

Answers

1. $y = 2x$

2. $y = x + 1$

3. $y = x + 2$

4. slope = $(9-5)/(5-1) = 1$; equation $y = x + 4$

5. slope = $(2-0)/(4-0) = 0.5$; equation $y = 0.5x$

6. slope = $(4-10)/(4-1) = -\frac{6}{3} = -2$; equation $y = -2x + 12$

7. slope = $(9-5)/(3-0) = \frac{4}{3} \approx 1.33$; equation $y = 1.33x + 5$

8. slope = $(11-3)/(6-2) = \frac{8}{4} = 2$; equation $y = 2x - 1$

9. slope = $(5.5-1)/(4-1) = 4 \cdot \frac{5}{3} = 1.5$; equation $y = 1.5x - 0.5$

10. slope = $(7-2)/(5-0) = \frac{5}{5} = 1$; equation $y = x + 2$

11. $y = 12$

12. $y = 11$

13. $y = 7$

14. $y = -2(5) + 12 = 2$

15. $y = 1.5(8) - 0.5 = 12 - 0.5 = 11.5$

16. slope = $(1400 - 1000)/(1950 - 1930) = \frac{400}{20} = 20$ (cigarettes per person per year per year)

17. Using point (1930,1000) and slope 20: $y = 20x + b$. Solve b: $1000 = 20(1930) + b \rightarrow b = 1000 - 38600 = -37600$.
So $y = 20x - 37600$

18. For $x = 1945$: $y = 20(1945) - 37600 = 38900 - 37600 = 1300$

19. Residual = actual - predicted = $1350 - 1300 = 50$

20. The slope means cigarettes per person increased by 20 each year.

21. slope = $(80 - 50)/(2010 - 2000) = \frac{30}{10} = 3$ hours per year

22. Use point (2000,50): $50 = 3(2000) + b \rightarrow b = 50 - 6000 = -5950$. So $y = 3x - 5950$

23. $x = 2005 \rightarrow y = 3(2005) - 5950 = 6015 - 5950 = 65$

24. slope = $(10 - 4)/(3 - 1) = \frac{6}{2} = 3$; equation $y = 3x + b$. Use (1,4): $4 = 3(1) + b \rightarrow b = 1$. So $y = 3x + 1$

25. $x = 2 \rightarrow y = 3(2) + 1 = 7$

26. slope = $(0 - 6)/(5 - 2) = -\frac{6}{3} = -2$; using (2,6): $6 = -2(2) + b \rightarrow b = 10$. Equation $y = -2x + 10$

27. For $y = -2x + 10$, at $x = 3$ predicted $y = -6 + 10 = 4$. Residual = actual - predicted = $4 - 4 = 0$

28. slope = $(20 - 4)/(8 - 0) = \frac{16}{8} = 2$; equation using (0,4): $y = 2x + 4$

29. $x = 6 \rightarrow y = 2(6) + 4 = 16$

30. slope = $(6 - 2)/(3 - 1) = \frac{4}{2} = 2$; using (1,2): $2 = 2(1) + b \rightarrow b = 0$. Equation $y = 2x$

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31. Slope 3 means y increases by 3 units for each 1-unit increase in x.
32. y increases by $4 \times 5 = 20$
33. For $x = 4$: $y_1 = 2(4) + 3 = 11$; $y_2 = 2.5(4) + 1 = 11$. So both give the same y (11). Difference = 0.
34. slope = $(42 - 30)/(14 - 10) = \frac{12}{4} = 3$; using (10,30): $30 = 3(10) + b \rightarrow b = 0$. Equation $y = 3x$
35. $x = 3 \rightarrow y = 5(3) - 10 = 15 - 10 = 5$. $x = 0 \rightarrow y = -10$
36. slope = $(0 - 7)/(7 - 0) = -\frac{7}{7} = -1$; equation $y = -x + b$. Using (0,7) gives $b = 7$. So $y = -x + 7$. At $x = 2 \rightarrow y = -2 + 7 = 5$
37. slope = $(10 - 1)/(4 - 1) = \frac{9}{3} = 3$; using (1,1): $1 = 3(1) + b \rightarrow b = -2$. Equation $y = 3x - 2$
38. $x = 2.5 \rightarrow y = 3(2.5) - 2 = 7.5 - 2 = 5.5$
39. $x = 6 \rightarrow y = -0.5(6) + 8 = -3 + 8 = 5$. Relationship is negative (y decreases as x increases).
40. predicted at $x = 10$: $y = 0.2(10) + 5 = 2 + 5 = 7$. Residual = actual - predicted = $7 - 7 = 0$
41. slope = $(7 - 10)/(4 - 1) = -\frac{3}{3} = -1$ (or see regular decrease by 1). Correlation is negative.
42. slope = $(3 - 0)/(6 - 0) = \frac{3}{6} = 0.5$; intercept from (0,0) is 0. Equation $y = 0.5x$
43. Slope 0 means y does not change with x; points lie roughly on a horizontal line (same y for different x).
44. slope = $(30 - 15)/(8 - 3) = \frac{15}{5} = 3$; using (3,15): $15 = 3(3) + b \rightarrow b = 6$. Equation $y = 3x + 6$. For $x = 10 \rightarrow y = 3(10) + 6 = 36$
45. $20 = 3x + 2 \rightarrow 3x = 18 \rightarrow x = 6$
46. slope = $(4 - 12)/(4 - 0) = -\frac{8}{4} = -2$; using (0,12): $b = 12$. Equation $y = -2x + 12$. $x = 2 \rightarrow y = -4 + 12 = 8$
47. slope = $(12 - 20)/(6 - 2) = -\frac{8}{4} = -2$. Equation using (2,20): $20 = -2(2) + b \rightarrow b = 24$. So $y = -2x + 24$. Interpretation: y decreases by 2 units for each 1-unit increase in x.
48. $y = 1.25(8) + 3 = 10 + 3 = 13$. Residual = actual - predicted = $13 - 13 = 0$
49. For $x = 10$: $y_1 = 10 + 5 = 15$. $y_2 = 0.8(10) + 6 = 8 + 6 = 14$. y_1 predicts higher by 1.
50. Change in y when x increases from 3 to 6: slope $(-4) \times$ change in x $(3) = -12$ (y decreases by 12). y at $x = 6$: $y = -4(6) + 50 = -24 + 50 = 26$