

PreReq: Review

$$2. 1 + 2 [3x + 3 - 6x + 2] = 1 + 2 [-3x + 5]$$

$$1 - 6x + 10 = -6x + 17$$

4. $\overset{\text{union}}{\{1, 2, 5, a\}}$

6. $\sqrt{3 \cdot 2 \cdot r \cdot 3r} = \sqrt{3r \cdot 2}$

8. $\frac{3}{5 + \sqrt{2}} \left(\frac{5 - \sqrt{2}}{5 - \sqrt{2}} \right) = \frac{15 - 3\sqrt{2}}{25 - 2} = \frac{15 - 3\sqrt{2}}{23}$

10. $\frac{(x+3)(x-1)}{(x-2)(x-1)} = \frac{x+3}{x-2} \quad x \neq 2, 1$

12.
$$\begin{array}{r} 2x^3 - 8x^2 + 6x \\ - 5x^2 + 20x - 15 \\ \hline 2x^3 - 13x^2 + 26x - 15 \end{array}$$

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14. $\frac{2(x+4)}{x-3} \cdot \frac{(x+3)(x+3)}{(x+4)(x+1)} = \frac{2(x+3)}{x+1} \quad x \neq 3, 4, -1$

16. $\frac{2x+3}{(x-3)(x-4)} - \frac{2}{x-3} = \frac{2x+3 - 2(x-4)}{(x-3)(x-4)} = \frac{11}{(x-3)(x-4)}$

18. $\left(\frac{2x\sqrt{x^2+5} - 2x^3\sqrt{x^2+5}}{x^2+5} \right) \cdot \frac{1}{x^2+5}$

$\left(\frac{2x(x^3+10x)}{x^2+5} \sqrt{x^2+5} - 2x^3\sqrt{x^2+5} \right) \cdot \frac{1}{x^2+5} = \frac{10x\sqrt{x^2+5}}{(x^2+5)^2}$

20. $x^3 + 2x^2 + 3x + 6 = (x+2)(x^2 + 3) = (x+3)(x+2)$

22. $(6x-7)^2$

24. $\frac{x^2 + 10x + 25 - 9y^2}{(x+5)^2 - 9y^2} = \frac{(x+5+3y)(x+5-3y)}{(x+5+3y)(x+5-3y)}$

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26. $\boxed{-7, -\frac{4}{5}, 0, .25, \sqrt{4}, \frac{22}{7}}$ $\sqrt{3}, \pi$ are irrational

28. Distributive

30. $27^{-\frac{5}{3}} = (\sqrt[3]{27})^{-5} = 3^{-5} = \frac{1}{3^5} = \frac{1}{243}$

32. a) $\frac{2003}{-1989} \quad M = -.28(14) + 47 = \boxed{43.08\%} > 43\%$ by .08%

b) $R = \frac{M}{W} = \frac{-.28n + 47}{.28n + 53}$

c) $\frac{2014}{-1989} \quad \frac{-.28(25) + 47}{.28(25) + 53}$ can't cancel!! $\boxed{\frac{2}{3}}$ describes projections exactly

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34. $2x - 3 = 2x - 8 - x - 1 \leftarrow \frac{2x-3}{4} = \frac{x-4}{2} - \frac{x-1}{4}$
 $\boxed{x = -6}$

36. $(2x + 1)(x - 2) = 0$
 $\boxed{x = -\frac{1}{2}} \quad \boxed{x = 2}$

38. $x^2 - 2x - 4 = 0$
 $x^2 - 2x + 1 = 4 + 1$
 $(x-1)^2 = 5$
 $x-1 = \pm\sqrt{5}$
 $\boxed{x = 1 \pm \sqrt{5}}$

40. $\sqrt{8-2x} = x$
 $8-2x = x^2$
 $x^2 + 2x - 8 = 0$
 $(x+4)(x-2) = 0$
 $\boxed{x = -4} \quad \boxed{x = 2}$
 extraneous

