Algebra 1 Semester 1 Final Review Key

Unit 1

1. $-2\sqrt{24}$

$24 = 6 \cdot 4$

$6 = 2 \cdot 3$, $4 = 2 \cdot 2$

$-2 \cdot 2\sqrt{2 \cdot 3}$

$\boxed{-4\sqrt{6}}$

2. $6\sqrt{54}$

$54 = 6 \cdot 9$

$6 = 2 \cdot 3$, $9 = 3 \cdot 3$

$6 \cdot 3\sqrt{2 \cdot 3}$

$\boxed{18\sqrt{6}}$

3. $\sqrt{72}$

$72 = 8 \cdot 9$

$8 = 2 \cdot 4$, $4 = 2 \cdot 2$, $9 = 3 \cdot 3$

$2 \cdot 3\sqrt{2}$

$\boxed{6\sqrt{2}}$

4. $4(x-2)+6x=12+5x$

$4x-8+6x=12+5x$

$10x-8=12+5x$

$+8 \quad +8$

$10x=20+5x$

$-5x \quad -5x$

$\frac{5x}{5}=\frac{20}{5}$

$\boxed{x=4}$

5. $2x-4=8$

$+4 \quad +4$

$\frac{2x}{2}=\frac{12}{2}$

$\boxed{x=6}$

6. $3(2x-5)=2(3x-2)$

$6x-15=6x-4$

$-6x \quad -6x$

$-15=-4$ x

$\boxed{\text{no solution}}$

7. $4x-3=2x+5$

$-2x \quad -2x$

$2x-3=5$

$+3 \quad +3$

$\frac{2x}{2}=\frac{8}{2}$

$\boxed{x=4}$

8. $\frac{5}{1}\left(\frac{2}{3}x\right)-(6)^{15}=\left(\frac{4}{5}\right)^{3}$

$\frac{10}{15}x-\frac{90}{15}=\frac{12}{15}$

$10x-90=12$

$+90 \quad +90$

$\frac{10x}{10}=\frac{102}{10}$

$\boxed{x=10.2}$ $\boxed{\frac{51}{5}}$

9. $1000 - 25x \quad 650 + 15x$
A = K

$1000 - 25x = 650 + 15x$
$+25x \quad +25x$

$1000 = 650 + 40x$
$-650 \quad -650$

$\frac{350}{40} = \frac{40x}{40}$

$8.75 = x$

8.75 weeks

$650 + 15(8.75)$

$781.25

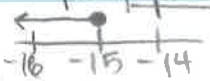
10.

S	R
$25 = 5(x-3)$	given
$25 = 5x - 15$	Dist Prop
$+15 \quad +15$	Add POE
$\frac{40}{5} = \frac{5x}{5}$	Simplify
	Div POE
$8 = x$	Simplify
$x = 8$	Symm. POE

11. $-125 \geq 8p - 5$
$+5 \quad +5$

$\frac{-120}{8} \geq \frac{8p}{8}$

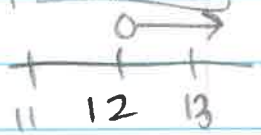
$-15 \geq p$ $\quad p \leq -15$



12. $9 + \frac{x}{3} > 13$
$-9 \quad -9$

$3 \cdot \frac{x}{3} > 4 \cdot 3$

$x > 12$

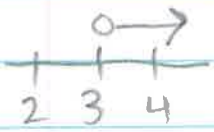


13. $98 < 7(3x+5)$
$98 < 21x + 35$
$-35 \quad -35$

$\frac{63}{21} < \frac{21x}{21}$

$3 < x$

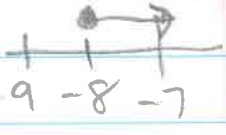
$x > 3$



14. $-5(n+1) - 6n \leq 83$
$-5n - 5 - 6n \leq 83$
$-11n - 5 \leq 83$
$+5 \quad +5$

