

**MATH A UNIT 4 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. Factor each polynomial completely. (See sections 6.1 – 6.5)**

1)  $14a^4b - 21a^7b^2$

2)  $21x^2y^3 + 28xy^2$

3)  $27m^8n^3 - 36m^9n^4$

4)  $30xy^2 - 25x^2y$

5)  $3y^2 - 12y + 6xy$

6)  $14x^3 - 100x^2$

7)  $xy + y + 4x + 4$

8)  $xy + 4x - 2y - 8$

9)  $x^3 + 3x^2 + 2x + 6$

10)  $b^2 + 5b - 24$

11)  $a^2 - 2a + 1$

12)  $y^2 - 6y - 55$

13)  $6p^2 - 5p - 4$

14)  $6x^2 - 19x - 7$

15)  $15y^2 - 22y - 5$

16)  $-2w^2 - 12w - 18$

17)  $8x^2 + 8x - 6$

18)  $2x^3 + 7x^2 - 72x$

19)  $y^2 - 64$

20)  $3y^2 - 12$

21)  $4x^3 - 100x$

22)  $16x^2 - 40xy + 25y^2$

23)  $25y^2 + 10y + 1$

24)  $16p^2 - 24p + 9$

**II. Solve each of the following equations. (See section 6.6)**

25)  $3x(x - 2) = 0$

26)  $-4x(x + 1) = 0$

27)  $(x - 3)(x + 4) = 0$

28)  $2m^2 + 10m = -12$

29)  $v^2 - 22v = 75$

30)  $2x^2 - 9x = 5$

31)  $x^2 - 64 = 0$

32)  $3y^3 - 75y = 0$

33)  $6x^3 = 6x$

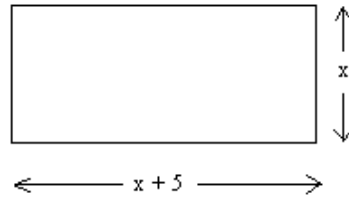
34)  $(a - 2)(a - 3) = 6$

35)  $(w + 3)(w - 2) = 50$

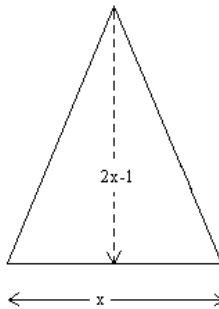
36)  $(x - 3)^2 = 4$

**III. Do the following word problems. (See section 6.6)**

- 37) The length of a rectangular garden is 5 feet greater than the width. The area of the rectangle is 300 square feet. Find the length and width.



- 38) Each end of a glass prism is a triangle with a height that is 1 inch shorter than twice the base. If the area of the triangle is 60 square inches, how long are the base and height?



- 39) The length of a rectangular sign is 3 feet longer than the width. If the sign has space for 40 square feet of advertising, find its length and its width.
- 40) The length of a rectangular garden is 6 feet longer than its width. If the area of the garden is 55 square feet, find its length and its width.

**IV. Simplify and reduce to lowest terms. (See section 7.1)**

$$41) \frac{24xy}{6x^2y} \qquad 42) \frac{10x^2y}{-50xy^2z} \qquad 43) \frac{2x^2 - 4x - 16}{4x - 16} \qquad 44) \frac{y^2 + 3y}{y^2 + 5y + 6}$$

**V. Perform the indicated operations. (See section 7.2)**

$$45) \frac{5rt}{6} \div \frac{10r^2t^3}{2t} \qquad 46) \frac{2xy}{5} \div \frac{8yx^2}{100} \qquad 47) \frac{x^2 - 1}{4x} \cdot \frac{2x}{3x + 3}$$

$$48) \frac{x^2 - 9}{x + 3} \cdot \frac{4x}{4x^2 - 12x} \qquad 49) \frac{4x - 4}{x + 4} \cdot \frac{x^2 - 16}{3x - 3} \qquad 50) \frac{x^2 - x - 2}{x^2 - x} \div \frac{x^2 - 2x}{x^2 - x}$$

**VI. Perform the indicated operations and simplify. (See section 7.4)**

$$51) 3 + \frac{4a}{5b} \qquad 52) \frac{2x}{3y} - 2 \qquad 53) \frac{x + 3}{6x + 36} - \frac{3}{x^2 + 6x} \qquad 54) \frac{10x}{x^2 - 9} - \frac{5}{x + 3}$$

**VII. Solve the following equations. (See section 7.6)**

55)  $\frac{1}{x} - \frac{2}{3x} = \frac{1}{4}$

56)  $\frac{4}{x} + \frac{3}{x} = \frac{2}{3}$

57)  $\frac{5}{3x} - \frac{4}{x} = \frac{1}{3}$

58)  $\frac{-3}{4} + \frac{7}{x} = \frac{2}{3x}$

59)  $\frac{4}{x} + \frac{2}{3} = \frac{1}{4}$

60)  $\frac{2}{5x} = \frac{1}{2x-15}$

61)  $\frac{10}{x+4} = \frac{3}{x-3}$

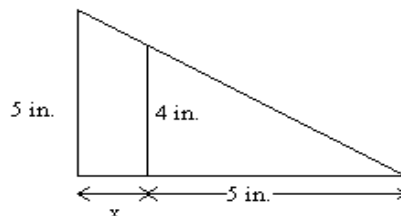
62)  $\frac{-1}{2x-7} = \frac{11}{3x+2}$

