Parallel lines have the same slope
Perpendicular lines have negative reciprocal slopes
flip it and negate it

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Geometry

Parallel and Perpendicular Slopes

What is the slope of the line:

1. Parallel to $y = 3x - 6$?

$m\| = 3$

2. Perpendicular to $y = 3x - 6$?

$m\perp = -\frac{1}{3}$

3. Parallel to $y = -2x + 1$?

$m\| = -2$

4. Perpendicular to $y = -2x + 1$?

$m\perp = \frac{1}{2}$

5. Parallel to $y = -\frac{2}{3}x - 7$?

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

6. Perpendicular to $y = -\frac{2}{3}x - 7$?

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

7. Parallel to $y = \frac{1}{4}x + 3$?

$m\| = \frac{1}{4}$

8. Perpendicular to $y = \frac{1}{4}x + 3$?

$m\perp = -4$

9. Parallel to $2x + 3y = 12$?

$-2x \quad -2x$

$\frac{3y}{3} = \frac{-2x+12}{3}$

$y = -\frac{2}{3}x + 4$

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

10. Perpendicular to $2x + 3y = 12$?

$y = -\frac{2}{3}x + 4 \quad m\perp = \frac{3}{2}$

11. Parallel to $-2x + 5y = 15$?

$+2x \quad +2x$

$\frac{5y}{5} = \frac{2x+15}{5}$

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

$m\| = \frac{2}{5}$

12. Perpendicular to $-2x + 5y = 15$?

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

negative reciprocal slopes

13. What is the slope of a line perpendicular to the line whose equation is $y = -\frac{2}{3}x - 5$?

1) $-\frac{3}{2}$

2) $-\frac{2}{3}$

3) $\frac{2}{3}$

4) $\frac{3}{2}$

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

negative reciprocal slopes

14. What is the slope of a line perpendicular to the line whose equation is $y = 3x + 4$?

1) $\frac{1}{3}$

2) $-\frac{1}{3}$

3) 3

4) -3

$m\perp = -\frac{1}{3}$

same slope

15. What is the slope of a line parallel to the line whose equation is $\frac{2y}{2} = \frac{-6x+8}{2}$?

1) -3

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

3) $\frac{1}{3}$

4) -6

$y = -3x + 4$

$m\parallel = -3$

same slope

16. What is the slope of a line that is parallel to the line whose equation is $3x + 4y = 12$?

1) $\frac{3}{4}$

2) $-\frac{3}{4}$

3) $\frac{4}{3}$

4) $-\frac{4}{3}$

$-3x \quad -3x$

$\frac{4y}{4} = \frac{-3x+12}{4}$

$y = -\frac{3}{4}x + 3$

$m\parallel = -\frac{3}{4}$

negative reciprocal slopes

17. What is the slope of a line perpendicular to the line whose equation is $5x + 3y = 8$?

1) $\frac{5}{3}$

2) $\frac{3}{5}$

3) $-\frac{3}{5}$

4) $-\frac{5}{3}$

$-5x \quad -5x$

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

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

$m\perp = \frac{3}{5}$

Same slope

18. What is the equation of a line that is parallel to the line whose equation is $y = 3x - 1$?

1) $y = -\frac{1}{3}x + 2$
3) $y = -3x + 6$
4) $y = 3x + 4$

$m\parallel = 3$

negative reciprocal slopes

19. What is the equation of a line that is perpendicular to the line whose equation is $y = \frac{1}{2}x + 4$?

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

$m\perp = -2$

negative reciprocal slopes

20. What is the equation of a line that is perpendicular to the line whose equation is $2x + 3y = 6$?

1) $y = -\frac{3}{2}x - 2$
2) $y = \frac{3}{2}x - 5$
3) $y = -\frac{2}{3}x + 7$
4) $y = \frac{2}{3}x + 1$

