

Preview #1

1. $x = 45$

2. $48 = \frac{1}{2}(3x)$

$$96 = 3x$$

$$32 = x$$

3. altitude

4. perpendicular bisector

5. D

6. D

7. C

8. B

9. $x + 3 = 3x - 3 \rightarrow 3 = 2x - 3 \rightarrow 6 = 2x \rightarrow x = 3 \rightarrow A$

6. $LF = 15, HF = 45$

7. $KL = 5, LE = 10$

8. $LJ = 12, DJ = 36$

9. $3a + 5 = -2a + 15$

$$5a = 20 \rightarrow a = 4$$

$$x_U = x_W = 3(4) + 5 = 17$$

10. ?

11. (a) $S = (n - 2) \times 180 = (18 - 2) \times 180 = 2,880^\circ$

(b) 160° (c) $180 - 160 = 20^\circ$

12. $x = 110^\circ$ $y = 102^\circ$ $z = 82^\circ$

13. $8x + 7x = 180 \quad | \quad 7(12) = y$

$$15x = 180 \quad | \quad \downarrow$$

$$x = 12 \rightarrow y = 84$$

14. $5y = x + 8 \quad | \quad 3y + 8 = 2(5y - 8) - 4$

$$x = 5y - 8 \quad | \quad 3y + 8 = 10y - 16 - 4$$

$$x = 5(4) - 8 \quad | \quad 8 = 7y - 20$$

$$x = 12 \quad | \quad 4 = y$$



15. yes

17. Rectangle

$$m\angle 1 = 40^\circ$$

$$m\angle 2 = 100^\circ$$

$$m\angle 3 = 50^\circ$$

$$m\angle 4 = 80^\circ$$

19. $4x+1=5x-15$

$$16=x$$

16. yes

18. Square

$$m\angle 1 = 45^\circ$$

$$m\angle 2 = 45^\circ$$

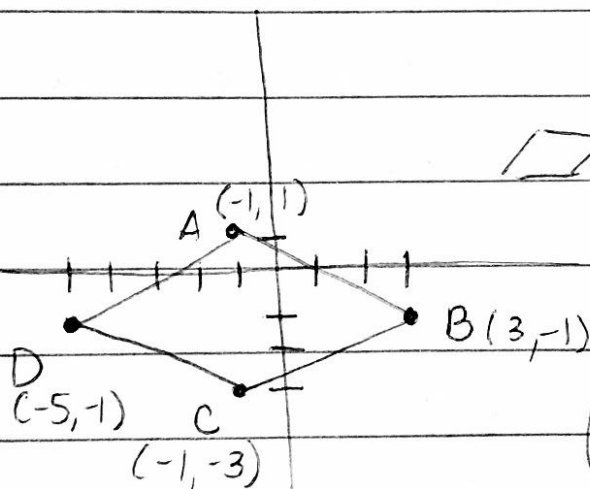
20. $3x-2 = \frac{1}{2}(x+1+10)$

$$3x-2 = \frac{1}{2}(x+11)$$

$$6x-4 = x+11$$

$$5x = 15 \rightarrow x = 3$$

21.



$$m_{DC} = \frac{-3-1}{-1-5} = \frac{-2}{4} = -\frac{1}{2} \checkmark$$

$$m_{AB} = \frac{-1-1}{3-1} = \frac{-2}{2} = -1 \checkmark$$

$$DC = \sqrt{(-5-1)^2 + (-1-3)^2} = \sqrt{16+4} = \sqrt{20} = 2\sqrt{5} \checkmark$$

$$AB = \sqrt{(3-1)^2 + (-1-1)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2} \checkmark$$

$$m_{AC} = \frac{-3-1}{-1-1} = \frac{-4}{0} = \text{undefined} \rightarrow \text{vertical} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{Rhombus}$$

$$m_{BD} = \frac{-1-1}{-5-3} = \frac{-2}{-8} = \frac{1}{4} \rightarrow \text{horizontal} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\}$$

AC = 4 units } not a rectangle
 BD = 8 units }


Quadrilateral ABCD is a Rhombus.

