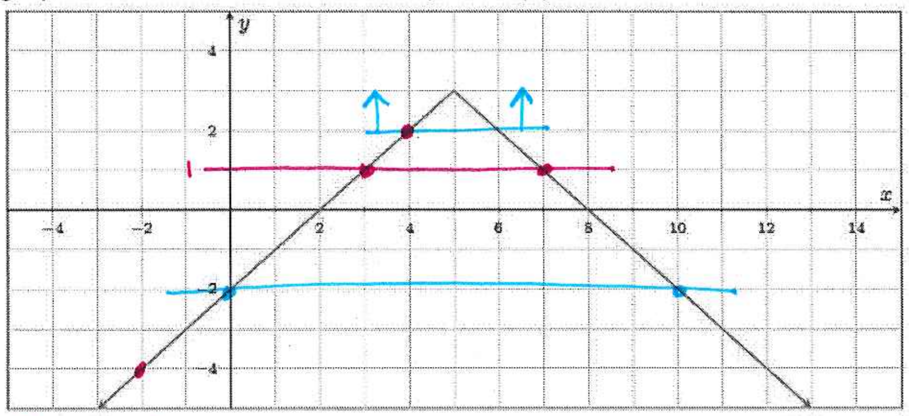
**Math 95** **Final Review** **Name** Solutions

Sections 2.1, 2.2, 3.1, 3.3 – 3.5, 8.1 – 8.4, 6.1 – 6.5, 7.1 – 7.6

**Part 1 – Graphing Calculator Needed. You may return to this part of the test if you have time. Practice showing all of your steps in proper form as you will on the test.**

1. Answer the following for the graph shown.

$y = w(x)$



a. Does the graph represent a function? Why or why not? Yes, because it passes the vertical line test.

b. What is the value of $w$ at 4? $f(4) = 2$

c. Where does $w$ have a value of 1? at $x = 3$ and $x = 7$

d. $w(-2) =$ $-4$

e. What are the solutions to $w(x) = -2$? $\{0, 10\}$

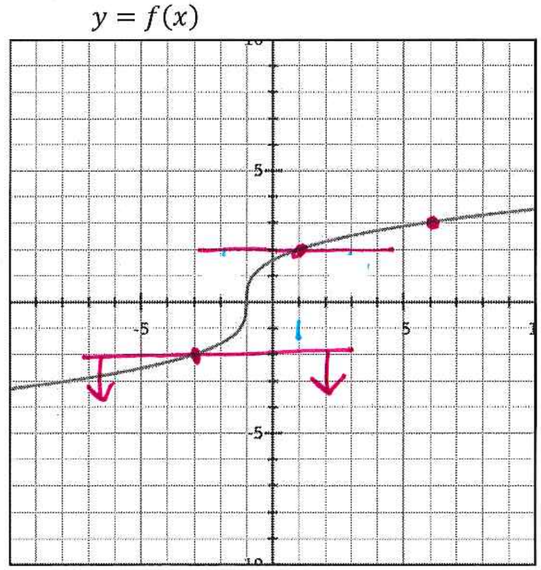
f. What is the solution to the inequality $w(x) > 2$ in interval or set notation. $(4, 6)$ or $\{x \mid 4 < x < 6\}$

g. What is the domain of $w$ in set or interval notation? $\mathbb{R}$

h. What is the range of $w$ in set or interval notation? $(-\infty, 3]$

2. Answer the following for the graph of $y = f(x)$ shown.

$y = f(x)$



a. Where does $f$ have a value of 3? at $x = 6$

b. What is the value of $f$ at -1? $f(-1) = 0$

c. Solve $f(x) = 2$. $\{1\}$

d. Solve $f(x) < -2$. $(-\infty, -3)$ or $\{x \mid x < -3\}$

e. What is the domain of $f$ in set or interval notation? $\mathbb{R}$

f. What is the range of $f$ in set or interval notation? $\mathbb{R}$

3. Solve graphically, symbolically and numerically and write the solution set. Show your solution(s) on your table and graph.

