

# MATH A UNIT 5 REVIEW

## INSTRUCTIONS:

Show all of your work on separate paper, do not write answers on this review sheet. Number each problem in order on your paper and box your answers. Follow directions for each problem.

### I. Perform the indicated operations and simplify without a calculator. (See sections 8.1 – 8.3)

1)  $-\sqrt{\frac{9}{144}}$

2)  $\sqrt{\frac{1}{169}}$

3)  $4\sqrt{2} \cdot 4\sqrt{2}$

4)  $4\sqrt{5} \cdot 5\sqrt{5}$

5)  $\sqrt[4]{243}$

6)  $\sqrt[3]{250}$

7)  $\sqrt{15} \cdot \sqrt{5}$

8)  $\sqrt{30} \cdot \sqrt{6}$

9)  $(1 + \sqrt{3})^2$

10)  $(7 + \sqrt{6})^2$

11)  $5\sqrt{12} - 5\sqrt{48}$

12)  $4\sqrt{27} - 6\sqrt{3}$

### II. Evaluate the expressions below; use your calculator if necessary. Round your answer to two decimal places. (See section 8.1)

13)  $\sqrt{\frac{13}{3}}$

14)  $\sqrt{\frac{25}{7}}$

15)  $\frac{14 + \sqrt{6}}{2}$

16)  $\frac{15 + \sqrt{2}}{7}$

17)  $\frac{19 - \sqrt{5}}{3}$

18)  $\frac{5 - \sqrt{3}}{2}$

### III. Solve the following problems and simplify your answers (dimensions are in feet). Write your answer in simplified radical form, then as a decimal rounded to the nearest tenth. (See section 8.3)

19) Find the area of a *rectangle* with a length of  $4\sqrt{10}$  and a width of  $2\sqrt{2}$ .

20) Find the area of a *rectangle* with a length of  $5\sqrt{8}$  and a width of  $3\sqrt{5}$ .

21) Find the area of a *triangle* with a base of  $6\sqrt{3}$  and a height of  $2\sqrt{6}$ .

### IV. Simplify the expressions. (See sections 8.1 – 8.3)

22)  $\sqrt{6x} \cdot \sqrt{3x}$

23)  $\sqrt{50y} \cdot \sqrt{20y^3}$

24)  $\sqrt{20x^3}$

25)  $\sqrt{200x^{31}}$

26)  $10\sqrt{72a} - 12\sqrt{8a}$

27)  $\sqrt{27x} - 5\sqrt{75x}$

28)  $\frac{\sqrt{24x^3}}{\sqrt{6x}}$

29)  $\frac{\sqrt{48y}}{\sqrt{3y}}$

### V. Simplify the expressions below by rationalizing the denominator. (See section 8.4)

30)  $\frac{5\sqrt{3}}{\sqrt{15}}$

31)  $\frac{3\sqrt{8}}{\sqrt{6}}$

32)  $\frac{8}{3 + \sqrt{7}}$

33)  $\frac{8}{9 - \sqrt{3}}$

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34)  $\frac{8+\sqrt{6}}{\sqrt{6}-2}$

35)  $\frac{8-\sqrt{5}}{9+\sqrt{5}}$

**VI. Solve the following equations and check your work. Show the check for each of your answers! (See section 8.5)**

36)  $\sqrt{2y-4} = 3$

37)  $\sqrt{12y+4} = 6$

38)  $\sqrt{2x-3} = x-3$

39)  $x+1 = \sqrt{7x-5}$

40)  $2 + \sqrt{4x-1} = 7$

41)  $\sqrt{3x+1} + 3 = x$

**VII. Do the following problems. (See section 8.5)**

- 42) When firefighters are working to put out a fire, the rate at which they spray water on the fire depends on the nozzle pressure. The formula  $f = 120\sqrt{p}$  models the water's flow rate,  $f$ , in gallons per minute, in terms of the nozzle pressure,  $p$ , in pounds per square inch. What nozzle pressure is needed to achieve a water flow rate of 720 gallons per minute?
- 43) Paleontologists use the formula  $W = 4\sqrt{2x}$  to estimate the walking speed of a dinosaur,  $W$ , in feet per second, where  $x$  is the length, in feet, of the dinosaur's leg. What was the leg length of a dinosaur whose walking speed was 16 feet per second?
- 44) The formula  $d = \sqrt{\frac{3h}{2}}$  models the distance,  $d$ , in miles, that you can see to the horizon at a height of  $h$  feet. From the top of Willis Tower in Chicago, using modern surveying tools you can see approximately 46.6 miles to the horizon. Using this information, determine the height of Willis Tower. **Use a calculator and round to the nearest foot.**

