

Properties of Linear Function Graphs

EXERCISE 3.2, page 81; Properties of Linear Function Graphs

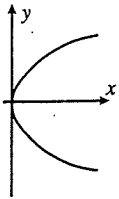
Q1. e.g. $\frac{1}{2}$ Q2. e.g. $\underline{-2}$ Q3. e.g. $\underline{3}$

Q4. $3x + 7 = 31 \rightarrow \underline{x = \{8\}}$ Q5. $5x - 2 = 5(3) - 2 = \underline{13}$

Q6. 20% of 63 is $\underline{12.6}$ Q7. Symmetric Axiom of Equality.

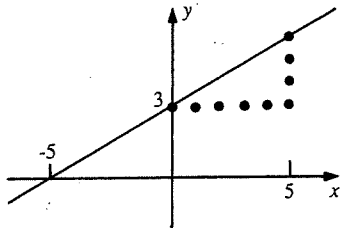
Q8. $|2 - 5x| = |2 - 5(3)| = |-13| = \underline{13}$

Q9. e.g.



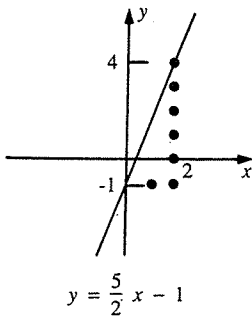
Q10. $\frac{2}{3} + \frac{3}{4} = 1 \frac{5}{12}$

1.