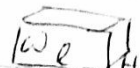
Review #2


1. C


2. A

3. D

4. A)  Rectangle

B)  Rectangular Prism

C)  Rectangle + 2
Semi-circles

D)  Cone + hemisphere

5. $V = \left(\frac{1}{2}bh\right)H$

$V = \left(\frac{1}{2} \cdot 12 \cdot 10\right) \cdot 9 = 540 \text{ cm}^3$

6. $V = \frac{1}{3}\pi(6)^2(\sqrt{11^2 - 6^2})$

$V \approx 347.6 \text{ ft}^3$

7. $SA = 2\pi r^2 + 2\pi rh$

$2\pi(12)^2 + 2\pi(12)(7)$

$288\pi + 168\pi$

$456\pi \rightarrow D$

8. $55 \times 3^3 = 1485 \text{ shirts}$

9. $V = \left(\frac{1}{2}(b_1 + b_2)h\right)H$

$= \left(\frac{1}{2}(4+6)5\right)4$

$= 100 \text{ in}^3$

10. $V = (7^3 - (\pi \cdot 1.5^2 \cdot 7)) \times 1000$

$343 - 1575$

Not possible

11. $V = \pi r^2 h + \frac{2}{3}\pi r^3$

$= \pi(13)^2(17) + \frac{2}{3}\pi(13)^3$

$2873\pi + 1464.7\pi$

$13,627.2 \text{ m}^3$

12. $V = 57,456 \text{ in}^3$

$\frac{207116 \cdot 1728 \text{ in}^3}{1 \text{ ft}^3} = 62.316 \text{ ft}^3$

$57,456 \text{ in}^3 \quad 1 \text{ ft}^3 \quad \text{A}^3$

13. $\frac{344,234 \text{ ppl}}{165.9 \text{ mi}^2} = 2074 \text{ ppl per mi}^2$

14. $V = 452.39 \times 50 + \frac{1}{3}\pi(452.39)(12)$

$V = 24,429.06 \text{ ft}^3, \text{ (19,637 bushels)}$

15. $V = 1008 \text{ cm}^3 \times 30 = 30,240 \text{ cm}^3$

A) $7,560 \text{ cm}^3$ marbles (252 ^{cm³} each vase)

B) vol of 1 marble is $\frac{4}{3}\pi(1.5)^3 = 14.1 \text{ cm}^3$, about 18 marbles

C) \$54, yes.

Review #3

1. 65°

3. $3^2 + x^2 = 6^2$

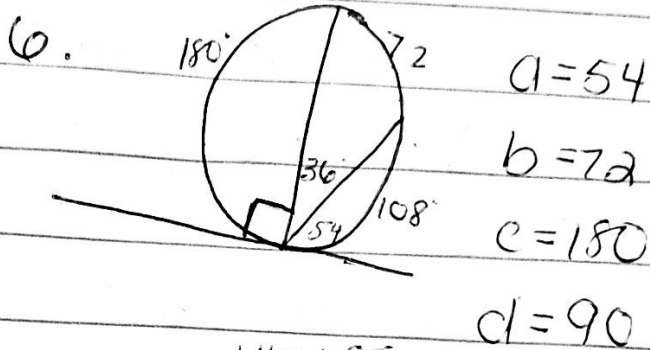
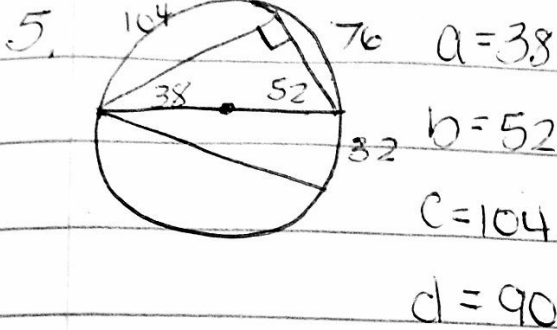
$$x = \sqrt{6^2 - 3^2} = \sqrt{27}$$

$$x = 3\sqrt{3}$$

2. $4 + 4 + 6 + 6 \rightarrow 6$

4. $x^2 + 6^2 = 8^2$

$$x = \sqrt{8^2 - 6^2} = \sqrt{28} = 2\sqrt{7}$$



7. $x = \frac{250 - 110}{2} = 70$

8. $x = \frac{140 + 85}{2} = 112.5$

$$y = 180 - 112.5 = 67.5$$

9. $10x = 7(8)$

$$x = 5.6$$

10. $6(6+x) = 5(21)$

$$36 + 6x = 105$$

$$6x = 69$$

$$x = 11.5$$

11. $x^2 = 6(18)$

$$x^2 = 108$$

$$x = \sqrt{108} = 6\sqrt{3}$$

12. $C(-1, -3) \quad r = 1$

13. $(x^2 - 2x + 1) + (y^2 + 4y + 4) = 4 + 4$

14. $(4x^2 - 4x) + (4y^2 + 2y) = 1$

$(x-1)^2 + (y+2)^2 = 9$

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

$C(1, -2) \quad r = 3$

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

15. $C(1, \frac{1}{2})$

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

$(-2-1)^2 + (7+\frac{1}{2})^2 = r^2$

$(x - \frac{1}{2})^2 + (y + \frac{1}{4})^2 = \frac{9}{16}$

$9 + 56.25 = r^2$

$4(x - \frac{1}{2})^2 + 4(y + \frac{1}{4})^2 = \frac{9}{4}$

$65.25 = r^2$

$C(\frac{1}{2}, -\frac{1}{4}) \quad r = \frac{3}{2}$

$(x-1)^2 + (y+\frac{1}{2})^2 = 65.25$

$$16. L = \frac{144}{360} \cdot 8\pi = \frac{2}{5} \cdot 8\pi = \frac{16}{5}\pi$$

$$A = \frac{144}{360} \cdot \pi(4)^2 = \frac{2}{5} \cdot 16\pi = \frac{32\pi}{5}$$

$$17. L = \frac{3}{4} \cdot 18\pi = 13.5\pi$$

$$A = \frac{3}{4} \cdot 9^2\pi = 60.75\pi$$

$$18. 10^2 + 20^2 \stackrel{?}{=} (10\sqrt{5})^2$$

$$100 + 400 = 500$$

✓

yes, a tangent.

