

# Practice for Test 1, the Algebra Check

Math 130 *Kovitz* Fall 2018

The test is on Tuesday, September 11.

1. Factor completely.  $28a^3b - 63ab^2$

2. (a) Divide:      i. 7 by  $-1/7$ .      ii.  $\frac{x/w}{w^2/x^2}$       iii.  $\frac{x/w}{x^2/w^2}$

(b) Simplify  $2 \div \frac{2}{3} + \frac{1}{3}$ .

3. Subtract  $10x^2 - 2x + 5$  from  $8x^2 + 10x - 2$ .

4. Multiply:

(a)  $(3a - 7)^2 - 30$ .

(b)  $3(x - 1/4)^2 - 1$ .

5. Divide. 
$$\frac{-72x^3 - 24x^2 + 8x}{8x}$$

6. Divide. 
$$\frac{-5 \pm 10\sqrt{5}}{-5}$$

7. How is  $\frac{12}{\sqrt{30}}$  related to  $\frac{\sqrt{30}}{5}$ ?

8. Add or subtract, then simplify.

$$\frac{2x - 7}{x - 3} - \frac{1}{3 - x} \quad (\text{Don't work too hard; there's a trick.})$$

9. True or false?

(a)  $(-4)(-5) = -(4)(5)$

(b)  $\frac{-6}{-7} = -\left(\frac{6}{7}\right)$

10. (a) Simplify this expression so that it stays in factored form without a leading minus sign.

$$- [(3 - \sqrt{3})(5 - \sqrt{5})]$$

(b) Solve for  $x$ .

$$-x = \frac{\sqrt{6} - \sqrt{3}}{\sqrt{2} - \sqrt{7}}.$$

**PRACTICE for TEST 1, the ALGEBRA CHECK**

11. Simplify  $\frac{1}{3-x} - \frac{5}{3+x}$ .

12. Solve for  $x$ :

$$\frac{1}{1.4} = \frac{x}{x+1}.$$

13. Solve for  $x$ .

(a)  $(3 - \sqrt{2})x = 3x$

(b)  $(\sqrt{2} + 1)x = 3$

14. Solve for  $x$ . Write all answers as fractions, not as decimals.

$$3x^2 - x + \frac{1}{12} = 0.$$

15. Solve for  $c$ .  $A = \frac{1}{2}h(c - d)$ .

16. Solve for  $q$ :  $(q - 1388)^2 = 64$ .

17. The total of two numbers is one hundred and three. One of them is seventeen less than three times the other. Find both numbers.

18. A automobile traveled for three hours at a constant speed and then drove back to the starting point for two hours at a constant speed ten miles per hour faster than the speed on the way out. After the five hours, there were still 28 miles remaining to get to the starting point.

Find the speed on the way back. (Calculator permitted.)

Verify that using the speeds found for the two parts of the trip satisfies the original wording of the problem.

**Answers follow on next page.**

PRACTICE for TEST 1, the ALGEBRA CHECK

## Answers.

1.  $7ab(2a - 3b)(2a + 3b)$ .
2. (a) i.  $-49$  ii.  $x^3/w^3$  iii.  $w/x$   
(b)  $3\frac{1}{3}$ .
3.  $-2x^2 + 12x - 7$ .
4. (a)  $9a^2 - 42a + 19$   
(b)  $3x^2 - \frac{3}{2}x - \frac{13}{16}$ .
5.  $-9x^2 - 3x + 1$ .
6.  $1 \pm 2\sqrt{5}$ .
7. It is twice as much.
8. 2.
9. (a) False.  
(b) False.
10. (a)  $(\sqrt{3} - 3)(5 - \sqrt{5})$  or  $(3 - \sqrt{3})(\sqrt{5} - 5)$ .  
(b)  $x = \frac{\sqrt{6} - \sqrt{3}}{\sqrt{7} - \sqrt{2}}$  or  $x = \frac{\sqrt{3} - \sqrt{6}}{\sqrt{2} - \sqrt{7}}$ .
11.  $\frac{6x - 12}{9 - x^2}$ .
12.  $x = 2.5$ .
13. (a)  $x = 0$ . (b)  $x = 3\sqrt{2} - 3$ .
14.  $1/6$
15.  $c = \frac{2A}{h} + d$  or  $c = \frac{2A + dh}{h}$ .
16.  $x = 1380$  or  $x = 1396$ .
17. The numbers were 30 and 73.
18. 58 miles per hour.  
The speeds were 48 miles per hour on the way out and 58 miles per hour on the way back, and 58 is 10 more than 48.  
Three hours at 48 miles per hour minus two hours at 58 miles per hour gives a total distance of 144 miles less 116 miles. That is 28 miles.