a. $\underbrace{4 - 2x}_{y_1} > \underbrace{1 + x}_{y_2}$

$y_1$: Line, $m = -2$, $b = 4$

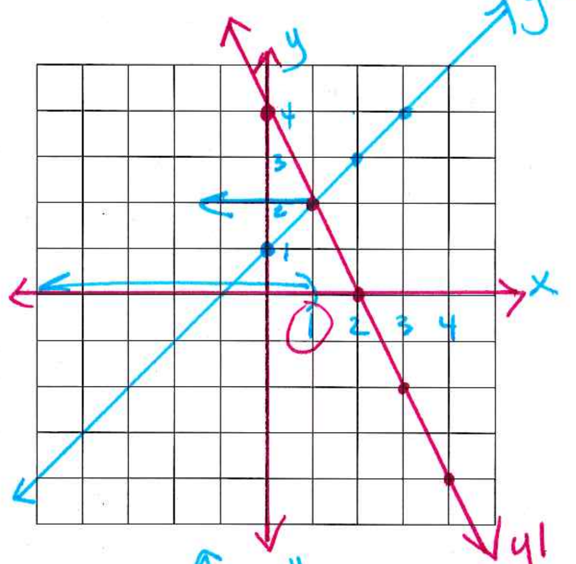
$y_2$: Line, $m = 1$, $b = 1$

$y_1 > y_2$

| X | $y_1$ | $y_2$ |
|---|---|---|
| −1 | 6 | 0 |
| 0 | 4 | 1 |
| 1 | 2 | 2 |
| 3 | −2 | 4 |

$4 - 2x > 1 + x$
$\quad -x \quad\quad -x$
$4 - 3x > 1$
$-4 \quad\quad -4$
$\frac{-3x}{-3} > \frac{-3}{-3}$
$x < 1$

$\{x \mid x < 1\}$



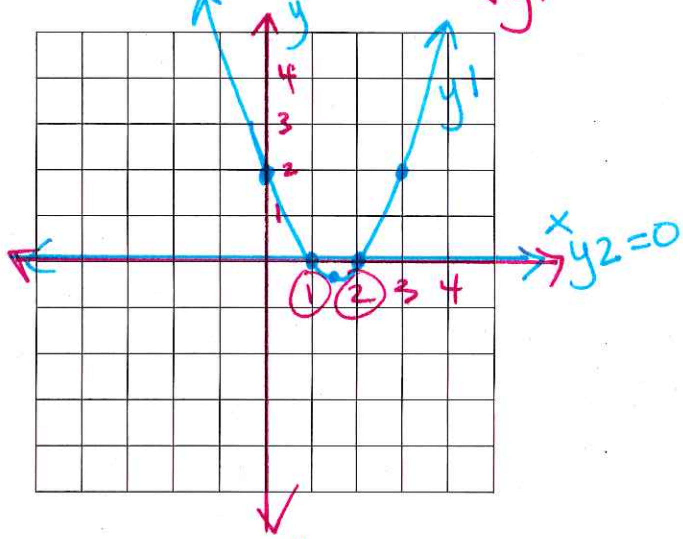

b. $\underbrace{x^2 - 3x + 2}_{y_1} = \underbrace{0}_{y_2}$

$y_1$: Parabola $\quad y_2$: constant

$(x-2)(x-1) = 0$
$x - 2 = 0$ or $x - 1 = 0$
$x = 2$ or $x = 1$

$\{1, 2\}$

| X | $y_1$ | $y_2$ |
|---|---|---|
| −1 | 6 | 0 |
| 0 | 2 | 0 |
| 1 | 0 | 0 |
| 2 | 0 | 0 |
| 3 | 2 | 0 |



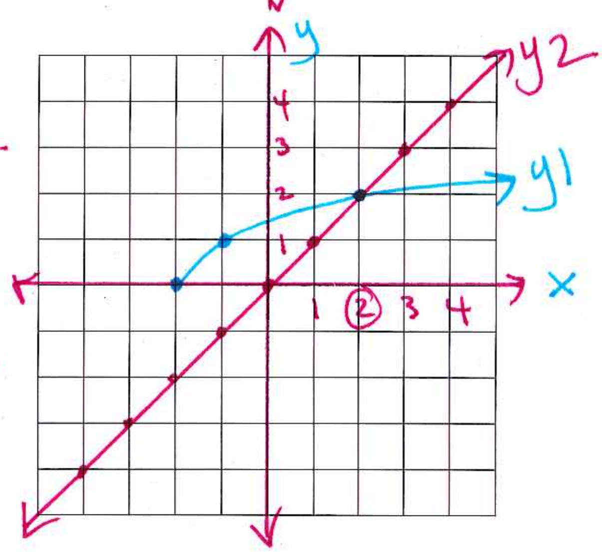

c. $\sqrt{x+2} = x$

Radical $y_1 \quad$ line $y_2$, $m = 1$, $b = 0$

| X | $y_1$ | $y_2$ |
|---|---|---|
| −3 | undef | −3 |
| −2 | 0 | −2 |
| −1 | 1 | −1 |
| 2 | 2 | 2 |