$\frac{-11n}{-11} \leq \frac{88}{-11}$

$n \geq -8$



15. $6x - 5(8-5x) < 16 + 3x$

$6x - 40 + 25x < 16 + 3x$

$31x - 40 < 16 + 3x$

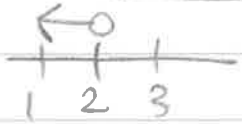
$-3x \qquad -3x$

$28x - 40 < 16$

$+40 \quad +40$

$\frac{28x}{28} < \frac{56}{28}$

$\boxed{x < 2}$



16. $3(x+1) \geq 2(-2+x)$

$3x + 3 \geq -4 + 2x$

$-2x \qquad -2x$

$x + 3 \geq -4$

$-3 \quad -3$

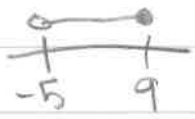
$\boxed{x \geq -7}$

17. $33 > -8x - 7 \geq -79$

$+7 \qquad +7 \quad +7$

$\frac{40}{-8} > \frac{-8x}{-8} \geq \frac{-72}{-8}$

$\boxed{-5 < x \leq 9}$



18. $\frac{-15}{-3} < \frac{-3(x-2)}{-3} < \frac{33}{-3}$

$5 > x - 2 > -11$

$+2 \quad +2 \quad +2$

$7 > x > -9$

$\boxed{-9 < x < 7}$

19. $-7x + 7 > 42$ or $2 - x \leq -2$

$-7 \quad -7 \qquad -2 \quad -2$

$\frac{-7x}{-7} > \frac{35}{-7} \qquad \frac{-x}{-1} \leq \frac{-4}{-1}$

$\boxed{x < -5 \text{ or } x > 4}$

20. $8x - 4 \geq 20$ or $5x - 1 \leq 4$

$+4 \quad +4 \qquad +1 \quad +1$

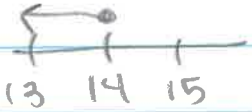
$\frac{8x}{8} \geq \frac{24}{8} \qquad \frac{5x}{5} \leq \frac{5}{5}$

$\boxed{x \geq 3 \text{ or } x \leq 1}$

21. $x + -6 \leq 8$

$+6 \quad +6$

$\boxed{x \leq 14}$



22. $-155 + x \geq 250$

$+155 \qquad +155$

$\boxed{x \geq 405}$

23. $200 \leq x + 125 \leq 450$

$-125 \quad -125 \quad -125$

$\boxed{75 \leq x \leq 325}$

24. $2x^4 \cdot 3x^{-1}$

$\boxed{6x^3}$

25. $\dfrac{x^1}{4x^{-1}} = \dfrac{x^1 x^1}{4}$

$\boxed{\dfrac{x^2}{4}}$

26. $x^3 \cdot 4x^3$

$\boxed{4x^6}$

27. $3x^0 \cdot x^2 y^3$

$\boxed{3x^2 y^3}$

28. $\dfrac{3x^{-3}}{3x^4} \quad \dfrac{1}{x^4 x^3}$

$\boxed{\dfrac{1}{x^7}}$

29. $\dfrac{n^{-1}}{4n^2} = \dfrac{1}{4n^2 n^1}$

$\boxed{\dfrac{1}{4n^3}}$

30. $\dfrac{2r}{r^3} = \boxed{\dfrac{2}{r^2}}$

31. $\dfrac{2a^{-4}}{a^{-3}} = \dfrac{2a^3}{a^4} = \boxed{\dfrac{2}{a^1}}$

Unit 2

1. a) $D: \{1, -1, 2, 8, -2\}$
   $R: \{5, 3, 7, 10\}$
   b) $D: \{-6 < x \leq 2\}$
   $R: \{-5 \leq y < 3\}$
   c) $D: \{-3, -1, 0, 1, 3\}$
   $R: \{2, 6, 10, 14, 18\}$
   d) $D: \{-5 < x \leq 7\}$
   $R: \{1 \leq y < 4\}$

2. a) no, not constant rate
   b) yes, line
   c) yes, constant rate
   d) yes, line

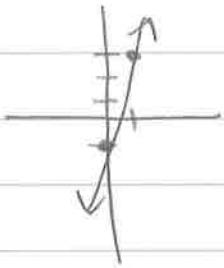
3. a) $g(-3) = 3 - 5(-3)$
   $= 3 + 15$
   $\boxed{g(-3) = 18}$ $(-3, 18)$
   b) $f(4) = 3(4) - 5$
   $= 12 - 5$
   $\boxed{f(4) = 7}$ $(4, 7)$
   c) $g(2) - f(-1)$
   $3 - 5(2)$ $\quad 3(-1) - 5$
   $3 - 10$ $\quad -3 - 5$
   $-7 \quad - \quad -8$
   $-7 + +8 = \boxed{1}$

4. a) $f(x) = 5x + 80$
   b) $f(6) = 5(6) + 80$
   $= 30 + 80$
   $f(6) = 110$
   $\boxed{\$110 \text{ for } 6 \text{ movies}}$
   c) $130 = 5x + 80$
   $-80 \qquad -80$
   $\frac{50}{5} = \frac{5x}{5}$
   $10 = x$
   $\boxed{\$130 \text{ for } 10 \text{ movies}}$

