The actual test has 17 questions. It is over everything that we went over in unit 4 and unit 4 enrichment. Problems appearing on the test **are similar** to those appearing on this study guide. You might want to work these out and then put them in order of how they will appear on the test and rework them, thinking of timing/strategy.
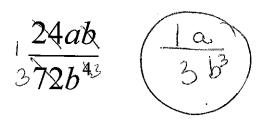
1. Simplify. Express your answer as a rational number. (like #12 on the test)

$$\frac{2 \cdot \frac{3}{4a^2} + \frac{3}{8a} \cdot a}{\frac{9 \cdot 3}{a \cdot a} - \frac{6}{a^2}}$$

$$\frac{\frac{6}{8a^2} + \frac{3a}{8a^2}}{\frac{-3a}{a^2} - \frac{6}{a^2}}$$

$$\frac{6+3a}{8a^2} \cdot \frac{a^2}{-3a-6}$$

$$\frac{3(2+a)}{8} \cdot \frac{1}{-3(a+2)} = -\frac{1}{8}$$

2. 7 students are standing in line at the media center. How many different ways are there for them to stand in line? If it takes them 1 minute to change positions, how long will it take them to stand in all the possible ways? (like #13 on the test)

$$_7P_7 = \frac{7!}{(7-7)!} = 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = \boxed{5040}$$

$$\boxed{5040}$$

$$4x^4 - 2x^2 - 2 = 0$$
$$(4x^4 - 4x^2) + (2x^2 - 2) = 0$$
$$4x^2(x^2-1) + 2(x^2-1) = 0$$

3. Factor completely (like #15 and #16 on the test) $4x^4 - 2x^2 - 2$ **or**

$$(4x^2+2)(x^2-1)$$
$$\boxed{(2x^2+1)(x+1)(x-1)}$$

$$2(2x^4 - 1x^2 - 1)$$
$$2(2x^4 - 2x^2) + (1x^2 - 1)$$
$$2 \cdot 2x^2(x^2-1) + 1(x^2-1)$$
$$(2x^2+1)(x^2-1)$$

4. Simplify. Express your answer as a rational number.(similar to #4 on the test)

$$\frac{24ab}{72b^4} \qquad \boxed{\frac{1\ a}{3\ b^3}}$$

5. Simplify. Express your answer as a rational number in lowest terms. (like #11 on the test)

$$\frac{\dfrac{3x+b}{6x}}{-\dfrac{7}{bx}}$$

$$\frac{(3x+b)}{6x} \cdot \frac{-bx}{7}$$

$$\frac{-b(3x+b)}{42} \quad \text{or} \quad \frac{-3bx-b^2}{42} =$$

$$= \frac{-3bx}{42} - \frac{b^2}{42} = \boxed{\frac{-bx}{14} - \frac{b^2}{42}}$$

6. Add. Express your answer as a proper fraction in lowest terms or as a mixed number in simplest form. (like #3 on the test)

$$3\frac{3}{7} + \left(-9\frac{1}{2}\right)$$

$$3\frac{6}{14} + -9\frac{7}{14}$$

$$\boxed{-6\frac{1}{14}}$$

7. Simplify. Express your answer as a proper fraction in lowest terms or as a mixed number in simplest form. (like #1 and #2 on the test)

$$\frac{a}{5} - \frac{(-2a) \cdot 5}{1 \cdot 5}$$

$$\frac{a + 10a}{5} = \boxed{\frac{11a}{5}}$$

8. Simplify. Express your answer as a proper fraction in lowest terms or as a mixed number in simplest form. (like #5 and #6 on the test)

$$2 \div \frac{7x}{y^3} \div \left(-\frac{3}{4y^2} \right)$$

$$\frac{2}{1} \cdot \frac{y^3}{7x} \cdot -\frac{4y^2}{3} = \boxed{\frac{-8y^5}{21x}}$$

9. You have 8 shirts and plan to wear a different one each day from Monday to Friday. How many arrangements of shirts are possible for those 5 days? (Similar to #14 on the test, but the one on the test has a lot more detail. Make sure you know permutations/combinations)

$8 \cdot 7 \cdot 6 \cdot 5 \cdot 4$ r

$= 6720$

$$_8P_5 = \frac{8!}{(8-5)!} = \frac{8!}{3!} = \frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{3 \cdot 2 \cdot 1} =$$

$$\boxed{= 6720}$$

10. The area of a certain rectangle is given below. Find the perimeter of the rectangle. (like #17 on the test)

$$x^2 + 8x + 16 \; in^2$$

$$(x + 4)(x + 4)$$
$$\quad L \qquad W$$

$2L + 2W$

or $P: (x+4) \cdot 4$ ⟨$4x + 16$⟩ perimeter

11. Factor completely (like #15 and #16 on the test):

$$4x^2 + 22x + 24$$

$2 \cdot 2x(x+4) +$

$+3(x+4)$

$2(2x+3)(x+4)$

$2(2x^2 + 11x + 12)$

$2(2x^2 + 8x + 3x + 12)$

$2(2x^2 + 8x) + (3x+12)$

	24
1	24
2	12
4	6
8	3

12. Write as a mixed number (like #9 and #10 on the test): $6.2\overline{345}$

$$\frac{(2345 - 23)}{9900} = \frac{2322}{9900} = 6\frac{2322}{9900}$$

13. Tell whether the following number is **rational** or **irrational**. If its _rational_, tell whether it is _terminates or repeats (similar to #7-10):_ $1.19119111...$

Irrational

14. Write as a mixed number in lowest terms (like #9 and 10 on the test):

$$-16.7\overline{73}$$

$$\frac{(773 - 7)}{990} = \frac{766}{990} = -16\frac{766}{990}$$

15. Solve: (like #11 on the test, but very similar #11 on p. 12 in your unit 4 notes)

$$3 - \cfrac{46}{4 + \cfrac{3}{5}}$$

$$5 \cdot \frac{4}{1} + \frac{3}{5} = \frac{20}{5} + \frac{3}{5} = \frac{23}{5}$$

$$3 - \cfrac{46}{\frac{23}{5}} = 3 - \frac{46}{1} \cdot \frac{5}{23} = 3 - 10 = -7$$