$$19. (x+2)^2 + (y-3)^2 = 25$$

$$(y-3)^2 = 25 - (x+2)^2$$

$$y-3 = \pm \sqrt{25 - (x+2)^2}$$

$$y = 3 \pm \sqrt{25 - (x+2)^2}$$

$$(-5, 7) \quad (3, 3) \quad (-6, 6)$$

$$(-2, 8) \quad (-7, 3) \quad (-5, -1)$$

$$(1, 7) \quad (-6, 6) \quad (1, -1)$$

$$(2, 4) \quad (-2, -2) \quad (7, 0)$$

Stable in calculator → 12 points

$$20. 18 = \underline{x} \cdot 12\pi$$

$$2\pi$$

$$18 = 6x$$

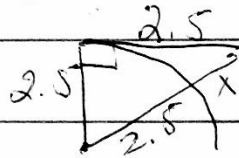
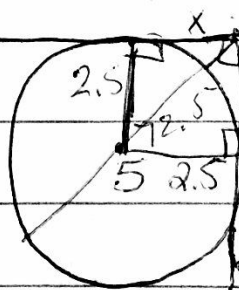
$$3 = x$$

$$21. (x+1)^2 + (y-3)^2 = 25$$

22. answers may vary.

$$23. 1x^2 + 1y^2 = 9$$

24.



$$2.5^2 + 2.5^2 = (2.5+x)^2$$

$$6.25 = 6.25 + 5x + x^2$$

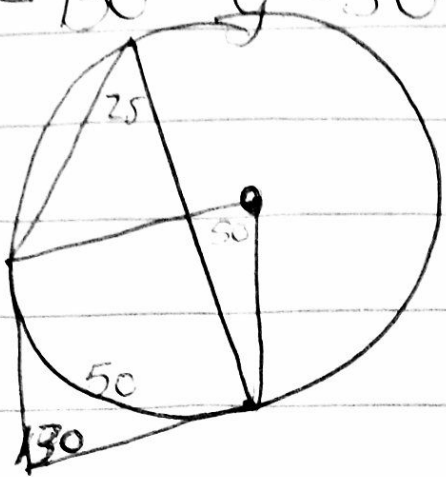
$$x^2 + 5x - 6.25 = 0$$

$$x = \frac{-5 \pm \sqrt{25 - 4(1)(-6.25)}}{2}$$

$$= \frac{-5 \pm 10}{2}$$

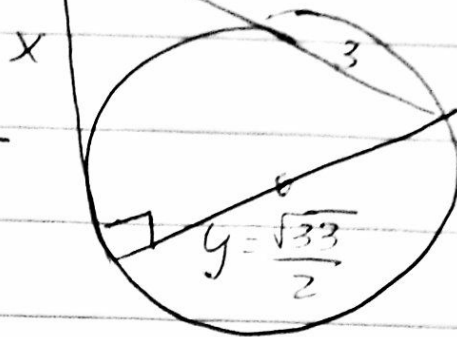
$$x = \frac{-5 + 5\sqrt{2}}{2} \quad \frac{-5 + 5\sqrt{2}}{2}$$

$$25. \quad x = 130 \quad y = 50$$



$$26. \quad x = 2\sqrt{22} \quad y = \frac{\sqrt{33}}{2}$$

$$\frac{\sqrt{88}}{2\sqrt{22}}$$



$$27. \quad 18 = \frac{x}{2\pi} \cdot 12\pi \rightarrow 28. \quad 40 = \frac{x}{2\pi} \cdot 24\pi$$

$$2\pi$$

$$18 = 6x$$

$$3 = x$$

$$2\pi$$

$$40 = 12x$$

$$\frac{10}{3} = x$$

$$A = \frac{10}{3} \cdot \pi (12)^2 = 240$$

$$2\pi$$

$$\text{cm}^2$$

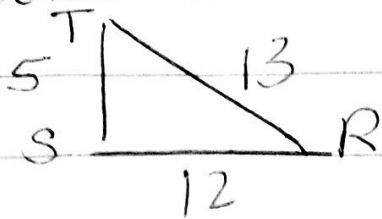
$$29. \quad \text{length} = \frac{2\pi}{3}$$

$$2\pi$$

$$\bullet 36\pi = \frac{2\pi}{3} \cdot 18 = 12\pi$$

radians

Review #4



$$1. \sin R = \frac{5}{13}$$

$$2. \sin T = \frac{12}{13}$$

$$3. \cos T = \frac{5}{13}$$

$$4. \cos R = \frac{12}{13}$$

$$5. \sin 37 = \frac{x}{12}$$

$$x = 12 \sin 37$$

$$x = 7.2$$

$$6. \tan x = \frac{47}{25}$$

$$x = \tan^{-1}\left(\frac{47}{25}\right) = 62.0^\circ$$

$$7. \cos 48 = \frac{5}{x}$$

$$x = \frac{5}{\cos 48} = 7.5$$

$$8. \cos x = \frac{6.5}{10}$$

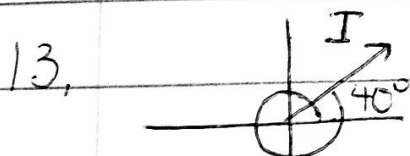
$$x = \cos^{-1}\left(\frac{6.5}{10}\right) = 49.5^\circ$$

$$9. \frac{270^\circ \cdot \pi}{180} = \frac{3\pi}{2}$$

$$10. \frac{-100^\circ \cdot \pi}{180} = \frac{-5\pi}{9}$$

$$11. \frac{5\pi \cdot 180}{\pi} = 900^\circ$$

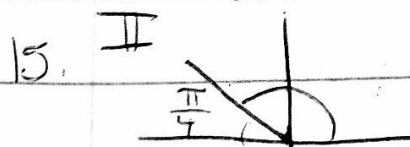
$$12. \frac{-5\pi \cdot 180}{6\pi} = -150^\circ$$