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42. $-3|4x-7| = -15$
 $|4x-7| = 5$
 $4x-7 = 5$ or $4x-7 = -5$
 $4x = 12$ $4x = 2$
 $x = 3$ $x = \frac{1}{2}$

- ①. I isolate
- ②. Set Up 2 equations

44. $3x+12 \geq 5x-12$
 $24 \geq 2x$
 $x \leq 12$ $(-\infty, 12]$

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46. $-9 \leq 2x+5 < 19$
 $-14 \leq 2x < 13$ $[-7, 6\frac{1}{2})$
 $-7 \leq x < 6\frac{1}{2}$

48. $h = \frac{3V}{lw}$ $V = \frac{1}{3}l \cdot w \cdot h$

50. $Ra + Rs = as$
 $Ra - as = -Rs$ (a)
 $a(R-s) = -Rs$
 $a = \frac{-Rs}{R-s}$

52. $1177 = .07x^2 + 47.4x + 500$
 use quad formula
 $x = 14$ $x = 691$
 14 yrs after 2004 = 2018

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(54) $x = \text{drive in}$
 $x + 16 = \text{movie}$
 $x + 64 = \text{video}$
 $x + x + 16 + x + 64 = 83$
 $3x = 3$
 $x = 1$ drive in
 17 movie
 65 video

(56) $2w + 4$
 w $48 = 2w^2 + 4w$
 $0 = w^2 + 2w - 24$
 $0 = (w + 6)(w - 4)$
 $w = 4$ width
 12 length

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(58) $x - .6x = 20$
 $.4x = 20$
 $x = 50$

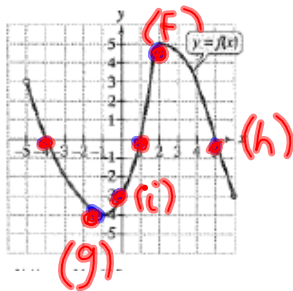
(60) $A < B$
 $25 < .06x + 13$
 $12 < .06x$
 $x > 200$
 Plan A better when more than 200 local

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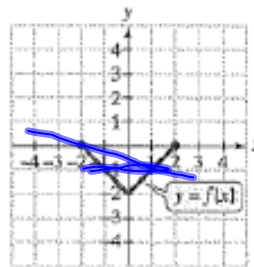
Chapter 1: Review

1. B, C, D (circle)

2. a) $f(4) - f(-3) = 3 - 2 = \sqrt{5}$
- b) $(-5, 6]$
- c) $[4, 5]$
- d) Inc $(-4, 2)$
- e) Dec $(5, 1) \cup (2, 6)$
- f) 2 ; max value 5
- g) -1 ; min value -4
- h) -4, 1, 5
- i) -3



3. a) -2, 2
 - b) -1, 1
 - c) 0
 - d) even $f(x) = f(-x)$
 - e) no, not 1-1
 - f) relative min.
 - g) horizontal left 1, then down 1
 - h) horizontal stretch of 2 & vertical shrink of $\frac{1}{2}$
 - i) reflect over x & y then up 1
- J) $(-2, 0)$ slope $\frac{0-1}{-2-1} = \frac{1}{-3}$
 $(1, -1)$



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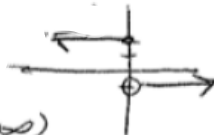
X. circle: radius of 3, center $(-2, 1)$

D $[-5, 1]$
 R $[-2, 4]$



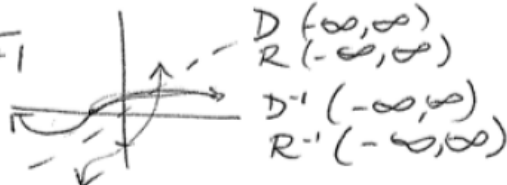
(Not 2012)

