Salt Lake Community College
Math 1010 Final Exam Form A
Fall Semester 2012

Name:_____. **Student ID #:**_____.

Instructor:_____. **Section #**:_____.

This exam consists of three parts:

Part I has ten "multiple choice" questions, all of which must be answered;

Part II has ten "show your work" questions, all of which must be answered and supported;

Part III has ten "show your work" questions; choose five out of the ten to answer and support.

Notes, books, graphing/programmable calculators, and cell/head phones **cannot** be used. However, a standard scientific calculator may be used.

Part I
Questions 1 – 10 are Multiple Choice

Answer all ten questions and **CIRCLE** the best answer choice. **No** partial credit will be awarded for incorrect answers.

1. **Divide** and write your final answer in the form $a + b\mathrm{i}$: $\dfrac{2+3\mathrm{i}}{4-2\mathrm{i}}$.

A) $\frac{1}{5}+\frac{1}{10}\mathrm{i}$ B) $\frac{1}{5}+\frac{4}{5}\mathrm{i}$ C) $\frac{1}{10}+\frac{4}{5}\mathrm{i}$ D) $\frac{1}{10}-\frac{4}{5}\mathrm{i}$

2. **Determine** the **domain** of $f(x)=\sqrt{x+5}$.

A) $(-5,\infty)$ B) $(-\infty,\infty)$ C) $(-\infty,-5)$ D) $[-5,\infty)$

3. **Factor** $27z^3-64w^3$.

A) prime

B) $(3z-4w)(9z^2+12zw+16w^2)$

C) $(3z+4w)(9z^2-12zw+16w^2)$

D) $(3z-4w)(9z^2+7zw+16w^2)$

4. **Write** the function in **exponential** form: $y=\log_2 x$.

A) $x=y^2$ B) $y=2x$ C) $2=x^y$ D) $x=2^y$

5. **Solve** $\left|2x-3\right|-7=-2$.

A) -4 or 4 B) -4 or 1 C) -1 or 4 D) no solution

6. **Evaluate** $f(-3)$, where $f(x)=\sqrt{x^2+16}$.

A) 7 B) 13 C) 5 D) 25

7. **Simplify**, using only positive exponents: $\left(\dfrac{-3m^{1/6}n^{1/3}}{4n^{-2/3}}\right)^2$.

A) $\dfrac{3m^{1/3}n}{16}$ B) $-\dfrac{9m^{1/3}n^2}{16}$ C) $\dfrac{-3m^3n^2}{4}$ D) $\dfrac{9m^{1/3}n^2}{16}$

8. **Determine** the **slope** of every line **perpendicular** to $-2x+3y=5$.

A) $\dfrac{2}{3}$ B) $-\dfrac{2}{3}$ C) $\dfrac{3}{2}$ D) $-\dfrac{3}{2}$

9. **Solve** $\sqrt[3]{2x+1}-2=3$.

A) 12 B) 62 C) 17 D) no solution

10. **Determine** which choice is **equal** to $(\sqrt{a}-\sqrt{b})^2$.

A) $a-2\sqrt{ab}+b$ B) $a+b$ C) $a-2ab+b$ D) $a+2\sqrt{ab}+b$

Part II
Questions 11 – 20 are Show Your Work

Answer all ten questions and **write your final answers in the spaces provided**. **Show** all relevant work, i.e., justify your answers! Communicate that you understand. Correct answers will **not** be awarded full credit without relevant justifications. Partial credit may be awarded for partially relevant work.

Leave your final answers in exact **fractional and radical forms**; decimal answers may *not* receive full credit. All answers must be completely simplified for full credit.

11. Completely **simplify** $\dfrac{x-y}{x^2-y^2} \div \dfrac{3x-6y}{x^2-xy-2y^2}$. 11_____.

12. Find the **center** and **radius** of the circle $x^2+y^2-2x+4y-4=0$. center _____.

radius _____.