$(\sqrt{x+2})^2 = x^2$
$x + 2 = x^2$
$-x - 2 \quad -x - 2$
$x^2 - x - 2 = 0$
$(x-2)(x+1) = 0$
$x = 2$ or $\cancel{x = -1}$

$\{2\}$




Check $\sqrt{2+2} = 2 \quad \sqrt{-1+2} = -1$
$\sqrt{4} = 2 \checkmark \quad \sqrt{1} \neq -1$

4. Show your steps to show both types of completing the square. You may use your calculator to check your answers.

Complete the square to solve the equation.

| a. $x^2 - 2x - 4 = 0$ | b. $2x^2 - 3x = 4$ |
|---|---|
| $x^2 - 2x + \underline{1^2} = 4 + \underline{1^2}$<br>$(x-1)^2 = 4+1$<br>$\sqrt{(x-1)^2} = \pm\sqrt{5}$<br>$x - 1 = \pm\sqrt{5}$<br>$x = 1 \pm \sqrt{5}$ $\{1 \pm \sqrt{5}\}$ | $\frac{2x^2}{2} - \frac{3x}{2} = \frac{4}{2}$<br>$x^2 - \frac{3}{2}x = 2$<br>$x^2 - \frac{3}{2}x + \underline{\left(\frac{3}{4}\right)^2} = 2 + \underline{\left(\frac{3}{4}\right)^2}$<br>$\left(x - \frac{3}{4}\right)^2 = 2 \cdot \frac{16}{16} + \frac{9}{16}$<br>$\sqrt{\left(x - \frac{3}{4}\right)^2} = \pm\sqrt{\frac{41}{16}}$<br>$x - \frac{3}{4} = \pm\frac{\sqrt{41}}{4}$<br>$x = \left\{\frac{3}{4} \pm \frac{\sqrt{41}}{4}\right\}$ |

Complete the square to put the parabola in vertex form.

| c. $y = x^2 + 4x + 1$ | d. $f(x) = 2x^2 + 4x - 9$ |
|---|---|
| $y = x^2 + 4x + \underline{2^2} - \underline{2^2} + 1$<br>$= (x+2)^2 - 4 + 1$<br>$y = (x+2)^2 - 3$<br>vertex $= (-2, -3)$ | $f(x) = 2(x^2 + 2x + \underline{1^2} - \underline{1^2}) - 9$<br>$= 2(x+1)^2 - 2(1) - 9$<br>$= 2(x+1)^2 - 11$<br>vertex $= (-1, -11)$ |

5. Graph the quadratic function $f(x) = 8.7x^2 + 55x - 29.2$ on your calculator. Be sure to find a viewing window that allows you to see the vertex and all intercepts.

Use the graphing features and round all answers to the nearest hundredth.

a. Find $f(20)$ = 4550.8

b. Find the vertex.
(−3.16, −116.13)

c. Find all x-intercepts
(−6.81, 0), (0.49, 0)

d. Find the y-intercept
(0, −29.2)

e. State the domain
$\mathbb{R}$

f. State the range
[−116.13, ∞)

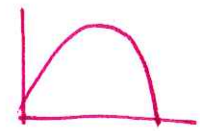
6. A graphing calculator is launched upward and its height $h$ in feet after t seconds is given by $h(t) = -16t^2 + 88t + 6$. Use your graphing utility. You do not need to show any work for these, just answer in complete sentences.

a. After how many seconds does the calculator reach its maximum height?

It takes 2.75 seconds for the calculator to reach its maximum height.

b. What is the maximum height reached?

The maximum height is 127 feet.



c. How many seconds will it take until the calculator hits the ground?

The calculator hits the ground in 5.6 seconds.

7. Suppose that an insect population $P$ in thousands per acre is modeled by the function $P(x) = \frac{5x+2}{x+1}$, where $x$ is the time in months that the population is being observed.

a. Evaluate $P(10)$ and interpret the result.