5. a) $-x + 2y = 12$
   $\frac{-x}{-1} = \frac{12}{-1}$ $\quad \frac{2y}{2} = \frac{12}{2}$
   $x = -12$ $\quad y = 6$
   $\boxed{(-12, 0)}$ $\quad \boxed{(0, 6)}$
   b) $6y + 3x = -18$
   $\frac{6y}{6} = \frac{-18}{6}$ $\quad \frac{3x}{3} = \frac{-18}{3}$
   $y = -3$ $\quad x = -6$
   $\boxed{(0, -3)}$ $\quad \boxed{(-6, 0)}$

6. a) $f(x) = -2/3x - 4$

6. b) $f(x) = 4x - 1$



7. a) $f(x) = 3x + 4$
   b) $g(x) = -1/4x - 3$
8. a) $y = -\frac{1}{2}x - 9$
   b) $y = 6x + 4$
   c) $y = -2x - 2$
9. a) reflected, stretch by 4, up 3
   b) stretched by $6/5$, down 7
   c) reflected, compress by $5/9$, down 9
   d) compress by $2/3$, up 6

Unit 3

1. a) $m = 3 \quad (-2, 5)$

$5 = 3(-2) + b$

$5 = -6 + b$

$+6 \quad +6$

$11 = b$

$\boxed{y = 3x + 11}$

b) $m = 2/3 \quad (6, 4)$

$4 = 2/3(6) + b$

$4 = 4 + b$

$-4 \quad -4$

$0 = b$

$\boxed{y = 2/3x}$

c) $\begin{array}{c|c} 1 & 2 \\ 3 & -2 \end{array}$ (+2, −4)

$m = -4/2 = -2 \quad (1, 2)$

$2 = -2(1) + b$

$2 = -2 + b$

$+2 \quad +2$

$4 = b$

$\boxed{y = -2x + 4}$

d) $\begin{array}{c|c} 4 & -2 \\ 8 & 4 \end{array}$ (+4, +6)

$m = 6/4 = 3/2 \quad (4, -2)$

$-2 = 3/2(4) + b$

$-2 = 6 + b$

$-6 \quad -6$

$-8 = b$

$\boxed{y = 3/2x - 8}$

e) $\begin{array}{c|c} 2 & 3 \\ 6 & 5 \end{array}$ (+4, +2)

$m = 2/4 = 1/2 \quad (2, 3)$

$3 = \frac{1}{2}(2) + b$

$3 = 1 + b$

$-1 \quad -1$

$2 = b$

$\boxed{y = \frac{1}{2}x + 2}$

f) $\parallel m = 2 \quad (-1, 3)$

$3 = 2(-1) + b$

$3 = -2 + b$

$+2 \quad +2$

$5 = b$

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

g) $3y - x = 12$

$+x \quad +x$

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

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

$\parallel m = \frac{1}{3} \quad (18, 2)$

$2 = \frac{1}{3}(18) + b$

$2 = 6 + b$

$-6 \quad -6$

$-4 = b$

$\boxed{y = \frac{1}{3}x - 4}$

1. h) $\perp m = -2$ $(7, 10)$

$10 = -2(7) + b$

$10 = -14 + b$

$+14 \quad +14$

$24 = b$

$\boxed{y = -2x + 24}$

i) $\frac{2y}{2} = \frac{8x}{2} - \frac{6}{2}$

$y = 4x - 3$

$\perp m = -\frac{1}{4}$ $(-3, 3)$

$3 = -\frac{1}{4}(-3) + b$

$3 = \frac{3}{4} + b$

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

$2\frac{1}{4} = b \qquad 2\frac{1}{4} = \frac{9}{4}$

$\boxed{y = -\frac{1}{4}x + \frac{9}{4}}$

2. a)

b) $y = 13.6x + 20.2$

c) positive

d) $r = 0.95$

3. $F(x) = -4x + 10$

4. $a_n = 3n - 14$

5. $a_n = 4n - 2$

6. $x^{-9} = \boxed{\frac{1}{x^9}}$

7. $6x^2y^5 \cdot 5x^4y^7$

$\boxed{30x^6y^{12}}$

8. $(4xy^4)^2$

$\boxed{16x^2y^8}$

9. $\frac{x^3y^9}{x^5y^2} = \boxed{\frac{y^7}{x^2}}$