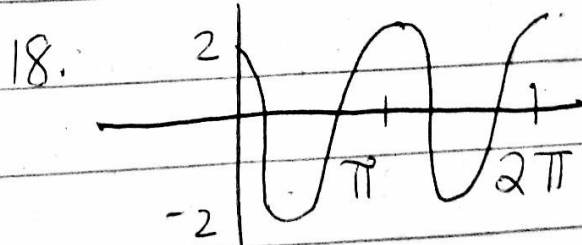
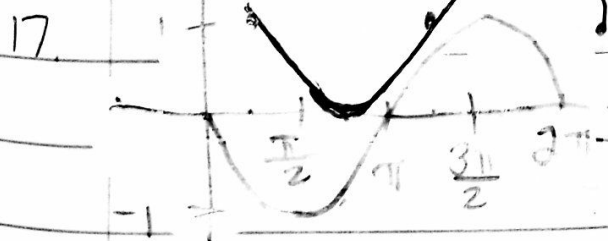
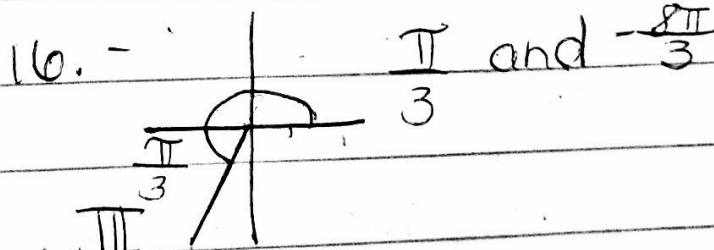
40° and -320°



-555° and 165°



$\frac{3\pi}{4}$ and $-\frac{5\pi}{4}$



19. $\sin 30^\circ = \frac{1}{2}$

20. $\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$

21. $\cos 180^\circ = -1$

22. $\sin \left(\frac{4\pi}{3} \right) = \frac{-\sqrt{3}}{2}$

23. $\frac{\pi}{3}, \frac{2\pi}{3}$

24. $\frac{2\pi}{3}, \frac{4\pi}{3}$

25. 3 full cycles and $\frac{1}{3}$ of another

26. 270°

27. cosine

28. $18 = \frac{4}{2\pi} \cdot \pi(2r) = 4r$
 $r = 9/2$ ft.

29. travel = $\frac{36}{60} \cdot 4 \cdot 4\pi = 2.64\pi$

$\frac{36}{60} = \frac{x}{2\pi}$

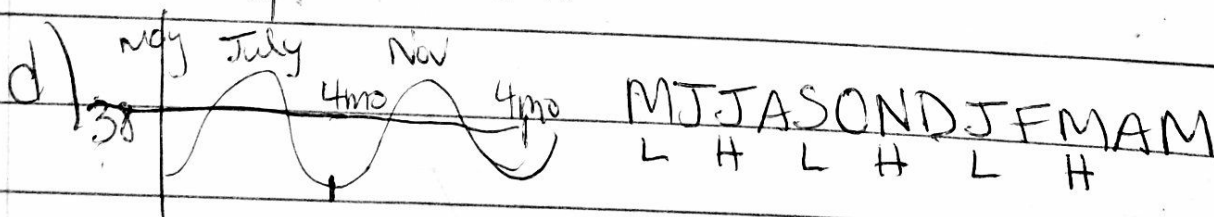
b) ≈ 8.29 m.

a) $1 \cdot 2\pi$ radians

30. a) midline (or avg)

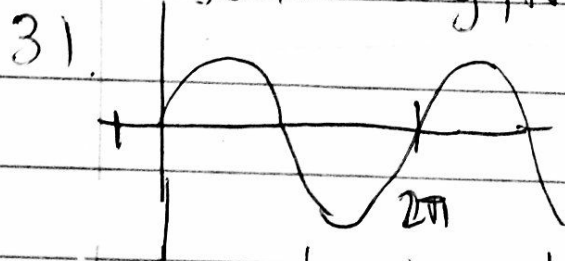
b) fluctuate 11 points above/below avg.

c) $p = \frac{2\pi}{\frac{2\pi}{4}} = 2\pi \cdot \frac{4}{2\pi} = 4 \rightarrow 4$ months



Buy = May, September, January

Sell = July, November, March

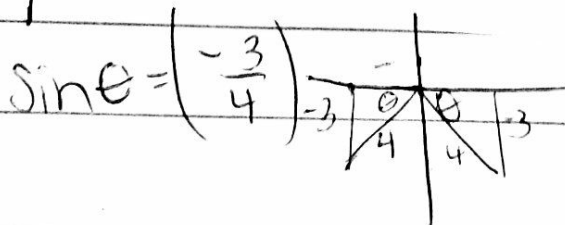


$\sin(2) = 0.91$

$\sin\left(\frac{11\pi}{6}\right) = -0.5$

approximately

229° and 311°



Review #10

(odds) (evens = opt)