$P(10) = \frac{5(10)+2}{10+1} = \frac{52}{11} \approx 4.73$

After 10 years, there are 4.73 thousand insects per acre.

b. Graph $P$ in the window: [0,50,10] by [0,6,1].

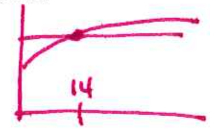
c. What happens to the population after several years?

The population of insects levels off and appears to approach 5,000 insects per acre.

d. After how many months is the insect population equal to 4.8 thousand per acre?

$y2 = 4.8$

After 14 months the population is 4.8 thousand insects per acre



8. Because of the Earth's curvature, a person can see a limited distance to the horizon. The higher the location of the person, the farther that person can see. The distance $D$ in miles to the horizon can be estimated by $D(h) = 1.22\sqrt{h}$, where h is the height of the person above the ground in feet.

You may solve these symbolically, graphically and/or numerically. Show your thinking to support your answer and state your answer in a complete sentence.

a. How far can a 6-foot person see when standing on the top of Mt. Everest at a height of 29,028 feet?

$D(29028+6) = D(29034) = 1.22\sqrt{29034}$

$\approx 207.88$ miles.

They could see approx 208 miles.

b. What height would allow a person to see 10 miles?

$(10)^2 = (1.22\sqrt{h})^2$

$\frac{100}{1.4884} = \frac{1.4884h}{1.4884}$

$h \approx 67.19$ feet

An elevation of 67 feet would allow a person to see for 10 miles.

**Math 95 Final Review** Name Solutions

Sections 2.1, 2.2, 3.1, 3.3 – 3.5, 8.1 – 8.4, 6.1 – 6.5, 7.1 – 7.6

**Part 2 – No Calculator. You may not return to this part after you turn it in. Practice showing all of your steps in proper form as you will on the test.**

1. Determine whether the table can represent a **linear** function. If it can, write the function in slope-intercept form. If it cannot represent a linear function, explain why.

+1 +1 +1 +1

| $x$ | -2 | -1 | 0 | 1 | 2 |
|---|---|---|---|---|---|
| $f(x)$ | -11 | -7 | -3 | 1 | 5 |

+4 +4 +4 +4

y-intercept

constant slope = $\frac{4}{1}$

$y = 4x - 3$

$f(x) = 4x - 3$

2. Find the domain of $f$. Write your answer in set-builder notation.

| | | |
|---|---|---|
| a. $f(x) = 3x + 2$<br>$\mathbb{R}$ | b. $f(x) = \frac{x-1}{x+6}$ $x+6 \neq 0$<br>$\{x \mid x \neq -6\}$ | c. $f(x) = \frac{3}{x^2-3x-10}$<br>$x^2-3x-10 \neq 0$<br>$(x-5)(x+2) \neq 0$<br>$\{x \mid x \neq 5 \text{ or } x \neq -2\}$ |
| d. $f(x) = \sqrt{x+2}$<br>$x+2 \geq 0$<br>$x \geq -2$<br>$\{x \mid x \geq -2\}$ | e. $f(x) = \sqrt[3]{x}$<br>$\mathbb{R}$ odd root | f. $f(x) = \frac{1}{\sqrt{x-5}}$<br>$x-5 > 0$<br>$+5 \quad +5$<br>$x > 5$<br>$\{x \mid x > 5\}$ |

3. Graph the function by hand, showing your calculations. Label your axes, scale and the axis of symmetry as an equation.

$f(x) = x^2 - 6x + 4$

$x = \frac{-b}{2a} = \frac{6}{2(1)} = 3$

| $x$ | $f(x)$ |
|---|---|
| 1 | -1 |
| 2 | -4 |
| 3 | -5 |
| 4 | -4 |
| 5 | -1 |

Vertex

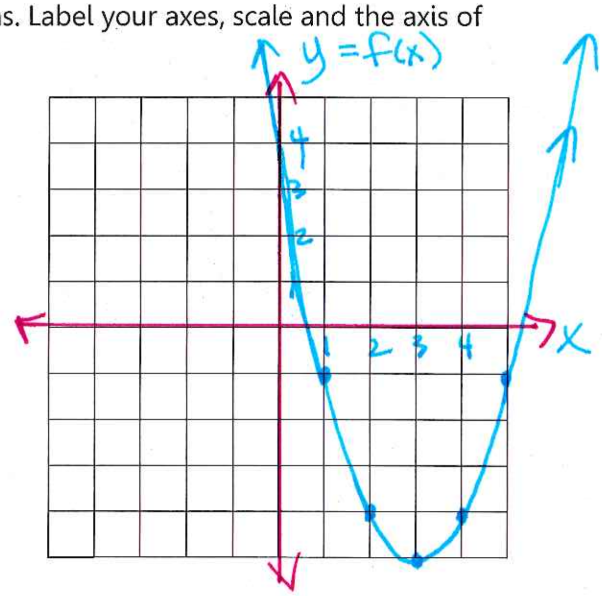
$f(3) = 3^2 - 6 \cdot 3 + 4$
$= 9 - 18 + 4 = -5$

