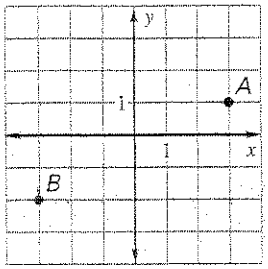
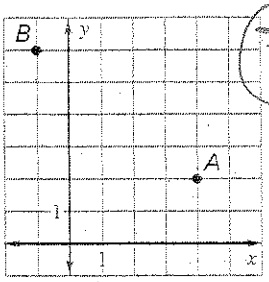
Adv. Geometry 3.4 Name Key

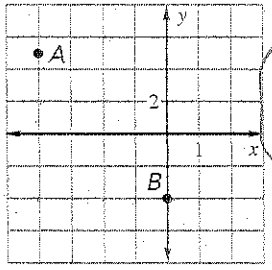
Find the slope of the line that passes through the points.

1. 

$\frac{3}{6}$ ($\frac{1}{2}$)

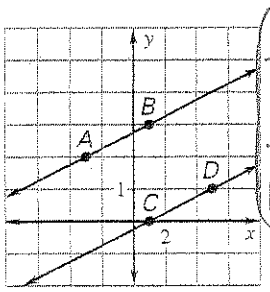
2. 

$\frac{-4}{5}$

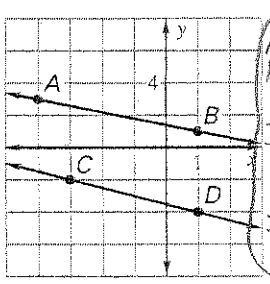
3. 

$\frac{-9}{4}$

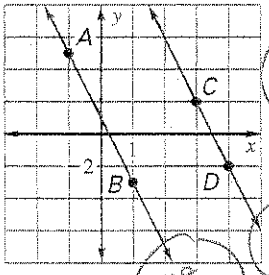
Find the slope of each line. Are the lines parallel?

4. 

$\frac{1}{4}$ $\frac{1}{4}$ Parallel

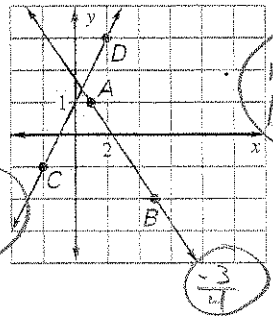
5. 

Not Parallel $\frac{-2}{5}$ $\frac{-2}{4}$

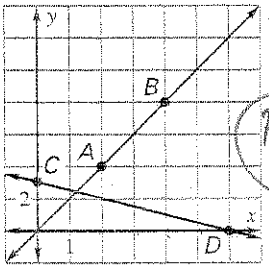
6. 

Parallel $\frac{-4}{1}$ $\frac{-8}{2}$

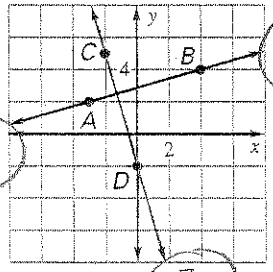
Find the slope of each line. Are the lines perpendicular?

7. 

not Perpendicular $-\frac{4}{4}$ $\frac{-3}{4}$

8. 

$\frac{4}{2}=2$ Perpendicular $\frac{-3}{6}=\frac{-1}{2}$

9. 

$\frac{2}{7}$ Perpendicular $\frac{-7}{2}$

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

10. Line 1: (−5, 6), (−2, 2) $\frac{-4}{3}$
Line 2: (4, 2), (7, 6) $\frac{2}{3}$
Neither

11. Line 1: (1, 1), (7, 2) $\frac{1}{6}$
Line 2: (−2, 5), (4, 6) $\frac{1}{6}$
Parallel

12. Line 1: (−4, 8), (6, 2) $\frac{-6}{10}$
Line 2: (−4, 1), (−1, 6) $\frac{5}{3}$
Perpendicular

13. Line 1: (−7, −4), (5, 7) $\frac{11}{12}$
Line 2: (2, 3), (14, 14) $\frac{11}{12}$
Parallel

14. Line 1: (−3, −3), (6, 3) $\frac{6}{11}$
Line 2: (1, 9), (7, −2) $\frac{-11}{6}$
Perpendicular

15. Line 1: (−3, 2), (2, 12) $\frac{10}{5}$
Line 2: (0, 8), (4, 16) $\frac{8}{4}$
Parallel

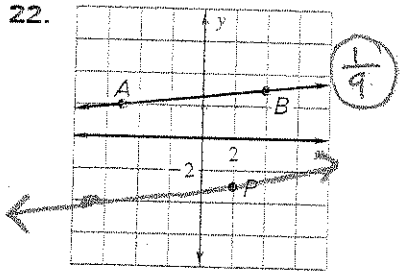
Tell which line through the given points is steeper.

