram, but not a rectangle.

19. slope of $\overline{AB} = 1$, slope of $\overline{BC} = -1$, slope of $\overline{CD} = 1$, slope of $\overline{DA} = -1$; $AB = BC = CD = DA = 2\sqrt{2}$; $ABCD$ is a square.

20.



21.



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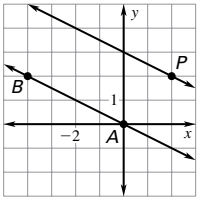

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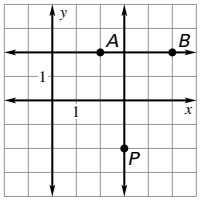

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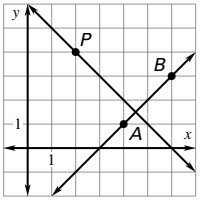

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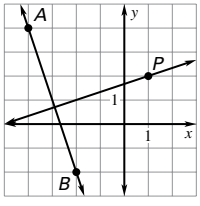


26. line c **27.** line a **28. a.** $\frac{1}{2}$ **b.** more steep

Practice Level B

1. 3 **2.** $-\frac{2}{5}$ **3.** 0 **4.** $m_{\overleftrightarrow{AB}} = \frac{3}{2}$, $m_{\overleftrightarrow{CD}} = \frac{3}{2}$; yes

5. $m_{\overleftrightarrow{AB}} = 1$, $m_{\overleftrightarrow{CD}} = \frac{2}{3}$; no

6. $m_{\overleftrightarrow{AB}} = -\frac{1}{2}$, $m_{\overleftrightarrow{CD}} = -\frac{1}{2}$; yes

7. $m_{\overleftrightarrow{AB}} = 2$, $m_{\overleftrightarrow{CD}} = -\frac{1}{2}$; yes

8. $m_{\overleftrightarrow{AB}} = 3$, $m_{\overleftrightarrow{CD}} = -\frac{1}{3}$; yes

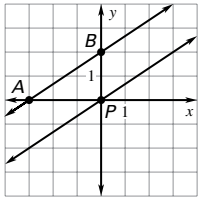
9. $m_{\overleftrightarrow{AB}} = \frac{3}{2}$, $m_{\overleftrightarrow{CD}} = -\frac{3}{2}$; no

10. parallel **11.** neither **12.** perpendicular

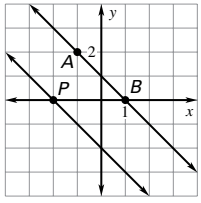
13. slope of $\overline{AB} = -\frac{1}{3}$, slope of $\overline{BC} = 4$, slope of $\overline{CD} = -\frac{1}{3}$, slope of $\overline{DA} = 4$; $AB = CD = \sqrt{10}$; $BC = DA = \sqrt{17}$; $ABCD$ has two pairs of parallel congruent sides, but it has no right angles. So, $ABCD$ is a parallelogram, but not a rectangle.

14. slope of $\overline{AB} = 1$, slope of $\overline{BC} = -1$, slope of $\overline{CD} = 1$, slope of $\overline{DA} = -1$; $AB = BC = CD = DA = 2\sqrt{2}$; $ABCD$ is a square.

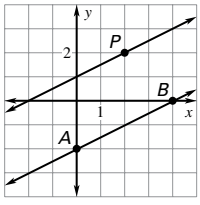
15.



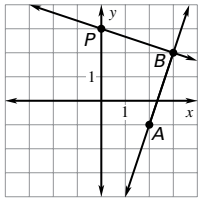
16.



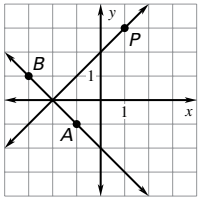
17.



18.



19.



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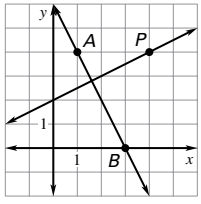

21. line b **22.** line a

23. $m_{\overleftrightarrow{AB}} = \frac{3}{2}$, $m_{\overleftrightarrow{CD}} = \frac{3}{2}$, $m_{\overleftrightarrow{BC}} = 0$, $m_{\overleftrightarrow{AD}} = 0$; The opposite sides of the figure are parallel because they have the same slope. **24.** 60 feet

Practice Level C

1. $\frac{1}{2}$ **2.** $-\frac{4}{5}$ **3.** $-\frac{9}{4}$ **4.** $m_{\overleftrightarrow{AB}} = \frac{1}{4}$, $m_{\overleftrightarrow{CD}} = \frac{1}{4}$; yes

5. $m_{\overleftrightarrow{AB}} = -\frac{2}{5}$, $m_{\overleftrightarrow{CD}} = -\frac{1}{2}$; no

6. $m_{\overleftrightarrow{AB}} = -4$, $m_{\overleftrightarrow{CD}} = -4$; yes

7. $m_{\overleftrightarrow{AB}} = -\frac{3}{4}$, $m_{\overleftrightarrow{CD}} = 1$; no

8. $m_{\overleftrightarrow{AB}} = 2$, $m_{\overleftrightarrow{CD}} = -\frac{1}{2}$; yes

9. $m_{\overleftrightarrow{AB}} = \frac{2}{7}$, $m_{\overleftrightarrow{CD}} = -\frac{7}{2}$; yes **10.** neither

11. parallel **12.** perpendicular **13.** parallel

14. perpendicular **15.** parallel