$f(1) = 1^2 - 6 \cdot 1 + 4$
$= 1 - 6 + 4 = -1$

$f(2) = 2^2 - 6 \cdot 2 + 4$
$= 4 - 12 + 4 = -4$

$f(4) = 4^2 - 6 \cdot 4 + 4$
$= 16 - 24 + 4 = -4$

$f(5) = 5^2 - 6 \cdot 5 + 4$
$= 25 - 30 + 4 = -1$



4. Solve symbolically and write the solution set. For inequalities, also include a number line and interval notation.

a. $\frac{2}{5}(x-4)=-12$

$\frac{5}{2}\cdot\frac{2}{5}(x-4) = \frac{-12}{1}\cdot\frac{5}{2}$

$x-4=-30$

$+4 \quad +4$

$x=-26$

$\{-26\}$

b. $\frac{2}{5}z+\frac{1}{4}z>2-(z-1)$

$\frac{8}{20}z+\frac{5}{20}z>2-z+1$ $\quad (\frac{20}{11},\infty)$

$\frac{13}{20}z>3-z$ $\quad \{z \mid z>\frac{20}{11}\}$

$+z \quad +z$

$(\frac{20}{33})\frac{33z}{20}>3(\frac{20}{33})$ $\quad z>\frac{20}{11}$

c. $5-x>1$ or $x+3\geq -1$

$-5 \quad -5 \quad -3 \quad -3$

$\frac{-x}{-1}>\frac{-4}{-1}$ or $x\geq -4$

$x<4$ or $x\geq -4$

$\mathbb{R}$

$-4 \quad 0 \quad 4$

$(-\infty,\infty)$

d. $-3\leq\frac{2}{3}x+5<11$

$-5 \quad -5 \quad -5$

$-8\cdot\frac{3}{2}\leq\frac{3}{2}\cdot\frac{2}{3}x<6\cdot\frac{3}{2}$

$-12\leq x<9$ $\quad \{x \mid -12\leq x<9\}$

$-12 \quad 0 \quad 9$ $\quad [-12,9)$

e. $3t-1>-1$ and $2t-\frac{1}{2}>6$ $\quad (\frac{13}{4},\infty)$

$+1 \quad +1 \quad +\frac{1}{2} \quad +\frac{1}{2}$

$\frac{3t}{3}>\frac{0}{3}$ and $\frac{1}{2}2t>\frac{13}{2}\cdot\frac{1}{2}$

$t>0$ and $t>\frac{13}{4}$ or $3\frac{1}{4}$

$0$ and $\{t \mid t>\frac{13}{4}\}$

f. $|1-3x|=4$

$1-3x=4$ or $1-3x=-4$

$-1 \quad -1 \quad -1 \quad -1$

$\frac{-3x}{-3}=\frac{3}{-3}$ $\quad \frac{-3x}{-3}=\frac{-5}{-3}$

$x=-1$ or $x=\frac{5}{3}$

$\{-1, 5/3\}$

g. $|-5x-8|>2$

$-5x-8>2$ or $-5x-8<-2$

$+8 \quad +8 \quad +8 \quad +8$

$\frac{-5x}{-5}>\frac{10}{-5}$ or $\frac{-5x}{-5}<\frac{6}{-5}$

$\{x \mid x<-2$ or $x>-\frac{6}{5}$ or $-1\frac{1}{5}\}$

$-2 \quad -1\frac{1}{5} \quad 0$ $\quad (-\infty,-2)\cup(-1\frac{1}{5},\infty)$

h. $2x^2=x+4$

$2x^2-x-4=0$ $\quad a=2,\ b=-1,\ c=-4$

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

$=\frac{1\pm\sqrt{33}}{4}$ $\quad \{\frac{1\pm\sqrt{33}}{4}\}$

i. $4x^2-x-3=0$ $\quad ac=-12$

$1\cdot 12$, $2\cdot 6$, $3\cdot 4$

$4x^2+3x-4x-3=0$

$x(4x+3)-1(4x+3)=0$

$(4x+3)(x-1)=0$

$4x+3=0$ or $x-1=0$