1. $-2n^3 + 3n^2 - n - 3$

Cubic (4 terms)

3. $x(x^2 - 2x - 35)$

$x(x-7)(x+5)$

5. $(x-2)(x^2 + 2x + 4)$

2. down & down

As $x \rightarrow -\infty, f(x) \rightarrow -\infty$
As $x \rightarrow \infty, f(x) \rightarrow \infty$

4.
$$\begin{array}{r|rrrr} -4 & 1 & k & -20 & -4k+16-20=0 \\ & \downarrow & -4 & -4k+16 & -4k-4=0 \\ & 1 & k-4 & 16 & -4k=4 \\ & & & & k=-1 \end{array}$$

6. $x = 5, -5/3$

$$x = \frac{7 \pm \sqrt{49 - 4(1)(15)}}{2(1)} = \frac{7 \pm \sqrt{11}}{2}$$

7. $y = (x-1)(3x-4)(x+4)^2$

$y = 2(x-1)(3x-4)(x+4)^2$

8. $x = 3, x = 4$ mult(2) $\rightarrow (x)$

$x = 0$ mult(2), $x = -1$ mult(3) $\rightarrow (x^3)$

9. (a) $w^4 - 13w^2 + 36 = 0$

$(w^2 - 9)(w^2 - 4) = 0$

$(w+3)(w-3)(w+2)(w-2) = 0$

$w = \{-3, -2, 2, 3\}$

(b) $(x+3)(x^2 - 3x + 9)$

$$x = \frac{3 \pm \sqrt{9 - 4(1)(9)}}{2(1)}$$

$x = \left\{ -3, \frac{3 \pm 3\sqrt{3}}{2} \right\}$

(c) $t(t^2 - 3t - 10) = 0$

$t(t-5)(t+2) = 0$

$t = \{-2, 0, 5\}$

(a) vert. stretch (b) left + 5

by 2

(c) reflect over x-axis

up 4

10.
$$\begin{array}{r|rrrrrr} -2 & 1 & -1 & 0 & 8 & -9 & 30 \\ & \downarrow & -2 & 6 & -12 & 8 & 2 \\ & 1 & -3 & 6 & -4 & -1 & 32 \end{array}$$

-2 is not a factor of

$p(x)$.

$p(-2) = 32$

11.
$$\begin{array}{r|rrrrr} 2 & 1 & -3 & a & -6 & 14 \\ & \downarrow & 2 & -2 & -1 & -14 \\ & 1 & -1 & \frac{-1}{2} & -7 & 0 \end{array}$$

$a - 2 = -\frac{1}{2} \rightarrow a = -\frac{1}{2} + 2 = \left(\frac{3}{2}\right)$

$$13. \begin{array}{r|rrr} -1 & -1 & 4 & 87 \\ & \downarrow & 1 & -5 \\ \hline & -1 & 5 & 82 \end{array}$$

$$-x + 5 + \frac{82}{x+1}$$

14. (a) 4 complex, 2 real, 2 mag
(b) 5 complex, 5 real
mult 2 at -3

$$15. (a) 3x(2x^2 + 5x + 4) \quad (b) \begin{array}{r|rrr} 2 & 10 & 11 & 12 \\ & \downarrow & 2 & 4 & 30 \\ \hline & 1 & 2 & 15 & 42 \end{array}$$

$$= 2x^2 + 5x + 4$$

$$x^2 + 2x + 15 + \frac{42}{x-3}$$

(c)

$$\begin{array}{r} \boxed{x^2 + 0x + 2} \\ \hline \begin{array}{r} x^3 - 3x^2 + x - 6 \\ - (x^3 + 0x^2 + 2x) \\ \hline -3x^2 - x - 6 \\ - (-3x^2 + 0x + 6) \\ \hline 0 \end{array} \end{array} = x - 3$$

16. $\max \approx 8.5$
 $\min \approx 2$

(a) $x^2(x+2) + 3(x+2) = 0$
 $(x^2 + 3)(x+2) = 0$
 $x = -2 \quad x = \pm i\sqrt{3}$

(b) $3x^3(x-1) + 1(x-1) = 0$
 $(3x^3 - 1)(x-1) = 0$
 $x = 1 \quad x = \pm \frac{\sqrt{3}}{3}$

18. $y = (x+2)^2(x-5)$

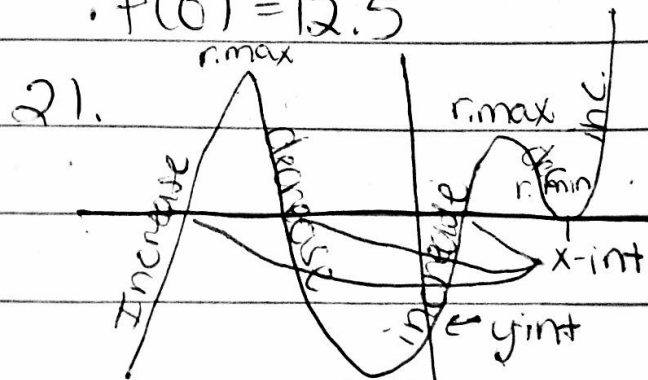
19. 12.5, y-int.
 $f(0) = 12.5$

20. $b = 20$

$2b+1 = 41$

$b+5 = 25$

$lwh = (20)(41)(25)$



As $x \rightarrow -\infty, f(x) \rightarrow -\infty$
As $x \rightarrow \infty, f(x) \rightarrow \infty$