13. **Simplify** $\dfrac{\dfrac{3}{x}-\dfrac{2}{x^2}}{\dfrac{3}{x-2}+\dfrac{1}{x^2}}$. 13_____.

14. A model rocket is launched straight upward from ground level with its distance from the ground given by $d(t) = -16t^2 + 160t$ measured in feet. What is the **maximum height** in feet that the rocket reaches?

14_____.

15. Completely **factor** $y^3 + 4y^2 - y - 4$. 15_____.

16. **Solve** $2x^2 - 4x + 5 = 0$. 16_____.

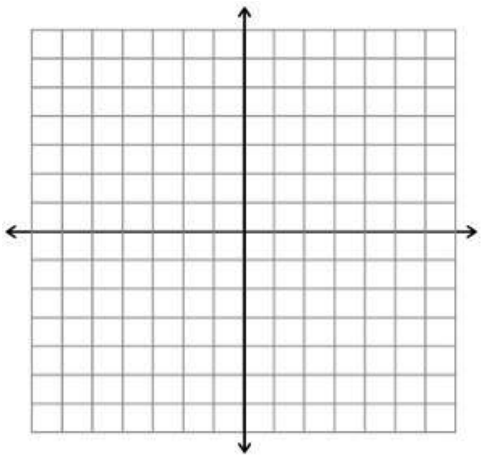
17. **Rationalize** the **denominator** of $\dfrac{\sqrt{3}}{\sqrt{m}+1}$. 17_____.

18. Write the equation of the line in **slope – intercept form** that passes through $(4,2)$ and $(-2,3)$.

18_____.

19. Find the **exact distance** using **radical notation** between $(-1,2)$ and $(2,4)$. 19_____.

20. **Graph** the linear inequality $5x-3y \le 15$. Clearly label all intercepts.



Part III
Questions 21 – 30 are Show Your Work

Answer **five** of the ten questions and **write your final answers in the spaces provided**. **Show** all relevant work, i.e., justify your answers! Communicate that you understand. Clearly cross-out the five questions *not* to be graded; otherwise, the first five problems will be graded. Correct answers will **not** be awarded full credit without relevant justifications. Partial credit may be awarded for partially relevant work.

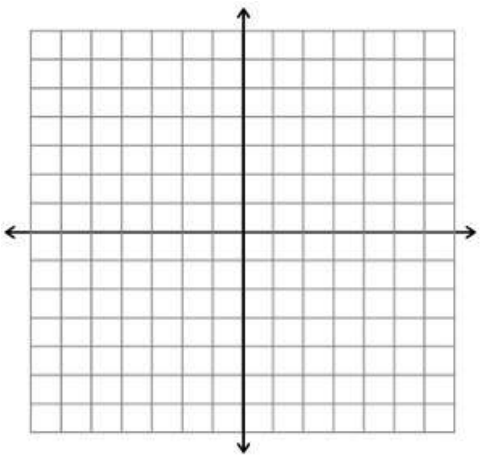
Leave your final answers in **fractional and radical forms**; decimal answers may *not* receive full credit. All answers must be completely simplified for full credit.

21. **Solve** the linear system for *x*: $x =$ _____.

$$\begin{cases} x - 2y + 2z = 9 \\ -x + 3y = -4 \\ 2x - 5y + z = 10 \end{cases}.$$

22. **Determine** the **vertex** of $f(x) = x^2 + 6x + 5$ and **graph** the parabola. **Label** the vertex and at least one other point on your graph.

vertex = _____.



23. If one solution is 25% acid and another solution is 50% acid, then how many liters of each must be mixed to get 30 L of solution that is 40% acid?

Liters with 25% acid_____.

Liters with 50% acid_____.