$-2x \quad -2x$

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

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

Same slope

21. What is the equation of a line that is parallel to the line whose equation is $4x - 3y = 9$?

1) $y = -\frac{3}{4}x + 1$
2) $y = \frac{3}{4}x - 8$
3) $y = -\frac{4}{3}x + 6$
4) $y = \frac{4}{3}x - 7$

$-4x \quad -4x$

$\frac{-3y}{-3} = \frac{-4x + 9}{-3}$

$y = \frac{4}{3}x - 3$

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

$m\parallel = \frac{4}{3}$

Same slope

22. What is the equation of a line that is parallel to the line whose equation is $y = 1x + 2$?

1) $x + y = 5$
2) $2x + y = -2$
3) $y - x = -1$
4) $y - 2x = 3$

$y - x = -1$

$+x \quad +x$

$y = 1x - 1$

$m\parallel = 1$

negative reciprocal slopes

23. Which equation represents a line perpendicular to the line whose equation is $2x + 3y = 12$?

1) $6y = -4x + 12$
2) $\frac{2y}{2} = \frac{3x + 6}{2}$
3) $2y = -3x + 6$
4) $3y = -2x + 12$

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

$-2x \quad -2x$

$\frac{3y}{3} = \frac{-2x + 12}{3}$

$y = \frac{-2}{3}x + 4$

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

Same slope

24. Which equation represents a line parallel to the line whose equation is $2y - 5x = 10$?

1) $5y - 2x = 25$
2) $5y + 2x = 10$
3) $4y - 10x = 12$
4) $2y + 10x = 8$

$+5x \quad +5x$

$\frac{2y}{2} = \frac{5x + 10}{2}$

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

$m\parallel = \frac{5}{2}$

$4y - 10x = 12$

$+10x \quad +10x$

$\frac{4y}{4} = \frac{10x + 12}{4}$

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

25. The lines $4x+2y=8$ and $y+2x=4$ are

1) parallel
2) perpendicular
3) the same line
4) neither parallel nor perpendicular

$4x+2y=8$ → $-4x \quad -4x$ → $\frac{2y}{2}=\frac{-4x+8}{2}$ → $y=-2x+4$

$y+2x=4$ → $-2x \quad -2x$ → $y=-2x+4$

26. The lines $-3y=x+9$ and $y+2=-\frac{1}{3}x$ are

1) parallel
2) perpendicular
3) the same line
4) neither parallel nor perpendicular

$\frac{-3y}{-3}=\frac{1x+9}{-3}$ → $y=-\frac{1}{3}x-3$

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

same slope

27. The lines $2x+4y=12$ and $4x-2y=12$ are

1) parallel
2) perpendicular
3) the same line
4) neither parallel nor perpendicular

$2x+4y=12$ → $-2x \quad -2x$ → $\frac{4y}{4}=\frac{-2x+12}{4}$ → $y=-\frac{1}{2}x+3$

$4x-2y=12$ → $-4x \quad -4x$ → $\frac{-2y}{-2}=\frac{-4x+12}{-2}$ → $y=2x-6$

negative reciprocal slopes

28. The lines $3y+1=6x+4$ and $2y+1=x-9$ are

1) parallel
2) perpendicular
3) the same line
4) neither parallel nor perpendicular

$3y+1=6x+4$ → $-1 \quad -1$ → $\frac{3y}{3}=\frac{6x+3}{3}$ → $y=2x+1$

$2y+1=x-9$ → $-1 \quad -1$ → $\frac{2y}{2}=\frac{x-10}{2}$ → $y=\frac{1}{2}x-5$

not the same slope
not negative reciprocal slopes

29. The lines represented by the equations $y+\frac{1}{2}x=4$ and $3x+6y=12$ are

1) the same line
2) parallel
3) perpendicular
4) neither parallel nor perpendicular

$y+\frac{1}{2}x=4$ → $-\frac{1}{2}x \quad -\frac{1}{2}x$ → $y=-\frac{1}{2}x+4$

same slope

$3x+6y=12$ → $-3x \quad -3x$ → $\frac{6y}{6}=\frac{-3x+12}{6}$ → $y=-\frac{1}{2}x+2$