

Math 32, Fall 2001, Tracy Hall
Pre-test, 16 January

Name _____
UGSI _____ Section _____

This test is not for credit and will not be collected. It is a review of some basic calculation and algebra skills which are expected background for the rest of what we will do this semester, including some concepts from the first chapter of the text for this course: *Precalculus*, David Cohen, fifth edition. Don't worry if you don't have time to finish; this is just a chance to get you thinking about math.

Instructions: In the next 30 minutes, answer as many of the following questions as you can. Work out your answers on scratch paper, if you like. No calculators, notes, or other references may be used.

1. Add the following fractions and simplify your result:

$$\frac{7}{15} + \frac{5}{6} + \frac{1}{10}$$

2. Multiply out the following expression and simplify the result:

$$\left(\frac{3 + \sqrt{7}}{2}\right)^2$$

3. Multiply out $(78)(347)$ (remember, no calculators).

4. Using long division, find how many times 37 goes into 15947.

5. Circle the inequalities which are true, and cross out those which are false:

$$4 \leq 7 \quad 3 \leq 3 \quad (2 - 4)^2 < (4 - 2)^2$$

$$-7 < -3 \quad (-7)^2 < (-3)^2 \quad |-7| < |-3|$$

6. Six years ago I was twice my youngest brother's age, but right now the ratio of his age to mine is 3 : 5. How old am I?

7. Write an expression which gives the distance between a and b on the real number line.

8. Write an expression for the number which is halfway between a and b on the real number line.

9. What natural numbers are included in the unbounded interval $(-\infty, 5)$? (Natural numbers are whole numbers greater than zero.)

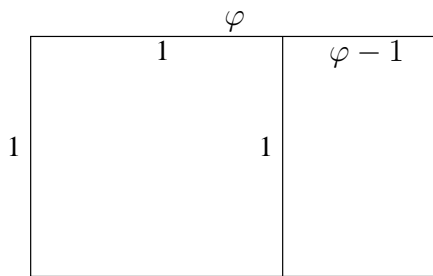
10. How many integers are included in the interval $[3, 13]$? How about the interval $(3, 13)$?

11. Is $21^2 - 2^2$ a prime number? Why, or why not?

12. What is the domain of this expression? In other words, for what real numbers t does the expression make sense?

$$\frac{\sqrt{t+3}}{t}$$

13. The rectangle below has the special property that removing a square from it leaves another rectangle of the same proportions; in other words, the ratio $1 : \varphi$ is the same as the ratio $(\varphi - 1) : 1$. The number φ is sometimes called the *golden mean*. What is it?



14. Find all solutions of the equation $4(s+2)^3 + (s+2)^2 = 0$.

15. Find all solutions of the equation $x^2 - 3x + 1 = 0$.

16. True or false? If a and b are positive numbers, then $\sqrt{a+b} = \sqrt{a} + \sqrt{b}$.

17. True or false? If $x^2 + 5 = y^2 + 5$, then $x = y$.

18. True or false? The number 0 is positive.

19. True or false? If p and q are natural numbers, then $\left(\frac{p}{q}\right)^2$ cannot possibly be equal to 3.

20. True or false? If $|a - b| \leq 0$, then a and b must be the same number.

21. True or false? If a and b are real numbers, then $|a + b| \leq |a| + |b|$.

22. True or false? If a is any real number, then $\frac{a}{a} = 1$.

23. True or false? The symbol ∞ represents the largest number.

24. True or false? The equation $2x^2 - 3x + 2 = 0$ has no solutions over the real numbers.