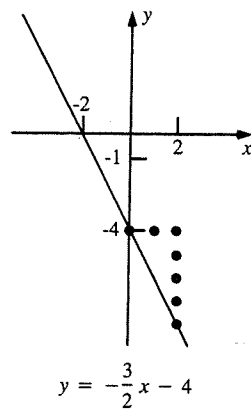


$$y = \frac{3}{5}x + 3$$

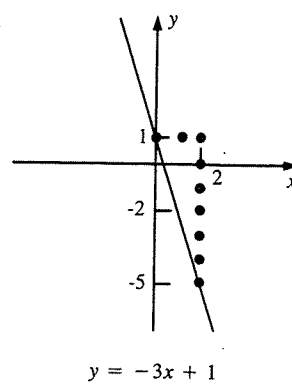
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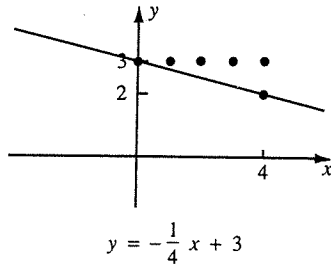
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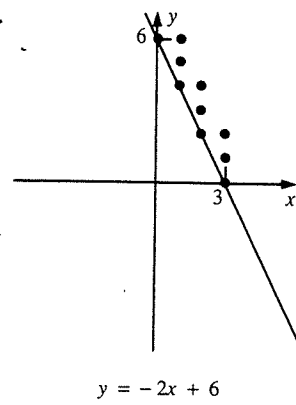
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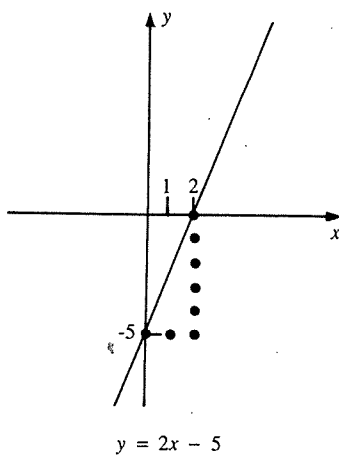
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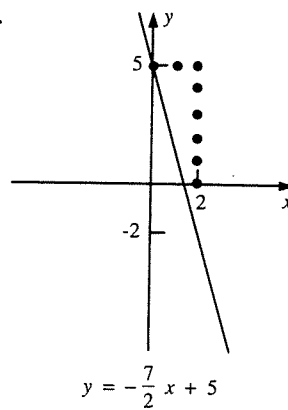
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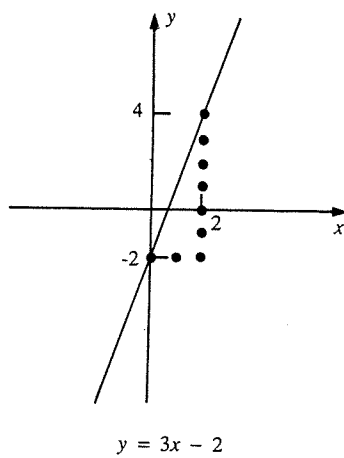
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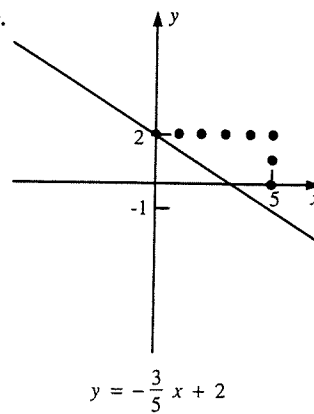
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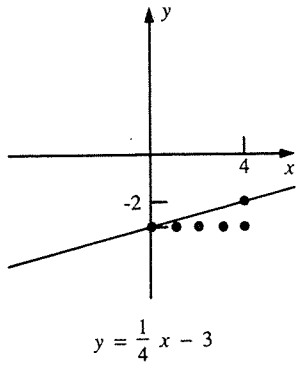
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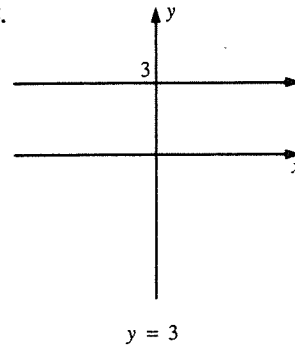
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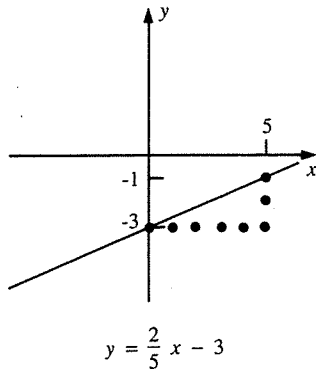
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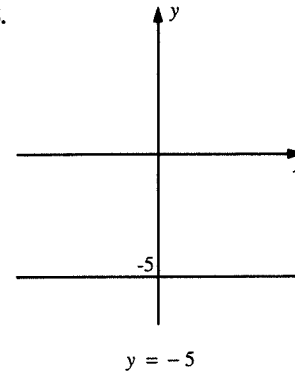
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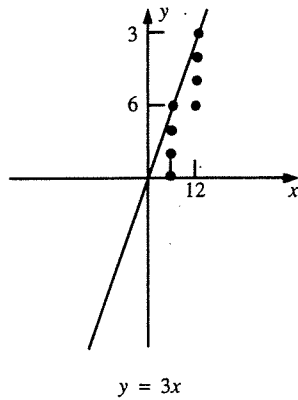
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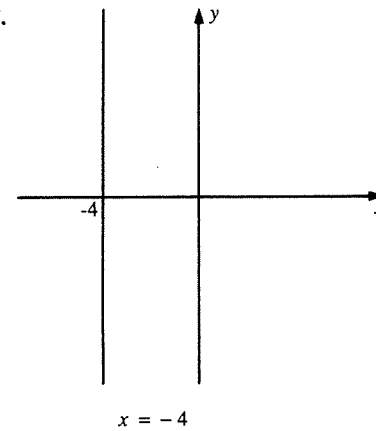
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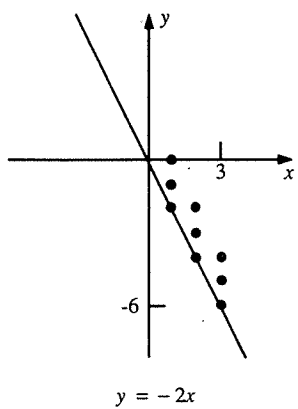
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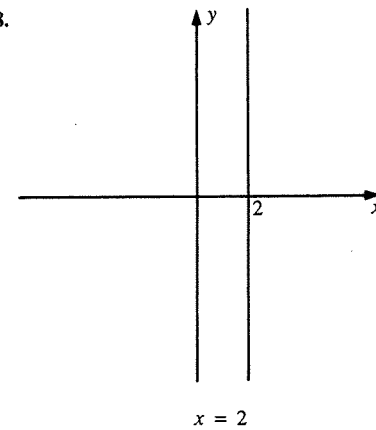
17.