16. Line 1: (2, 14), (11, 23) $\frac{9}{9}=1$
Line 2: (4, 2), (13, 12) $\frac{10}{9}=1\frac{1}{9}$

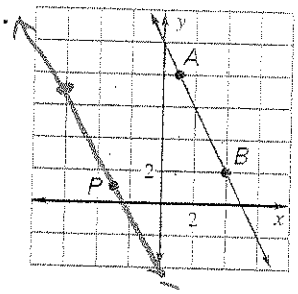
17. Line 1: (−10, −3), (2, 12) $\frac{15}{12}$
Line 2: (1, −5), (7, 0) $\frac{5}{6}$

18. Line 1: (−12, 11), (3, −5) $\frac{-16}{15}$
Line 2: (−2, 9), (4, 13) $\frac{4}{6}=\frac{2}{3}$

Graph the line parallel to line *AB* that passes through point *P*, and give its slope.

22. 

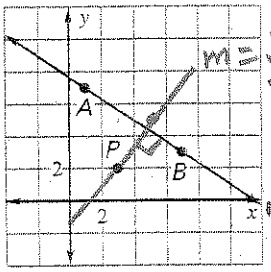
$\frac{1}{9}$

23. 

$m=\frac{-6}{3}=-2$

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

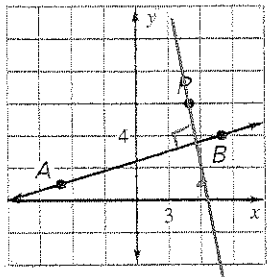
25.



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

$m = -\frac{4}{6} = -\frac{2}{3}$

26.



$m = \frac{3}{15} = \frac{1}{5}$

$m = -5$

(28) $\frac{y-2}{5-2} = 3$

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

$y-2 = 9$

$y = 11$

Find the unknown coordinate so the line through the points has the given slope.

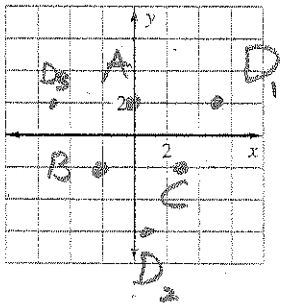
28. $(5, y)$, $(2, 2)$; slope $= 3$ $y = 11$

29. $(-1, 1)$, $(5, y)$; slope $= \frac{1}{2}$ $\frac{1-y}{-1-5} = \frac{1}{2}$ $\frac{1-y}{-6} = \frac{1}{2}$ → $1-y = -3$ $4 = y$

31. Population The population of a small town was 32,150 in 1990. A census in 2002 showed that the population was 22,550. Find the average rate of change in population per year from 1990 to 2002. $\frac{22550-32150}{2002-1990} = \frac{-9600}{12} = -800$

In Exercises 32 and 33, use the following information.

A parallelogram is a four-sided figure whose opposite sides are parallel. Given: $A(0, 2)$, $B(-2, -2)$, and $C(3, -2)$



32. Plot and label the three points.

33. Determine the coordinates of point D so that the points are the vertices of a parallelogram. There is more than one location.

$D_1(5, 2)$

$D_2(1, -6)$ $D_3(-5, 2)$

3. Is it possible for two lines with positive slopes to be perpendicular to each other? *Explain* your reasoning. NO, Perpendicular lines have slopes that are going to have opposite signs $(+)(-) = -$

5. Find the value of k if the line through the points $(2k + 1, -4)$ and $(5, 3 - k)$ is parallel to the line through the points $(-4, -9)$ and $(2, -3)$. $m = \frac{-6}{-6} = 1$ $\frac{-4-3+k}{2k+1-5} = 1$ → $\frac{-7+k}{2k-4} = 1$ $-7+k = 2k-4$ $-3 = k$

6. Find the value of k if the line through the points $(10 - k, k)$ and $(k + 4, 5k + 1)$ is perpendicular to the line through the points $(-1.5, -0.5)$ and $(7, 6)$.

$m = \frac{-.5-6}{-2.5-7} = \frac{-\frac{13}{2}}{-\frac{17}{2}} = \frac{13}{17}$ $\frac{k-(5k+1)}{(10-k)-(k+4)} = -\frac{17}{13}$ → $-52k-13 = 34k-102$

$\frac{-4k-1}{-2k+6} = -\frac{17}{13}$ $89 = 86k$ $k = \frac{89}{86}$

8. Let $A(4, 2)$, $B(-4, -2)$, and $C(x, y)$ be three points in the coordinate plane.

a. Find the slopes of $\overline{AC}$ and $\overline{BC}$.

b. Suppose $\overline{AC} \perp \overline{BC}$. Write and simplify an equation involving x and y.

c. Describe the set of points C such that $\overline{AC} \perp \overline{BC}$.

a) $m_{AC} = \frac{y-2}{x-4}$ $m_{BC} = \frac{y+2}{x+4}$

b) $m_{\perp AC} = -\frac{x+4}{y-2}$ = → $\frac{-x+4}{y-2} = \frac{y+2}{x+4}$

$(-x+4)(x+4) = (y-2)(y+2)$

$-x^2+16 = y^2-4$ $x^2+y^2=20$

c) The points on a circle centered @ the origin w/ radius $\sqrt{20}$