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

$\{-\frac{3}{4}, 1\}$

j. $x^2-4x=6$

$x^2-4x-6=0$

$x^2-4x+2^2=6+2^2$

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

$\sqrt{(x-2)^2}=\pm\sqrt{10}$

$x-2=\pm\sqrt{10}$

$\{2\pm\sqrt{10}\}$

| | |
|---|---|
| k. $\frac{4}{x-3} = \frac{x}{1}$ $\quad x \neq 3$<br>$4 = x(x-3)$<br>$4 = x^2 - 3x$<br>$0 = x^2 - 3x - 4$<br>$0 = (x+1)(x-4)$<br>$x+1=0$ or $x-4=0$<br>$x=-1$ or $x=4$<br>$\{-1, 4\}$ | l. $\frac{2}{\cancel{x+5}}\,(x+5)(x-5) = \frac{-3}{x^2-25}\,\cancel{(x+5)(x-5)} + \frac{1}{\cancel{x-5}}\,(x+5)(x-5)$ $\quad x \neq 5$ or $-5$<br>$2(x-5) = -3 + (x+5)$<br>$2x - 10 = -3 + x + 5$<br>$2x - 10 = 2 + x$<br>$-x + 10 \quad +10 - x$<br>$x = 12$<br>$\{12\}$ |

5. Simplify the expressions and simplify your answers.

| | |
|---|---|
| a. $\frac{4a}{3ab^2} + \frac{b}{a^2c}$ $\quad LCD = 3a^2b^2c$<br>$= \frac{4a}{3ab^2} \cdot \frac{ac}{ac} + \frac{b}{a^2c} \cdot \frac{3b^2}{3b^2}$<br>$= \frac{4a^2c}{3a^2b^2c} + \frac{3b^3}{3a^2b^2c}$<br>$= \frac{4a^2c + 3b^3}{3a^2b^2c}$ | b. $\frac{2}{t+2} - \frac{t}{t^2-4}$<br>$= \frac{2}{t+2} \frac{(t-2)}{(t-2)} - \frac{t}{(t+2)(t-2)}$<br>$= \frac{2(t-2) - t}{(t+2)(t-2)} = \frac{2t - 4 - t}{(t+2)(t-2)}$<br>$= \frac{t-4}{(t+2)(t-2)}$ |
| c. $\frac{x^2-2x-8}{x^2+x-12} \div \frac{(x-4)^2}{x^2-16}$<br>$= \frac{(x+2)(x-4)}{(x-3)(x+4)} \div \frac{(x-4)^2}{(x-4)(x+4)}$<br>$= \frac{(x+2)\cancel{(x-4)}}{(x-3)\cancel{(x+4)}} \cdot \frac{\cancel{(x-4)}\cancel{(x+4)}}{\cancel{(x-4)}\cancel{(x-4)}}$<br>$= \frac{x+2}{x-3}$ | d. $\frac{\frac{4}{x^2} + \frac{1}{x} \cdot \frac{x}{x}}{\frac{4}{x^2} - \frac{1}{x} \cdot \frac{x}{x}} = \frac{\frac{4+x}{x^2}}{\frac{4-x}{x^2}}$<br>$= \frac{4+x}{\cancel{x^2}} \cdot \frac{\cancel{x^2}}{4-x}$<br>$= \frac{4+x}{4-x}$ |

6. Simplify the expression and include absolute value bars as appropriate.

| | | |
|---|---|---|
| a. $\sqrt{(x+3)^2}$ <br> $\lvert x+3 \rvert$ | b. $\sqrt[3]{64x^3} = \sqrt[3]{4^3x^3}$ <br> $= 4x$ | c. $\sqrt[5]{-x^{10}}$ <br> $= -x^2$ |

7. Translate the expression into radical notation or exponential notation.

| | |
|---|---|
| a. $(5)^{1/3}$ <br> $= \sqrt[3]{5}$ | b. $\sqrt[5]{x^3}$ <br> $= x^{3/5}$ |

