Math 3: Unit 1 Test
SAMPLE

100 points Name: _____

- **A photo ID should be out, on your desk.**
- **You will not be allowed to leave the room during the exam unless it is an emergency.**
- **Phones must be silent and put away. Any visible phone (smart watch, headphones, ipad etc.) will result in a grade F . Hands must remain in view during the exam.**
- **No graphing calculator.**
- **No credit will be given for solutions if clear work is not shown.**

On all problems containing exponents, express answer using only positive exponents

CIRCLE T FOR TRUE, F FOR FALSE. (2 points each)

T F (1) $\sqrt{81} = \pm 9$

T F (2) $\left(12a^7 b\right)\left(-2a^{-2}b^{-8}\right) = \dfrac{-24a^5}{b^7}$.

T F (3) $\sqrt{a^2 + b^4} = a + b^2$

T F (4) Simplifying, $\dfrac{x^3 + 3x^2}{x^3 + 2} = \dfrac{\cancel{x}^3 + 3x^2}{\cancel{x}^3 + 2} = \dfrac{3x^2}{2}$

T F (5) Dividing, $\dfrac{2+3i}{1-i} = -\dfrac{1}{2} + \dfrac{5}{2}i$

Fill in the blanks.

(6) Simplify completly: $\left(-2a^6 b^{-1}\right)^4$ _____

(7) Simplify. $\dfrac{12x^5 y^2}{18x^{-3} y^7}$ _____

(8) Factor completely: $x^3 - 64$ _____

(9) Multiply and simplify: $y^{-2/3}\left(y^{2/3} + 5y^{8/3}\right)$ _____

(10) $16^{-3/4}$=_____

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(11) Simplify: (4 points each)

(a) $\left(\dfrac{2x^{-3}y^{3/2}}{6x^2\sqrt{y}}\right)^{-1/3}$

(b). $\left(\sqrt{x} + 3y\right)^2$

(12) Factor Completely: (5 points each)

(a) $15x^2 - 6x - 2$

(b) $20x^{-5/3} + 5x^{1/3} + 20x^{-2/3}$

(c) $2x^4 - 162$

(d) $3x^2\sqrt{5x-1} + \frac{1}{2}x^3(5x-1)^{-1/2}(5)$

(13) Simplify: (6 points each)

(a) $\dfrac{1}{x+1}-\dfrac{2}{(x+1)^2}+\dfrac{3}{x^2-1}$

(b) $\dfrac{\dfrac{1}{\sqrt{x+2}}-\dfrac{1}{\sqrt{x}}}{\dfrac{2}{\sqrt{x}}}$

(14) Solve. Express answer in interval notation. Show all work. No credit given for improper method. (6 points each)

(a) $|5x-3|<4$

(b) $3+10x-8x^2\geq 0$

(15). Find all the solutions of the following equations (real or complex) (7 points each)

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

(b) $2x-3=2x^2$

(c) $\frac{3}{x}-\frac{2}{x-3}=\frac{-12}{x^2-9}$

(d) $x^4-5x^2-36=0$