Review #5

1. A) $f(-2) = -15$

B) $f(3-x) = 2(3-x) - 11$

$= 6 - 2x - 11$

$= -2x - 5$

C) $f^{-1}(x) = \frac{x+11}{2}$

$x = 2y - 11$

$x+11 = 2y$

4. $x = 4(y-1)^2$

$\frac{x}{4} = (y-1)^2$

$\pm\sqrt{\frac{x}{4}} = y-1$

$y = 1 \pm \frac{\sqrt{x}}{2}$; no

7. up 2

8. right 1

9. reflect over x-axis

vert. stretch by 3

10. a) $f(-3) = -3$

b) $g(-3) = 2$

c) $(f+g)(x) = 4x+9 + -2x-4$

$= 2x+5$

d) $(f+g)(-3) = -1$

e) $(f+g)(x) =$

$f(x) + g(x)$

11. $x = \frac{1}{10}y$
 $y = 10x$

$x = 10^y$
 $\log_{10} x = y$

$f(x)$ and $h(x)$

$g(x)$ and $j(x)$

20. $x+5 \leq 6.5$ $x+5 \geq -6.5$

21. $x \approx \{-0.94, 1.21, 2.92, 4.83\}$

22. A. $x \approx 1.21$

B. $x = 0$

2. $x = 27y^3 - 1$

$x+1 = 27y^3$

$\frac{x+1}{27} = y^3$

$y = \sqrt[3]{\frac{x+1}{27}} = \frac{\sqrt[3]{x+1}}{3}$; yes

3. $x = \frac{1}{3}y + 3$

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

$y = 3x - 9$; yes

5. $x = y^2 \rightarrow y = \pm\sqrt{x}$

6. $x = 3y + 1$

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

$$23. x = -\frac{1}{3}$$

$$y = 3^{\frac{2}{3}}$$

$$24. \begin{array}{r} 2x - 3y = -6 \\ -2(x + 2y = 11) \\ \hline x + 2(4) = 11 \\ x + 8 = 11 \rightarrow x = 3 \\ \hline -7y = -28 \\ y = 4 \end{array}$$

$$25. 0 < x < 4$$

$$26. (-4, 0) \text{ and } (3, 7)$$

$$27. a) \$106.85$$

$$28. y = 93e^{-0.09t}$$

$$b) 6 \text{ or } 5.5$$

c) the first one

$$d) 5.025 \text{ GB}$$

$$29. \begin{array}{r} 3(2x + 3y = 26.35) \\ -4(1.5x + 2y = 18.35) \\ \hline 6x + 9y = 79.05 \\ -6x - 8y = -73.40 \\ \hline y = 5.65 \end{array}$$

$$30. x = -\frac{3}{2}y - 3$$

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

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

reflection over $y=x$

$$6x + 9y = 79.05$$

$$-6x - 8y = -73.40$$

$$y = 5.65$$

$$x = \frac{26.35 - 3(5.65)}{2}$$

2

$$x = 4.70$$

cheese = \$4.70/lb

loaf = \$5.65/lb

$$32. \begin{array}{c|c|c|c|c|c} x & 2 & 4 & 9 & 4 & 12 \\ \hline f^{-1}(x) & 1 & 2 & 3 & 4 & 5 \end{array}$$