8. Simplify the expression. Assume that all variables are positive.

| | | |
|---|---|---|
| a. $16^{1/4}$ <br> $=(2^4)^{1/4} = 2$ | b. $(-27)^{2/3}$ <br> $\sqrt[3]{(-27)^2}$ <br> $= \sqrt[3]{(3^3)^2} = 9$ | c. $(-2)^{1/2}$ <br> $= \sqrt{-2}$ <br> not a real number |
| d. $(z^3)^{2/3}$ <br> $z^{\cancel{3}\cdot\frac{2}{\cancel{3}}} = z^2$ | e. $(x^2y^4)^{1/2}$ <br> $x^{2\cdot\frac{1}{2}}y^{4\cdot\frac{1}{2}}$ <br> $= xy^2$ | f. $\left(\frac{8x^3}{y^6}\right)^{-1/3}$ <br> $= \sqrt[3]{\frac{y^6}{8x^3}} = \frac{y^2}{2x}$ |

9. Simplify the expression. Assume that all variables are positive.

| | | |
|---|---|---|
| a. $\sqrt[3]{4} \cdot \sqrt[3]{16}$ <br> $= \sqrt[3]{4^3}$ <br> $= 4$ | b. $\sqrt[3]{x^4} \cdot \sqrt[3]{x^2}$ <br> $= \sqrt[3]{x^6}$ <br> $= x^2$ | c. $\frac{\sqrt{80}}{\sqrt{20}} = \sqrt{4}$ <br> $= 2$ |
| d. $\frac{\sqrt{y^3}}{\sqrt{4y}} = \sqrt{\frac{y^3}{4y}}$ <br> $= \sqrt{\frac{y^2}{4}} = \frac{y}{2}$ | e. $\sqrt{32a^3b^2}$ <br> $= \sqrt{16a^2b^2} \cdot \sqrt{2a}$ <br> $= 4ab\sqrt{2a}$ | f. $\sqrt[5]{-16z^3} \cdot \sqrt[5]{16z^3}$ <br> $= \sqrt[5]{-16 \cdot 16 z^6}$ <br> $= \sqrt[5]{-2^4 \cdot 2^4 z^6}$ <br> $= \sqrt[5]{-2^8 z^6} = \sqrt[5]{-2^5z^5} \cdot \sqrt[5]{2^3z}$ <br> $= -2z\sqrt[5]{2^3z}$ |

10. Simplify the expression.

| | |
|---|---|
| a. $\sqrt{45}+\sqrt{20}$<br>$=\sqrt{9}\sqrt{5}+\sqrt{4}\sqrt{5}$<br>$=3\sqrt{5}+2\sqrt{5}$<br>$=5\sqrt{5}$ | b. $(10+\sqrt{3})(10-\sqrt{3})$<br>$=100-10\cancel{\sqrt{3}}+10\cancel{\sqrt{3}}-\sqrt{9}$<br>$=100-3$<br>$=97$ |

11. Rationalize the denominator.

| | |
|---|---|
| a. $\frac{3}{\sqrt{5}}\frac{\sqrt{5}}{\sqrt{5}}=\frac{3\sqrt{5}}{5}$ | b. $\frac{\sqrt{5}}{\sqrt{8}}=\frac{\sqrt{5}}{2\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}}=\frac{\sqrt{10}}{2\cdot 2}$<br>$=\frac{\sqrt{10}}{4}$ |
| c. $\frac{1}{\sqrt{3}+2}\frac{(\sqrt{3}-2)}{(\sqrt{3}-2)}$<br>$=\frac{\sqrt{3}-2}{\sqrt{9}-4}=\frac{\sqrt{3}-2}{3-4}=\frac{\sqrt{3}-2}{-1}$<br>$=-\sqrt{3}+2$ or $2-\sqrt{3}$ | d. $\frac{\sqrt{6}}{4-\sqrt{7}}\frac{(4+\sqrt{7})}{(4+\sqrt{7})}$<br>$=\frac{4\sqrt{6}+\sqrt{42}}{16-\sqrt{49}}=\frac{4\sqrt{6}+\sqrt{42}}{16-7}$<br>$=\frac{4\sqrt{6}+\sqrt{42}}{9}$ |