14.

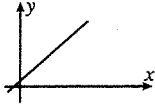


18.



EXERCISE 3.3; page 23; Other Forms of the Linear Function Equation

Q1. e.g.



Q2. $3 + 2(x - 5) = \underline{2x - 7}$

Q3. $(2x - 7)(x + 3) = \underline{2x^2 - x - 21}$

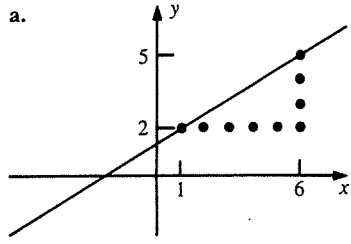
Q4. $2x - 7 = 31 \rightarrow \underline{S = \{19\}}$ Q5. $5x^2 = 5 \cdot 3^2 = \underline{45}$

Q6. 12 is 30% of 40. Q7. Reflexive Axiom of Equality.

Q8. $\sqrt{49} = \underline{7}$ (not -7!) Q9. $\frac{2}{3} \cdot \frac{3}{4} = \underline{\frac{1}{2}}$

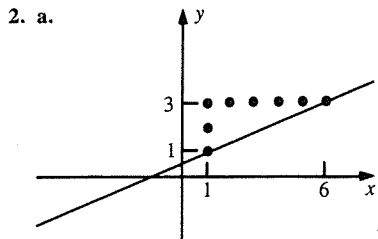
Q10. $x^2 + 4x - 5 = \underline{(x + 5)(x - 1)}$

1. a.

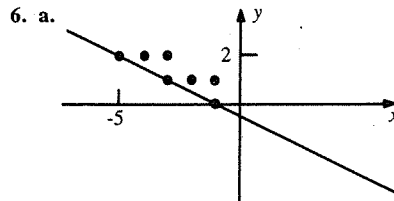


b. $y = \frac{3}{5}x + \frac{7}{5}$

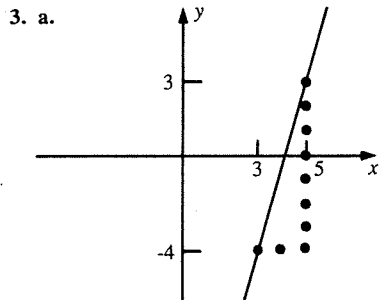
c. $3x - 5y = -7$



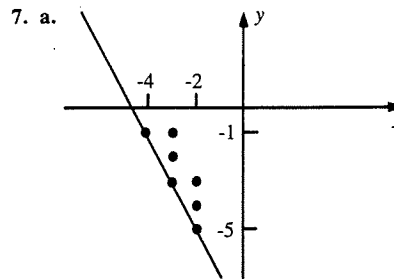
b. $y = \frac{2}{5}x + \frac{3}{5}$
 c. $2x = 5y = -3$



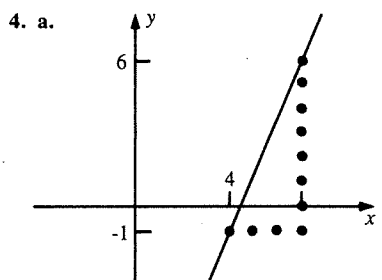
b. $y = -\frac{1}{2}x - \frac{1}{2}$
 c. $x + 2y = -1$