**VIII. Solve each of the quadratic equations below using the square root property. (See section 9.1)**

45)  $3x^2 = 75$

46)  $16y^2 = 25$

47)  $y^2 - 13 = 2$

48)  $(x+6)^2 = 14$

49)  $(2x+1)^2 = 49$

50)  $(y+8)^2 = 11$

**IX. Solve each of the quadratic equations below by using the quadratic formula (not by factoring). Leave your answers in simplified radical form (not as decimals). (See section 9.3)**

51)  $x^2 + 7x + 12 = 0$

52)  $x^2 = 11x - 30$

53)  $4x^2 - x - 4 = 0$

54)  $y^2 + 6y = -9$

55)  $x^2 - 2x = 2$

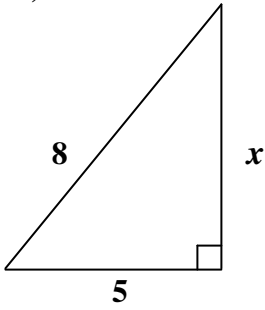
56)  $3x^2 - 8x - 2 = 0$

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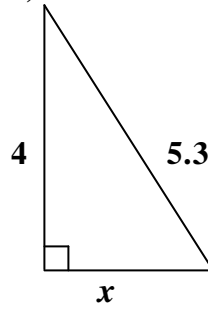
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**X. Find the length of the unknown side of the triangle shown in the diagrams below. (Round your answer to one decimal place. Assume all measurements are in feet.) (See section 9.1)**

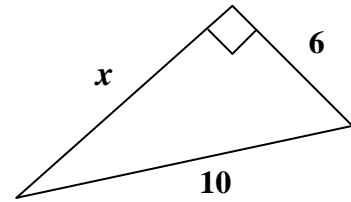
57)



58)



59)



# MATH A UNIT 5 REVIEW *Answers*

- 1)  $-\frac{1}{4}$                       2)  $\frac{1}{13}$                       3) 32                      4) 100
- 5)  $3\sqrt[4]{3}$                       6)  $5\sqrt[3]{2}$                       7)  $5\sqrt{3}$                       8)  $6\sqrt{5}$
- 9)  $4+2\sqrt{3}$                       10)  $55+14\sqrt{6}$                       11)  $-10\sqrt{3}$                       12)  $6\sqrt{3}$
- 13) 2.08                      14) 1.89                      15) 8.22                      16) 2.34                      17) 5.59                      18) 1.63
- 19)  $16\sqrt{5}$  sq. ft. or 35.8 sq. ft.                      20)  $30\sqrt{10}$  sq. ft. or 94.9 sq. ft.
- 21)  $18\sqrt{2}$  sq. ft. or 25.5 sq. ft.
- 22)  $3x\sqrt{2}$                       23)  $10y^2\sqrt{10}$                       24)  $2x\sqrt{5x}$                       25)  $10x^{15}\sqrt{2x}$
- 26)  $36\sqrt{2a}$                       27)  $-22\sqrt{3x}$                       28)  $2x$                       29) 4
- 30)  $\sqrt{5}$                       31)  $2\sqrt{3}$                       32)  $12-4\sqrt{7}$                       33)  $\frac{36+4\sqrt{3}}{39}$
- 34)  $11+5\sqrt{6}$                       35)  $\frac{77-17\sqrt{5}}{76}$
- 36)  $y = \frac{13}{2}$                       37)  $y = \frac{8}{3}$                       38)  $x = 6$
- 39)  $x = 2, x = 3$                       40)  $x = \frac{13}{2}$                       41)  $x = 8$
- 42) 36 lbs per square inch                      43) 8 feet                      44) 1448 feet
- 45)  $x = \pm 5$                       46)  $x = \pm \frac{5}{4}$                       47)  $y = \pm\sqrt{15}$
- 48)  $x = -6 \pm \sqrt{14}$                       49)  $x = 3, x = -4$                       50)  $y = -8 \pm \sqrt{11}$
- 51)  $x = -3, x = -4$                       52)  $x = 5, x = 6$                       53)  $x = \frac{1 \pm \sqrt{65}}{8}$
- 54)  $y = -3$                       55)  $x = 1 \pm \sqrt{3}$                       56)  $x = \frac{4 \pm \sqrt{22}}{3}$
- 57)  $x \approx 6.2$  feet                      58)  $x \approx 3.5$  feet                      59)  $x \approx 8.0$  feet