12. Solve the equation symbolically. Check your solution(s) and write the solution set.

| | |
|---|---|
| a. $(\sqrt{x-2})^2=5^2$<br>$x-2=25$<br>$+2\quad +2$<br>$x=27$<br>$\{27\}$<br>$\sqrt{27-2}\stackrel{?}{=}5$<br>$\sqrt{25}=5$ ✓ | b. $(\sqrt{x+2})^2=x^2$<br>$x+2=x^2$<br>$x^2-x-2=0$<br>$(x+1)(x-2)=0$<br>$x=\cancel{-1}$ or $x=2$<br>$\{2\}$<br>$\sqrt{-1+2}\stackrel{?}{=}-1$<br>$\sqrt{1}\neq-1$<br>$\sqrt{2+2}\stackrel{?}{=}2$<br>$\sqrt{4}=2$ ✓ |
| c. $(\sqrt[3]{3x})^3=3^3$<br>$\frac{3x}{3}=\frac{27}{3}$<br>$x=9$<br>$\{9\}$<br>$\sqrt[3]{3\cdot 9}\stackrel{?}{=}3$<br>$\sqrt[3]{27}=3$ ✓ | d. $\sqrt{2x-1}^2=\sqrt{x+3}^2$<br>$2x-1=x+3$<br>$-x\qquad -x$<br>$x-1=3$<br>$+1\quad +1$<br>$x=4$<br>$\{4\}$<br>$\sqrt{2\cdot 4-1}\stackrel{?}{=}\sqrt{4+3}$<br>$\sqrt{7}=\sqrt{7}$ ✓ |

e. $\sqrt{2x} + 4 = x$

$\sqrt{2\cdot 2}+4 \overset{?}{=} 2$

$2+4 \neq 2$

$-4 \quad -4$

$(\sqrt{2x})^2 = (x-4)^2$

$\sqrt{2\cdot 8}+4 \overset{?}{=} 8$

$\sqrt{16}+4=8$

$4+4=8$ ✓

$2x = x^2-8x+16$

$0 = x^2-10x+16$

$0 = (x-2)(x-8)$

$\cancel{x=2}$ or $x=8$

$\{8\}$

f. $(\sqrt{x} + 1)^2 = (\sqrt{x + 2})^2$

$(\sqrt{x}+1)(\sqrt{x}+1) = x+2$

$x+2\sqrt{x}+1 = x+2$

$-x \quad -1 \quad -x \quad -1$

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

$(\sqrt{x})^2 = \left(\frac{1}{2}\right)^2$

$x = \frac{1}{4}$ $\quad \left\{\frac{1}{4}\right\}$

$\sqrt{\frac{1}{4}}+1 \overset{?}{=} \sqrt{\frac{1}{4}+2\cdot\frac{4}{4}}$

$\frac{1}{2}+1 = \sqrt{\frac{9}{4}}$

$\frac{3}{2} = \frac{3}{2}$ ✓

13. Solve the equation for the indicated variable.

a. $t^2 = (\sqrt{x + y})^2$, for $x$

$t^2 = x+y$

$-y \quad -y$

$t^2-y = x$ $\quad x = t^2-y$

b. $A^2 = \left(\sqrt{\frac{R}{P}}\right)^2$, for $R$

$A^2\cdot P = \frac{R}{\cancel{P}}\cdot \cancel{P}$

$A^2P = R$ $\quad R = A^2P$

14. Let $p(x) = \sqrt{x + 10}$. Find and simplify the following expressions below.

a. $p(2x) = \sqrt{2x+10}$

b. $p(x + 6) = \sqrt{x+6+10}$

$= \sqrt{x+16}$

c. $3p(x) = 3\sqrt{x+10}$

d. $p(x) + 6 = \sqrt{x+10} + 6$

15. Let $f(x) = (x - 1)^{2/3}$ and $g(x) = x^{-3/2}$. Find and simplify the following expressions below.

a. $f(0) = (0-1)^{2/3}$

$= (-1)^{2/3}$

$= \sqrt[3]{1} = 1$

b. $f(9) = (9-1)^{2/3} = (8)^{2/3}$

$= \sqrt[3]{8^2}$

$= \sqrt[3]{(2^3)^2} = 2^2 = 4$

c. $g(-1)$

$= (-1)^{-3/2} = \frac{1}{(-1)^{3/2}} = \frac{1}{\sqrt{-1}}$

not a real number

d. $g(2)$

$= (2)^{-3/2} = \frac{1}{2^{3/2}} = \frac{1}{\sqrt{8}}$

$= \frac{1}{2\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{4}$