9. $f(x) = \begin{cases} 2 & x \leq 0 \\ -1 & x > 0 \end{cases}$



D $(-\infty, \infty)$
 R $\{-1, 2\}$ not interv. not at

14. $f(x) = x^3 - 1$
 $f^{-1}(x) = \sqrt[3]{x+1}$



D $(-\infty, \infty)$
 R $(-\infty, \infty)$
 D^{-1} $(-\infty, \infty)$
 R^{-1} $(-\infty, \infty)$

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16. $(x-1)^2 - (x-1) - 4$ $f(x-1)$
 $x^2 - 2x + 1 - x + 1 - 4 = x^2 - 3x - 2$

17. $(x+h)^2 - (x+h) - 4$ $f(x+h)$
 $x^2 + 2xh + h^2 - x - h - 4$
 $\frac{2xh + h^2 - h}{h} = 2x + h - 1$

18. $2x - 6 - x^2 + x + 4 = -x^2 + 3x - 2$ $(g-f)(x) = g(x) - f(x)$

19. $\frac{x^2 - x - 4}{2x - 6}$ $D: (-\infty, 3) \cup (3, \infty)$ $\frac{f}{g}$

20. $f(g(x)) = (2x-6)^2 - (2x-6) - 4$
 $4x^2 - 24x + 36 - 2x + 6 - 4$
 $4x^2 - 26x + 38$ $f(g(x)) = f(2x-6)$

$f: x^2 - x - 4 \quad (-\infty, \infty)$

$g: 2x - 6 \quad (-\infty, \infty)$

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23. $f(-x) = x^2 + x - 4$
 neither

24. $(-4, 0) \perp -\frac{1}{4}$
 so 4

$y = 4x + b$ slope-intercept
 $0 = -16 + b$
 $b = 22$
 $y - 0 = 4(x + 4)$ point-slope

26. $(-7, -10) \parallel \frac{2y = 4x + 5}{-2}$
 $y + 10 = -2(x + 7)$
 $-2x - 14$
 $2x + y + 24 = 0$ ← General Form

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27. $(4, 486)$ slope = $\frac{10}{2} = 5$
 $(2, 476)$
 a) $y - 476 = 5(x - 2)$
 $y = 5x - 10 + 476$
 b) $f(x) = 5x + 466$
 c) $f(10) = 5(10) + 466 = 516$

28. $(4, 103)$ $(10, 295)$
 $\frac{295 - 103}{10 - 4} = \frac{192}{6} = 32$
 $\frac{3(10)^2 - 5}{3(4)^2 - 5} = \frac{300 - 5}{48 - 5} = \frac{295}{43}$
 $\frac{192}{43} = 4.47$ ← average rate of change

29. $g(-1) = 3 - (-1) = 4$
 $g(7) = 7 - 3 = 4$

30. $D: (-\infty, -5) \cup (-5, 1) \cup (1, \infty)$ $\frac{3}{x+5} + \frac{7}{x-1} \frac{x+5}{(x+5)(x-1)} \neq 5, 1$

31. $(-\infty, \infty)$ and $[1, \infty)$
 intersect: $[1, \infty)$
 $= 3\sqrt{x+5} + 7\sqrt{x-1}$
 $[-5, \infty) \cup [1, \infty)$

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32. $f(g(x)) = \frac{7}{\frac{x}{2} - 4} \left(\frac{x}{x} \right) = \frac{7x}{2 - 4x}$
 $D: x \neq 0, \frac{1}{2}$
 $(-\infty, 0) \cup (0, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$

33. $f(x) = x^7$
 $g(x) = 2x + 3$

34. distance $\sqrt{(5-2)^2 + (2-2)^2} = \sqrt{9 + 0} = 3$ (2012)
 $\frac{2+5}{2}, \frac{-2+2}{2}$
 $(3\frac{1}{2}, 0)$

35. a) $f(x) = 41.78 - .19x$
 b) $35.7 = 41.78 - .19x$
 $x = 32$ yrs after 1980
 which is 2012

$f(g(x)) = \frac{7}{(\frac{x}{2} - 4)} \cdot x$
 $\frac{7}{2 - 4x} \cdot x \neq 0, \frac{1}{2}$