not a function,

multiple outputs at 4

$$33. A) 80,000 + 1,000x$$

$$B) 60,000(1.04)^x$$

after 11 years

Review #7

1. $d(-\infty, \infty)$

2. $d(-\infty, \infty)$

3. $r(-1, \infty)$

$r(0, \infty)$

3. $d(0, \infty)$

4. $d(-1, \infty)$

$r(-\infty, \infty)$

$r(-\infty, \infty)$

5. growth

6. decay

0.5

1.023

67%

2%

7. decay

8. growth

.35

400

400%

320%

9. $\log_9 729 = 3$

10. $\ln \frac{1}{2} = -x$

11. $10^3 = n$

12. $e^0 = 1$

13. 3

14. -2

15. 0

16. $\frac{1}{2}$

17. $\log_3 9 = (3^2)^2 = 3^2$

18. $-\frac{1}{3}$

$3x = 2$

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

19. $\frac{1}{20}$

20. A & C

for B, limit to $x: (0, \infty)$

21. $x \approx 3.3$

22. $2 - 4^x = -62$

$-4^x = -64$

$4^x = 64 \rightarrow x = 3$

$$23. 3^4 = (x+1)$$

$$81 = x+1$$

$$80 = x$$

$$25. 36^{x+1} = 6$$

$$6^{2(x+1)} = 6^1$$

$$2(x+1) = 1$$

$$2x+2 = 1$$

$$2x = -1$$

$$x = -\frac{1}{2}$$

$$27. x+1 = 2x-11$$

$$12 = x$$

$$24. 3x \ln e = \ln 20$$

$$3x = \ln 20$$

$$x = \frac{\ln 20}{3}$$

$$26. 10^{-2} = x$$

$$\frac{1}{10^2} = x$$

$$\frac{1}{100} = x$$

$$28. x+2 = 4x$$

$$2 = 3x$$

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

$$29. (a) \text{V.A. } x=0$$

$$\text{H.A. } y=1$$

$$\text{domain } (-2, 0) \cup (0, \infty)$$

$$\text{range } (-\infty, -1) \cup (-1, \infty)$$

$$(b) \text{V.A. } x=2$$

$$\text{H.A. } y=1$$

$$\text{dom } (-\infty, 2) \cup (2, \infty)$$

$$\text{ran } (-\infty, 1) \cup (1, \infty)$$

$$30. y = \frac{4}{x+2} - 4$$

$$31(a) \text{VA } x=2, x=-2$$

$$\text{H.A. } y=0$$

$$\text{dom } (-\infty, -2) \cup (-2, 2) \cup (2, \infty)$$

$$\text{x-int } (0, 0)$$

$$\text{y-int } (0, 0)$$

$$31 (b) y = \frac{x(3x+2)}{x} = 3x+2 \quad 31(c) y = \frac{(x+4)(x-4)}{x^2+4}$$

V.A. none

H.A. none

dom $(-\infty, 0) \cup (0, \infty)$

x-int: $(-2/3, 0)$

y-int: none

V.A. $x = \pm \sqrt{-4}$ none

H.A. $y=1$

dom $(-\infty, \infty)$

x-int $(4, 0), (-4, 0)$

y-int $(0, -4)$

$$32. \frac{5x^2y}{10xy^4} = \frac{x}{2y^3}$$

$x \neq 0$

$y \neq 0$

$$33. \frac{2d(2d+4)}{2d} = 2d+4$$

$2d$

$d \neq 0$

$$34. \frac{(x+6)(x+3)}{x+6} = x+3$$

$x \neq -6$

$$35. \frac{(x+2)(x+1)(x-1)}{(x-1)(x+2)} = x+1$$

$x \neq 1, -2$

$$36. \frac{2(x+2)(x+6)(x-6)}{x(x-6)4(x+2)}$$

$x(x-6)4(x+2)$

$x+6$

$2x$

$x \neq 0, 6, -2$

$$37. \frac{(x-4)(x+2)}{(x+3)} \cdot \frac{x+3}{x-4}$$

$x+2$

$x \neq -3, 4$

$$38. \frac{(x+2)(x-2)(x^2+2x-5)}{(x^2+2x-5)(x+2)}$$

$(x^2+2x-5)(x+2)$

$x-2$

$x = -2$

$x \neq -2 \pm \sqrt{4-4(1)(-5)}$

$x \neq -1 \pm \sqrt{6}$

$$39. \frac{2+3x}{2x} = \frac{2+3x}{2x} \cdot \frac{2x}{2x} = 1$$

$x \neq 0, -2/3$

$$40. \frac{(4x+13)}{x-3} \left(\frac{2}{2} \right) \left(\frac{x+3}{x+3} \right) + \frac{(x+2)}{(2x+6)} \left(\frac{x-3}{x-3} \right)$$

$$\frac{(4x+13)(2x+6) + (x^2-x-6)}{2(x+3)(x-3)}$$

$$\frac{8x^2 + 50x + 78 + x^2 - x - 6}{2(x+3)(x-3)} = \frac{7x^2 + 49x + 72}{2(x+3)(x-3)}$$

$$x \neq -3, 3$$

$$41. \frac{3x+7}{x-2} \left(\frac{2}{2} \right) + \frac{-3x-15}{2(x-2)} = \frac{6x+14-3x-15}{2(x-2)}$$

$$\frac{3x-1}{2(x-2)} \quad x \neq 2$$

$$42. \frac{2}{x-1} \left(\frac{-1}{-1} \right) + \frac{-3}{-(x-1)} = \frac{-2-3}{-(x-1)} = \frac{-5}{-x+1} = \frac{5}{x-1} \quad x \neq 1$$

43. Because you are multiplying by $\frac{2}{2}$, which is 1

$$44. \frac{2}{(x+1)(x-1)} = \frac{4}{x+1} \left(\frac{x-1}{x-1} \right) \quad 45. \frac{3}{x+4} \left(\frac{4}{4} \right) + \frac{5}{4} \left(\frac{x+4}{x+4} \right) = \frac{18}{x+4}$$

$$2 = 4x - 4$$

$$6 = 4x$$

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

$$12 + 5x + 20 = 72$$

$$5x = 40$$

$$x = 8$$

$$46. 2 \left(\frac{1}{2} \right)^6 \quad \left(\frac{1}{2} \right)^5 \quad 2 \left(\frac{1}{4} \right)^3$$

$$2 \left(\frac{1}{2^6} \right) \quad \frac{1}{2^5} \quad 2 \left(\frac{1}{4^3} \right)$$

$$2 \left(\frac{1}{64} \right) \quad \frac{1}{32} \quad 2 \left(\frac{1}{64} \right)$$

$$\frac{1}{32}$$

$$\frac{2}{64}$$

$$\frac{1}{32}$$

Review #9

1. a) $V = x(16-2x)(20-2x)$

b) Either 2in \times 12in \times 16in

or 4in \times 8in \times 12in

2. a) $p = -63.3x^3 + 3050x^2 + 271,833.3x + 6790000$
with x representing years since 1970

b) $2.01 \times 10^7 = 20,100,000$

c) according to this model, it happened around 1904 and will never happen again.

