

Name: _____ Date: _____ Period: _____

Unit 1 Exam Review

You must be able to perform the following problems without notes and without a calculator. You will be given a multiplication table to use on the exam. There will be multiple choice and free response questions on this exam. These problems should be worked out on a separate sheet of paper.

Add, subtract, multiply, divide and reduce fractions.

SMILEY FACE METHOD

$$1. \frac{5}{7} + \frac{2}{3}$$

15, 14, 21

$$\frac{5}{7} + \frac{2}{3} = \frac{29}{21}$$

$$2. \frac{12}{5} - \frac{2}{9}$$

108, 10, 45

$$\frac{12}{5} - \frac{2}{9} = \frac{98}{45}$$

MULTIPLY ACROSS

$$3. \frac{9}{10} \times \frac{4}{5}$$

Reduce

$$\frac{36}{50} \div 2 = \frac{18}{25}$$

KEEP, CHANGE, FLIP

$$4. \frac{1}{7} \div \frac{3}{2}$$

$$\frac{1}{7} \times \frac{2}{3} = \frac{2}{21}$$

Solve multi-step equations (including with fractions).

$$5. 5(x-3) = 21$$

$$5x - 15 = 21$$

$$+15 \quad +15$$

$$\frac{5x}{5} = \frac{36}{5}$$

$$x = \frac{36}{5}$$

$$6. 4x - 9 = 10x + 56$$

$$+9 \quad +9$$

$$4x = 10x + 65$$

$$-10x \quad -10x$$

$$-6x = 65$$

$$\frac{-6x}{-6} = \frac{65}{-6}$$

$$x = -\frac{65}{6}$$

$$7. \frac{1}{2}x + \frac{3}{5} = 10 \quad \text{LCD: 10}$$

$$10 \cdot \frac{1}{2}x + 10 \cdot \frac{3}{5} = 10 \cdot 10$$

$$\frac{10x}{2} + \frac{30}{5} = 100$$

$$5x + 6 = 100$$

$$-6 \quad -6$$

$$\frac{5x}{5} = \frac{94}{5}$$

$$x = \frac{94}{5}$$

$$8. 7 - 2(4x+1) = 12$$

$$7 - 8x - 2 = 12$$

$$5 - 8x = 12$$

$$-5 \quad -5$$

$$-8x = 7$$

$$\frac{-8x}{-8} = \frac{7}{-8}$$

$$x = -\frac{7}{8}$$

Simplify exponential expressions using the rules of exponents. There should be no negative exponents in your final answer.

$$9. b^3 \cdot b^{-5}$$

$$b^{3+(-5)}$$

$$b^{-2}$$

$$= \frac{1}{b^2}$$

$$10. (4x^2y)^2 \cdot 5y$$

$$4^2 (x^2)^2 y^2 \cdot 5y$$

$$16x^4y^2 \cdot 5y$$

$$80x^4y^3$$

$$11. \left(\frac{3x^4}{y}\right)^2$$

$$\frac{3^2 (x^4)^2}{y^2}$$

$$\frac{9x^8}{y^2}$$

$$12. 7x^0 \cdot 3y$$

$$7(1) \cdot 3y$$

$$21y$$

Add/subtract, multiply, divide and simplify radical expressions.

$$13. \sqrt{20} - 6\sqrt{5}$$

$$\sqrt{2 \cdot 2 \cdot 5} - 6\sqrt{5}$$

$$2\sqrt{5} - 6\sqrt{5}$$

$$-4\sqrt{5}$$

$$14. -2\sqrt{6x} \cdot \sqrt{3x}$$

$$-2\sqrt{6x \cdot 3x}$$

$$-2\sqrt{18x^2}$$

$$-2\sqrt{2 \cdot 3 \cdot 3 \cdot x \cdot x}$$

$$-2 \cdot 3x \sqrt{2}$$

$$-6x\sqrt{2}$$

$$15. \sqrt{25x^3y}$$

$$\sqrt{5 \cdot 5 \cdot x \cdot x \cdot x \cdot y}$$

$$5x\sqrt{xy}$$

$$16. \frac{\sqrt{12}}{\sqrt{4}}$$

$$\sqrt{\frac{12}{4}}$$

$$\sqrt{3}$$

Rationalize the denominator of a radical expression.

17. $\frac{5}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}}$
 $\frac{5\sqrt{6}}{6}$

18. $\frac{\sqrt{19}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$
 $\frac{\sqrt{38}}{2}$

Simplify radicals with negative numbers as the radicand.

19. $\sqrt{-4}$
 $\sqrt{-1} \cdot \sqrt{4}$
 $2i$

20. $-\sqrt{-20}$
 $-\sqrt{-1} \sqrt{20}$
 $-i \cdot 2\sqrt{5}$
 $-2i\sqrt{5}$

21. $\sqrt{-\frac{2}{5}}$
 $\sqrt{-1} \cdot \sqrt{\frac{2}{5}}$
 $i\sqrt{\frac{2}{5}}$

22. $\sqrt{-\frac{9}{25}}$
 $\sqrt{-1} \cdot \frac{\sqrt{9}}{\sqrt{25}}$
 $i \cdot \frac{3}{5}$
 $\frac{3}{5}i$

Add, subtract, multiply and divide complex numbers.

COMBINE LIKE TERMS

23. $(13 + 2i) + (-4 - 5i)$

$9 - 3i$

24. $(3 + 2i) - (5 + 4i)$

$3 + 2i - 5 - 4i$
 $-2 - 2i$

25. FOIL
 $(1 + 6i)(4 - 3i)$

$4 - 3i + 24i - 18i^2$
 $4 - 3i + 24i - 18(-1)$
 $4 + 21i + 18$

$22 + 21i$

26. $\frac{7}{6-i} \cdot \frac{6+i}{6+i}$

$\frac{7(6+i)}{(6-i)(6+i)}$
 $\frac{42+7i}{36 + 6i - 6i - i^2}$
 $\frac{42+7i}{36 - (-1)}$

complex conjugate of $6-i$ is $6+i$

$\frac{42+7i}{37}$
 $\frac{42}{37} + \frac{7}{37}i$

Compute any power of i to either i , -1 , $-i$, or 1 .

27. $i^{26} =$

$i^2 = -1$

28. $i^{315} =$

$i^3 = -i$

29. $i^{56} =$

$i^0 = 1$

30. $i^{89} =$

$i^1 = i$

Remember the remainder is the new exponent for i .

$4 \overline{)26}$
 $\underline{-24}$
 2 R

$4 \overline{)315}$
 $\underline{-28}$
 35
 $\underline{-32}$
 3 R

$4 \overline{)56}$
 $\underline{-4}$
 16
 $\underline{-16}$
 0 R

$4 \overline{)89}$
 $\underline{-8}$
 9
 $\underline{-8}$
 1 R