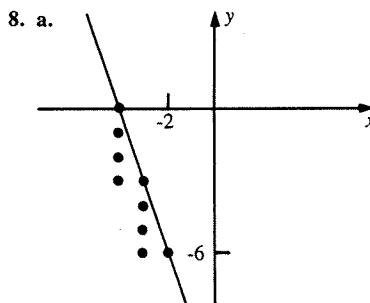
b. $y = \frac{7}{2}x - \frac{29}{2}$
 c. $7x - 2y = 29$



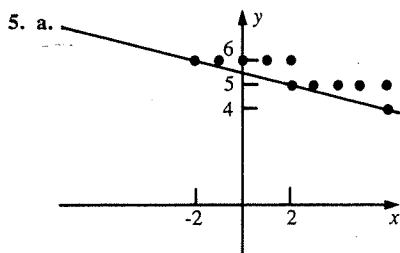
b. $y = -2x - 9$
 c. $2x + y = -9$



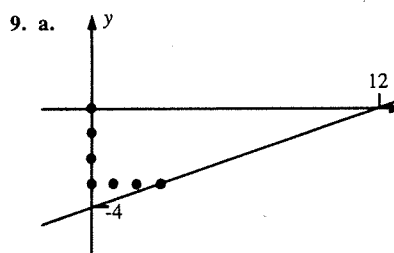
b. $y = \frac{7}{3}x - \frac{31}{3}$
 c. $7x - 3y = 31$



b. $y = -3x - 12$
 c. $3x + y = -12$

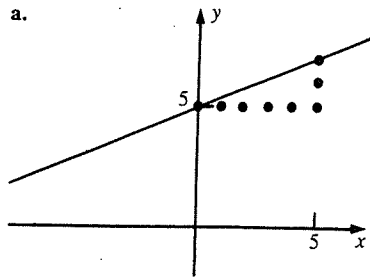


b. $y = -\frac{1}{4}x + \frac{11}{2}$
 c. $x + 4y = 22$



b. $y = \frac{1}{3}x - 4$
 c. $x - 3y = 12$

10. a.



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

c. $2x - 5y = -25$

11. $y - 7 = -3(x - 5)$ 12. $y - 3 = 5(x - 6)$

13. $y - 5 = \frac{9}{13}(x + 2)$ 14. $y + 9 = -\frac{22}{7}(x - 7)$

EXERCISE 10, page 30: Equations of Linear Functions from their Graphs

Q1. $y = mx + b$ Q2. $3x + 4y = 36 \rightarrow y - \text{int.} = 12$

Q3. $x^2 - x - 72 = (x - 9)(x + 8)$

Q4. $2x - 3 = 2(x + 4) \rightarrow 2x - 3 = 2x + 8$
 $S = \emptyset$.

Q5. 30 is 40% of 75. Q6. $x + y = y + x$

Q7. $y = \frac{4}{7} + 3x; m = \frac{3}{7}$ (not $\frac{4}{7}$!) Q8. $5^3 = 125$

Q9. $\frac{2}{3} \div \frac{3}{4} = \frac{8}{9}$ Q10. $(x - 3)^2 = x^2 - 6x + 9$

1. a. $y = -5x + 21$ 2. a. $y = 7x - 13$
b. $y = -5x + 21$ b. $y = 7x - 13$
c. $5x + y = 21$ c. $7x - y = 13$

3. a. $y - 7 = 11(x - 3)$ 4. a. $y - 9 = 5.73(x - 4)$
b. $y = 11x - 26$ b. $y = 5.73x - 13.92$
c. $11x - y = 26$ c. $5.73x - 100y = 1392$

5. a. $y + 5 = -6(x - 4)$ 6. a. $y - 7 = -\frac{8}{5}(x + 3)$
b. $y = -6x + 19$
c. $6x + y = 19$
b. $y = -\frac{8}{5}x + \frac{11}{5}$
c. $8x + 5y = 11$

7. a. $y - 7 = \frac{3}{2}(x - 1)$ 8. a. $y - 2 = 3(x - 5)$
b. $y = \frac{3}{2}x + 5\frac{1}{2}$ b. $y = 3x - 13$
c. $3x - 2y = -11$ c. $3x - y = 13$