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36. a) $y(x) = 50 - 1.5(x-30)$
 b) $T(x) = x(50 - 1.5(x-30))$
 $50 - 1.5x + 45$
 $x(95 - 1.5x)$
 $95x - 1.5x^2$

37. $2l + 2w = 600$
 $l + w = 300$
 $l = 300 - w$

$2l + 2w = 600$
 $l + w = 300 \quad l = 300 - w$


$A(x) = (300 - w)w$
 $300w - w^2$



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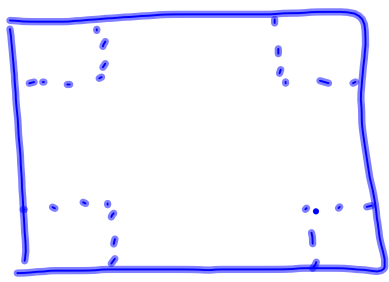
(1.10)

$V = l \cdot w \cdot h$
 $8000 = x \cdot x \cdot h$
 $h = \frac{8000}{x^2}$



SA. = $2(x^2) + 4(xh)$
 $2x^2 + 4x \left(\frac{8000}{x^2} \right)$
 $2x^2 + \frac{32000}{x}$

Quiz:



$V = (15-2x)(18-2x)x$
 $250 = (15-2x)(18-2x)x$

y_2 y_1

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Probability and Statistics:

P.1034

19. different positions - order matters

$$19. \quad {}_{11}P_3 = \frac{11!}{8!} = \frac{11 \cdot 10 \cdot 9 \cdot 8!}{8!} = \boxed{990 \text{ ways}}$$

$$20. \quad {}_{10}C_4 = \frac{10!}{6!4!} = \boxed{210 \text{ sets}}$$

$$21. \quad \frac{2}{1} \cdot \frac{7}{1} \cdot \frac{9}{1} \cdot \frac{10}{1} \cdot \frac{10}{1} \cdot \frac{10}{1} \cdot \frac{10}{1} = 10^4 = \boxed{10,000}$$

$$22. \quad 1 - P(\text{brown}) = 1 - \frac{40}{100} = \boxed{\frac{3}{5} \text{ or } 60\%}$$

$$23. \quad P(\text{brown}) + P(\text{blue}) \\ \frac{40}{100} + \frac{38}{100} = \frac{78}{100} = \boxed{\frac{39}{50} \text{ or } 78\%}$$

$$24. \quad P(\text{female}) + P(\text{green}) - P(\text{overlap}) \\ \frac{50}{100} + \frac{22}{100} - \frac{12}{100} = \frac{60}{100} = \boxed{\frac{3}{5} \text{ or } 60\%}$$

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$$23. \quad P(\text{brown}) + P(\text{blue})$$

$$\frac{40}{100} + \frac{38}{100} = \frac{78}{100} = \boxed{\frac{39}{50} \text{ or } 78\%}$$

$$24. \quad P(\text{female}) + P(\text{green}) - P(\text{overlap})$$

$$\frac{50}{100} + \frac{22}{100} - \frac{12}{100} = \frac{60}{100} = \boxed{\frac{3}{5} \text{ or } 60\%}$$

$$25. \quad \frac{18}{38} = \boxed{\frac{9}{19}}$$

$$26. \quad \textcircled{50} \cdot \frac{{}_{15}C_6}{5005} = \frac{50}{5005} = \boxed{\frac{10}{1001}}$$

$$27. \quad \frac{26}{52} + \frac{12}{52} - \frac{6}{52} = \frac{32}{52} = \boxed{\frac{8}{13}}$$

$$28. \quad \frac{25}{50} + \frac{20}{50} - \frac{15}{50} = \frac{30}{50} = \boxed{\frac{3}{5}}$$

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$$29. \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} = \frac{1}{256} \quad \boxed{\frac{1}{256}}$$

$$30. \frac{2}{8} \cdot \frac{2}{8} = \boxed{\frac{1}{16}}$$

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