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[Click here for an alleged answer sheet.](#)

1 This review sheet is now in final form.

2 Test #1 is on Thursday, 2/16/06.

Check item 12 below for a description of the with-calculator portion of the test.

The test covers the material of assignments #1 - #15.

3 On pages 132-133 is a sample test. All the problems are fair game *except* problems 1, 3, 9, 14. All the answers for this sample test are in the back of the book.

4 Some 1.2-type problems:

Let  $f(x) = 16^x$  and  $g(x) = x^{2/3}$ . Evaluate the following to numbers.

- |              |                |                 |
|--------------|----------------|-----------------|
| (a) $f(2)$   | (d) $f(-1/4)$  | (g) $f(3/4)$    |
| (b) $f(1/2)$ | (e) $g(-8)$    | (h) $f(f(0))$   |
| (c) $f(3/2)$ | (f) $g(-1/27)$ | (i) $g(f(3/2))$ |

5 More 1.2-type problems:

- |                             |   |  |
|-----------------------------|---|--|
| (a) $(a^2b^3)^2(a^{-3}b^4)$ | (b) $(64a^6)^{2/3} \left( \frac{32a^{12}}{a^7} \right)^{2/5}$ | (c) $c^{20} \left( \frac{b^{17}c^{10}}{32a^{15}b^{-3}} \right)^{-2/5}$ |
|-----------------------------|---|--|

6 Some section-1.3 products:

- |  |
|--|
| (a) $(3\sqrt{x} - 2\sqrt{y})(5\sqrt{x} + 3\sqrt{y})$                   |
| (b) $(x + y + z + xz)(x - y + z - xz)$                                 |
| (c) $(x^{3/2} - y^{5/2})(x^{3/2} + y^{5/2})$                           |
| (d) $(x^{1/2} - 3\sqrt{2}x^{1/4} + 9)(x^{1/2} + 3\sqrt{2}x^{1/4} + 9)$ |

7 Some section-1.3 factoring:

- |                                       |  |
|---------------------------------------|--|
| (a) $16a^4b - 54ab^4$                 | (d) $8x^{5/3} - 2x^{2/3} - 21x^{-1/3}$             |
| (b) $4a^2b^4 - 16a^3 + 16a^4b^{-4}$   | (e) $(6x - 7)^{2/3} + 4x(6x - 7)^{-1/3}$           |
| (c) $8x^{7/3} - 2x^{4/3} - 21x^{1/3}$ | (f) $3x^{3/2} - 2x^{1/2} - 12x^{-1/2} + 8x^{-3/2}$ |

8 Some section 1.4 fractions to simplify: compute and simplify the *slope* of the line through the pair of points given:

(a)  $(a, 4a^2)$  and  $(b, 4b^2)$

(b)  $\left(a, \frac{1}{a+2}\right)$  and  $\left(b, \frac{1}{b+2}\right)$

(c)  $\left(\frac{1}{a+2}, \frac{a}{b+2}\right)$  and  $\left(\frac{1}{b+2}, \frac{b}{a+2}\right)$

(d)  $(ab^{-1}, a^{-2}b)$  and  $(a^{-1}b, ab^{-2})$

9 Suppose  $a$  and  $b$  are positive constants. Find the center and radius of the circle with equation

$$x^2 + y^2 - 4abx + 6aby - 3a^2b^2 = 0$$

10 You need to know how to translate a *right triangle* into algebra. You also need to know how to spot triangles that are *similar* to one another.

In the following, assume that  $A$  and  $B$  are both positive.

(a) A tall, straight, tree  $(A^2 - B^2)$  *ft* tall casts a shadow  $(A^2 + B^2)$  *ft* long on level ground. What is the straight-line distance from the top of the tree to the end of the shadow furthest from the tree?

(b) Near the tree in part (a) stands a tree  $(A - B)$  *ft* tall. How long is the shadow of this tree?

(c) A rectangle of area  $A^3B + 4A^2B^2 + 4AB^3$  *ft*<sup>2</sup> is  $AB$  times as long as it is wide. Find its length and width.

(d) A rectangle of area  $A^4B^2 - A^3B^2$  *ft*<sup>2</sup> is  $AB$  *ft* longer than it is wide. Find its length and width.

11 Here are some section-1.7 non-linear inequalities. Solve each one for  $x$ , and leave the answer in interval form:

(a) Assume  $B > 0$  and solve  $|Bx - AB^2| \leq B$

(b) Assume that  $0 < A < B < C$ . Solve

$$25x(x - A)(x - B)(x - C) \geq 0$$

(c) Assume that  $A > 0$  and solve

$$\frac{(x - 2A)(x - A)^2}{x^2 + 3Ax + 2A^2} \leq 0$$

(d) Solve for  $x$ :

$$\frac{8}{x - 2} + \frac{10}{x + 7} \geq 0$$

**12** Make sure you bring along your calculator, with batteries that won't quit on you.

The calculator part of the test will be a brief (10-minute) computational problem. This problem will not involve the graphing capabilities of your calculator.

The calculator part will be handed out first. When you're finished with it, put your calculator away, and raise your hand. I will come over and take the calculator part away, and give you the main, non-calculator part of the exam.

Here are some problems such as you might encounter on the calculator part of the test:

- (a) A tall, straight, tree **94 ft** tall casts a shadow **217 ft** long on level ground. What is the straight-line distance from the top of the tree to the end of the shadow furthest from the tree? Round your answer to three decimal places.
- (b) Near the tree in part (a) stands a tree **78 ft** tall. How long is the shadow of this tree?
- (c) A rectangle of area **5280 ft<sup>2</sup>** is **3.7** times as long as it is wide. Find its length and width.
- (d) A rectangle of area **5280 ft<sup>2</sup>** is **90 ft** longer than it is wide. Find its length and width.

**13** Some fractional expressions (section 1.4): simplify and consolidate to a single lowest-terms fraction:

(a) 
$$\frac{\left(\frac{a}{b}\right)^2 - 1}{a^{-1} - b^{-1}}$$