\rightarrow It will come close (20,465,219) in 2027.

3. Graphs B, C, D, E have inverse functions

For Graph A, break apart at y-axis

For F, at y-axis

For G, at y-axis

For H, break apart at the rel. min/max

4. Either $x \leq 3$ or $x \geq 3$

5. a) The least zero for $f(x)$ is 2 / difference is
 $g(x)$ is -3 / 5 units

b) $f(x)$ has the largest rel. maximum

c) $f(x)$ is cubic, so different behavior on each end, while $g(x)$ is quartic with the same behavior on each end.

6. The lowest possible degree is 4. (FTA)

It could be and even # above 4 if

only part of the graph is shown.

7. $y = (x-1)^2(x-2)(x-3)$

↳ touch and turn

8. $f(x)$ has a higher y int.

$g(x)$'s y -int is -6 .

Recited #10

9. $y = 48000 (1 - .15)^5 = \$21,300$

10. $y = 900 e^{.06(5)} = \$1,214.87$

11. $28,500 = 1500p \rightarrow p = 95\%$

12. $\frac{x}{5} + \frac{x}{4} + \frac{x}{6} + \frac{x}{3} = 10$
 $\frac{12x + 15x + 10x + 20x}{60} = \frac{600}{60}$

unrealistic
people

tend to

talk when

or
1.1 min/problem $x = 10.5$ min. grouped together

However, if they divide and conquer,
this is feasible.

13. a) $x = -4, -2, 1$

b) as $x \rightarrow -\infty, f(x) \rightarrow -\infty$

as $x \rightarrow \infty, f(x) \rightarrow \infty$

c) Increasing $(-\infty, -3.1) \cup (-.2, \infty)$

Decreasing $(-3.1, -.2)$

14. a) 2π

b) rel max -2 , rel min -8

increasing $(-2\pi, -\frac{3\pi}{2}) \cup (-\frac{\pi}{2}, \frac{\pi}{2}) \cup (\frac{3\pi}{2}, 2\pi)$

decreasing $(-\frac{3\pi}{2}, -\frac{\pi}{2}) \cup (\frac{\pi}{2}, \frac{3\pi}{2})$

lines of symmetry, any reflection over
a max or min point would produce

symmetry.

$$15. f(x) = \frac{x+4}{-x+2} = \frac{x+4}{-(x-2)}$$

Vertical Asymptote at $x=2$

Horizontal Asymptote at $y=-1$

$$16. \text{ domain } [-3, 7)$$

$$\text{ range } [-5, 9]$$

x -int $(0,0)$, y -int $(0,0)$

relative min. $(0,0)$

no relative maximums

no end behavior

discontinuity at $x=3$

$$17. y = 2|x+4| - 1$$

18. because when you solve for x , you have

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

added 3 to x ,
moving you right!

$$y(x-3) = 1$$

$$yx - 3y = 1$$

$$yx = 1 + 3y$$

$$x = \frac{1+3y}{y}$$

$$x = \frac{1}{y} + 3$$

120. skip

21. $2 = 1(1.0114)^t$ $t = 60$, so 2068

22. from the last week of december to
end of june.

23. $h(-4) = 0.0625$

$$3h(0) + 2h(-3) - h(-6)$$

$$3(\text{undefined}) + 2(-1) - 0.0156 \rightarrow \text{undefined}$$

domain, all real numbers except 0

$$(-\infty, 0) \cup (0, \infty)$$

24. \$11.45 for all boxes below $12\frac{1}{3}$ lbs!

or \$5.57 plus \$0.72/lb for each pound

25. $V = (x)(30-2x)(16-2x)$

$$x = 3.\bar{3}$$

$$(3.\bar{3} \times 36.\bar{6} \times 22.\bar{6}) \text{ cm}^3$$

26. $f(x, y) = 20x + 22y$ where $x, y = \# \text{ hrs}$ ^{of} chef

tomato: $6x + 12y \geq 120$

potato: $5x + 4y \geq 50$

at 10 and 25 hours \Rightarrow \$2.50

3

3

chef 1

chef 2

27.	$0 \leq x \leq 10$	$10 \leq x \leq 20$	$20 \leq x \leq 30$	$30 \leq x \leq 40$	$40 \leq x \leq 50$
x^3	$\frac{1000 - 0}{10} = 100$	$\frac{8000 - 1000}{10} = 700$	$\frac{27000 - 8000}{10} = 1900$	$\frac{64000 - 27000}{10} = 3700$	$\frac{125000 - 64000}{10} = 11500$
$1.3x$	$\frac{13000 - 1}{10} = 1300$	$\frac{19005 - 13750}{10} = 17.6$	$\frac{2620 - 190.05}{10} = 242.995$	$\frac{36119 - 2620}{10} = 3349.9$	$\frac{497929 - 36119}{10} = 46181$

around $x = 40$

on graph, at $x = 43$