9. a. $y + 4 = \frac{6}{7}(x - 2)$ 10. a. $y - 4 = 2(x + 1)$
b. $y = \frac{6}{7}x - 5\frac{5}{7}$ b. $y = 2x + 6$
c. $6x - 7y = 40$ c. $2x - y = -6$

11. a. $y - 8 = 7(x - 5)$ 12. a. $y - 2 = -4(x - 7)$
b. $y = 7x - 27$ b. $y = -4x + 30$
c. $7x - y = 27$ c. $4x + y = 30$

13. a. $y - 6 = -2.5(x + 4)$ 14. a. $y + 5 = \frac{1}{8}(x - 3)$
b. $y = -2.5x - 4$ b. $y = \frac{1}{8}x - 5\frac{3}{8}$
c. $5x + 2y = -8$ c. $x - 8y = 43$

15. a. $y - 8 = -\frac{2}{3}(x - 5)$ 16. a. $y - 2 = \frac{5}{3}(x - 7)$

b. $y = -\frac{2}{3}x + 11\frac{1}{3}$ b. $y = \frac{5}{3}x - 9\frac{2}{3}$

c. $2x + 3y = 34$ c. $5x - 3y = 29$

17. a. $y - 1 = -\frac{7}{5}(x - 4)$ 18. a. $y - 6 = \frac{4}{3}(x - 0)$

b. $y = -\frac{7}{5}x + 6\frac{3}{5}$ b. $y = \frac{4}{3}x + 6$

c. $7x + 5y = 33$ c. $4x - 3y = -18$

19. a. $y - 0 = -\frac{2}{3}(x - 5)$ 20. a. $y - 0 = -\frac{5}{7}(x - 7)$

b. $y = -\frac{2}{3}x + 3\frac{1}{3}$ b. $y = -\frac{5}{7}x + 5$

c. $2x + 3y = 10$ c. $5x + 7y = 35$

21. a. $y = 0.315x$ 22. a. $y = 2x$
b. $y = 0.315x + 0$ b. $y = 2x + 0$
c. $315x - 1000y = 0$ c. $2x - y = 0$
($63x - 200y = 0$)

23. a. $y = 9$ 24. a. $y = -13$
b. $y = 0x + 9$ b. $y = 0x - 13$
c. $0x + y = 9$ c. $0x + y = -13$

25. a. $x = -8$ 26. a. $x = 11$
b. (Can't be done!) b. (Can't be done!)
c. $x + 0y = -8$ c. $x + 0y = 11$

27. All slopes equal -1 , so the particular equation is $x + y = 8$.

28. For $(-3, 16)$ and $(1, 10)$, $m = -\frac{3}{2}$.

For $(-3, 16)$ and $(9, -3)$, $m = -\frac{19}{12}$.

For $(1, 10)$ and $(9, -3)$, $m = -\frac{13}{8}$.

\therefore there is *no* linear function containing all three points.

29. All slopes equal $\frac{3}{2}$, so the particular equation is $3x - 2y = -5$.

30. For $(4, 9)$ and $(20, 23)$, $m = \frac{7}{8}$.

For $(20, 23)$ and $(13, 17)$, $m = \frac{6}{7}$.

For $(13, 17)$ and $(29, 31)$, $m = \frac{7}{8}$.

\therefore there is *no* linear function containing all four points.

31. Intercept Form

a. If $x = 0$, then $\frac{0}{a} + \frac{y}{b} = 1$.

So $y = b$.

If $y = 0$, then $\frac{x}{a} + \frac{0}{b} = 1$. So $x = a$.

$\therefore a$ and b are the x - and y -intercepts, respectively.

b. i. $\frac{x}{3} + \frac{y}{5} = 1 \Rightarrow \underline{5x + 3y = 15}$

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

c. $y = 4x - 12 \Rightarrow 4x - y = 12 \Rightarrow \underline{\frac{x}{3} - \frac{y}{12} = 1}$

x -intercept is 3 , y -intercept is -12 .