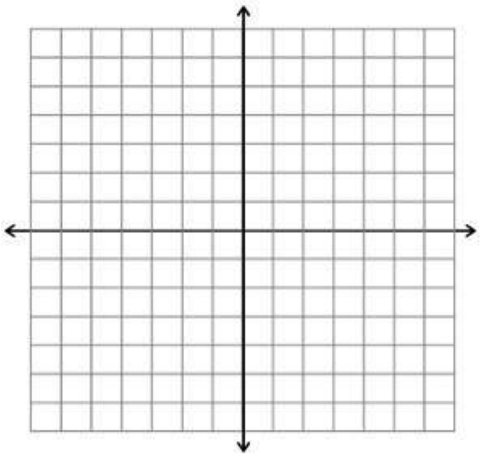
24. **Solve** and write your final answer using **interval notation**:

$$\left|9-\frac{x}{2}\right|-7\le 4$$

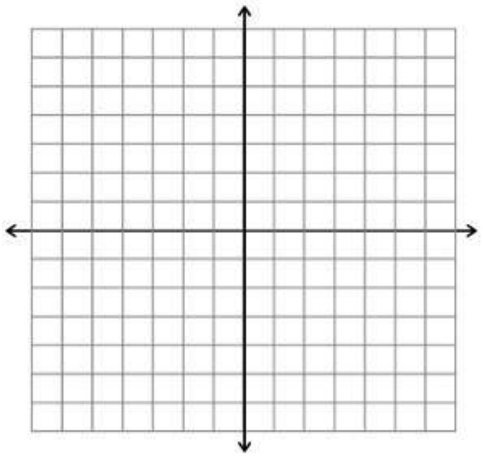
24_____.

25. Find the x and y **– intercepts** of $5x-6y=10$ and **graph** the equation. x-intercept _____.

y-intercept_____.



26. **Graph** $f(x) = 2^{x-1}$ and **label** at least **three** distinct **points** on your graph.



27. If a student has scored 80%, 85%, and 88% on their first three exams, what score must they earn on their fourth exam to average at least a B+ grade, i.e., 87%?

27_____.

28. Find the **midpoint** of the line segment with endpoints $(-5,-3)$ and $(9,3)$. 28_____.

29. Completely **simplify** $\dfrac{x+2}{x-1} - \dfrac{2}{x+6} - \dfrac{14}{x^2+5x-6}$. 29_____.

30. A right triangle's hypotenuse is 8 m and one leg is 4 m. What is the length of the other leg?

30_____.

M1010 Final Exam Form A Answers:

Every problem is worth 4 points (100pts total). *Multiple Choice* questions earn no partial credit; they are either correct (4pts) or incorrect (0pts). *Show your Work* questions may be awarded partial credit. If an answer is incorrect, let your experience determine the number of points to be awarded; roughly half the necessary work shown *towards a correct solution* should be awarded 2/4pts, etc. If approximately correct answers are given in decimal form in lieu of exact answers, award 3/4pts. Grade fairly, but meritoriously and consistently.

1. C
2. D
3. B
4. D
5. C
6. C
7. D
8. D
9. B
10. A
11. $\frac{1}{3}$
12. $(x-1)^2+(y+2)^2=9$ with radius 3 and center $(1,-2)$
13. $\frac{x-2}{x+1}$
14. 400 feet
15. $(y+1)(y-1)(y+4)$
16. $\frac{2\pm\sqrt{6}\,\mathrm{i}}{2}$ (complete sq or use quad formula)
17. $\frac{\sqrt{3m}-\sqrt{3}}{m-1}$
18. $y=-\frac{1}{6}x+\frac{8}{3}$
19. $\sqrt{13}$
20. The solution set is $\{(x,y)\mid y\geq\frac{5}{3}x-5\}$ with intercepts $(3,0)$ and $(0,-5)$ and corresponding graph
21. $x=1, y=-1, z=3$
22. vertex is $(-3,-4)$ with correct graph of $y=(x+3)^2-4$
23. 12 L with 25% acid and 18 L with 50% acid
24. $[-4,40]$
25. $x=2$, $y=-\frac{5}{3}$ with corresponding graph
26. Any 3 correct pts suffice with corresponding correct graph
27. 95%
28. $(2,0)$
29. $\frac{x}{x-1}$
30. $4\sqrt{3}$ m