**VIII. Do the following problems. (See section 7.6)**

- 63) A company that manufactures wheelchairs has fixed costs of \$500,000. The average cost per wheelchair,  $C$ , for the company to manufacture  $x$  wheelchairs per month is modeled by the formula  $C = \frac{400x + 500,000}{x}$ . Use this mathematical model to answer the question: How many wheelchairs per month can be produced at an average cost of \$405 per wheelchair?
- 64) In Palo Alto, California, a government agency ordered computer-related companies to contribute to a pool of money to clean up underground water supplies. (The companies had stored toxic chemicals in leaking underground containers.) The formula  $C = \frac{2x}{100-x}$  models the cost,  $C$ , in millions of dollars, for removing  $x$  percent of the contaminants. Use this model to answer the question: What percentage of the contaminants can be removed for \$8 million?
- 65) The formula  $S = \frac{C}{1-r}$  describes the selling price,  $S$ , of a product in terms of its cost to the retailer,  $C$ , and its markup,  $r$ , usually expressed as a percent. A small television cost a retailer \$140 and was sold for \$200. Find the markup. Express the answer as a percent.

**IX. Do the following problems. Round to one decimal places. (See section 7.7)**

- 66) Use similar triangles and the fact that corresponding sides are proportional to find the length of the side marked with an  $x$ .



- 67) A person who is 5 feet tall casts a shadow that is 6 feet long. At the same time, a nearby tree casts a shadow 86 feet long. Draw a **diagram** of the situation and set up an **equation**. What does your variable stand for? What is the height of the tree?
- 68) A person who is 5 feet tall is standing 9 feet away from the base of a lamppost. The light from the lamppost causes the person to cast a 6 foot long shadow. Draw a **diagram** of the situation and set up an **equation**. What does your variable stand for? How tall is the lamppost?

# MATH A UNIT 4 REVIEW *Answers*

- |   |  |                               |
|---|--|-------------------------------|
| 1) $7a^4b(2-3a^3b)$   | 2) $7xy^2(3xy+4)$                        | 3) $9m^8n^3(3-4mn)$           |
| 4) $5xy(6y-5x)$   | 5) $3y(y-4+2x)$                          | 6) $2x^2(7x-50)$              |
| 7) $(x+1)(y+4)$   | 8) $(y+4)(x-2)$                          | 9) $(x+3)(x^2+2)$             |
| 10) $(b+8)(b-3)$  | 11) $(a-1)^2$                            | 12) $(y-11)(y+5)$             |
| 13) $(3p-4)(2p+1)$  | 14) $(3x+1)(2x-7)$                       | 15) $(5y+1)(3y-5)$            |
| 16) $-2(w+3)^2$   | 17) $2(2x+3)(2x-1)$                      | 18) $x(2x-9)(x+8)$            |
| 19) $(y+8)(y-8)$  | 20) $3(y+2)(y-2)$                        | 21) $4x(x+5)(x-5)$            |
| 22) $(4x-5y)^2$   | 23) $(5y+1)^2$                           | 24) $(4p-3)^2$                |
| 25) $x=0$ or $x=2$  | 26) $x=0$ or $x=-1$                      | 27) $x=3$ or $x=-4$           |
| 28) $m=-3$ or $m=-2$  | 29) $v=25$ or $v=-3$                     | 30) $x=-\frac{1}{2}$ or $x=5$ |
| 31) $x=8$ or $x=-8$   | 32) $y=0, 5, -5$                         | 33) $x=0, 1, -1$              |
| 34) $a=0$ or $a=5$  | 35) $w=-8$ or $w=7$                      | 36) $x=1$ or $x=5$            |
| 37) length = 20 feet ; width = 15 feet                              | 38) base = 8 inches ; height = 15 inches |                               |
| 39) length = 8 feet ; width = 5 feet                                | 40) length = 11 feet ; width = 5 feet    |                               |
| 41) $\frac{4}{x}$   | 42) $-\frac{x}{5yz}$                     | 43) $\frac{x+2}{2}$           |
| 44) $\frac{y}{y+2}$   |  |                               |
| 45) $\frac{1}{6rt}$   | 46) $\frac{5}{x}$                        | 47) $\frac{x-1}{6}$           |
| 48) 1   | 49) $\frac{4(x-4)}{3}$                   | 50) $\frac{x+1}{x}$           |
| 51) $\frac{4a+15b}{5b}$   | 52) $\frac{2x-6y}{3y}$                   | 53) $\frac{x-3}{6x}$          |
| 54) $\frac{5}{x-3}$   |  |                               |
| 55) $x=\frac{4}{3}$   | 56) $x=\frac{21}{2}$                     | 57) $x=-7$                    |
| 58) $x=\frac{76}{9}$  |  |                               |
| 59) $x=-\frac{48}{5}$   | 60) $x=-30$                              | 61) $x=6$                     |
| 62) $x=3$   |  |                               |
| 63) 100,000 wheelchairs   | 64) 80%                                  | 65) 30%                       |
| 66) 1.25 inches   |  |                               |
| 67) The variable stands for the height of the tree; about 71.7 feet |  |                               |
| 68) The variable stands for the height of the lamppost; 12.5 feet   |  |                               |