

Math 80  
Winter 2009  
Exam 3 Version A ANSWERS

Name \_\_\_\_\_

**Directions:** You have the full class period to complete the exam. All you need is a pencil—no calculators allowed! Be sure to follow directions carefully and show all your work. Good luck!

For numbers 1-4, **factor** each polynomial as much as possible. If the given polynomial is prime, write “prime.” (8 pts)

1.  $x^2 - 9x + 20$

$$(x-5)(x-4)$$

2.  $3x^2 - 27$

$$3(x-3)(x+3)$$

3.  $7t^2 + 33t - 10$

$$(7t-2)(t+5)$$

4.  $-2p^2 - 10p - 12$

$$-2(p+3)(p+2)$$

For numbers 5-7, solve each equation **by factoring**. (11 pts)

5.  $r^2 + 2r = 15$

$$r = -5, r = 3$$

6.  $5m^2 - 15m = 0$

$$m = 0, m = 3$$

7.  $4a(a - 2) = -3$

$$a = \frac{1}{2}, a = \frac{3}{2}$$

For numbers 8 and 9, solve by writing and solving a quadratic equation. Be sure to define a variable and answer in a complete sentence. (9 pts)

8. A sail is in the shape of a triangle. The height is 3 times longer than the length of the base. The area of the sail is 24 square feet. Find the height of the sail and the length of the base.

The height of the sail is 12 feet, and the length of the base is 4 ft.

9. The longer leg of a right triangle is 3 cm longer than the shorter leg. If the hypotenuse is 6 cm longer than the shorter leg, find the lengths of the sides of the triangle using the Pythagorean Theorem.

The sides are 9 cm, 12 cm, and 15 cm long.

For numbers 10-12, simplify each square root as much as possible. (6 pts)

10.  $\sqrt{\frac{36}{25}} = \frac{6}{5}$

11.  $\sqrt{54} = 3\sqrt{6}$

12.  $\sqrt{\frac{50}{9}} = \frac{5\sqrt{2}}{3}$

For numbers 13-15, fill in the blank under the square root symbol to give an example of each type of number. (3 pts)

13. A rational number:

$\sqrt{\text{any perfect square, for example 25}}$

14. An irrational number:

$\sqrt{\text{not a perfect square, for example 6}}$

15. Not a real number:

$\sqrt{\text{any negative number, for example -2}}$

For numbers 16-18, solve each quadratic equation **using the square root property**. Simplify your answer as much as possible. If the equation has no real number solutions, say so. (9 pts)

16.  $y^2 = 75$

$$y = \pm 5\sqrt{3}$$

17.  $2r^2 + 10 = 0$

no real solutions

18.  $(3k - 5)^2 = 12$

$$k = \frac{5 \pm 2\sqrt{3}}{3}$$

For numbers 19-20, solve each quadratic equation by **completing the square**. (9 pts)

19.  $x^2 + 8x + 6 = 0$

$$y = -4 \pm \sqrt{10}$$

20.  $4x^2 - 16x = 3$

$$y = 2 \pm \frac{\sqrt{19}}{2}$$