

# MATH D 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. Perform the operations and simplify without using a calculator. Assume all variables represent positive numbers. (See section 7.5)**

1)  $(4 + 2\sqrt{h})(3 - \sqrt{h})$

2)  $(3\sqrt{z} + 4)(2\sqrt{z} - 5)$

3)  $(\sqrt{5} + 6x)^2$

4)  $-\frac{6}{\sqrt[3]{3y}}$

5)  $\frac{6}{\sqrt[3]{2a}}$

6)  $\frac{9}{\sqrt[3]{3x^2}}$

7)  $\frac{4}{2 + \sqrt{6}}$

8)  $\frac{6 - \sqrt{3}}{3 + \sqrt{3}}$

9)  $\frac{2\sqrt{3} + 1}{2 - \sqrt{3}}$

**II. Solve the equations below. (See section 7.6)**

10)  $\sqrt[3]{2x-5} - 2 = 3$

11)  $\sqrt[3]{2x+11} + 5 = 8$

12)  $3 + \sqrt{2x-3} = x$

13)  $\sqrt{3h+16} - 1 = h + 5$

14)  $\sqrt{m-3} - 5 + \sqrt{m} = -2$

15)  $\sqrt{x+7} = 7 - \sqrt{x}$

16)  $1 - \sqrt{x} = \sqrt{x+2} - 3$

17)  $T = c\sqrt{\frac{L}{g}}$ , for  $L$

18)  $2x = \sqrt{\frac{y}{6z}}$ , for  $z$

**III. Simplify without using a calculator. (See section 7.7)**

19)  $\sqrt{-8}\sqrt{-12}$

20)  $\sqrt{-15}\sqrt{-25}$

21)  $-\sqrt{-20}\sqrt{5}$

22)  $\frac{2-i}{1+4i}$

23)  $\frac{2}{4-5i}$

24)  $\frac{3i+2}{2-3i}$

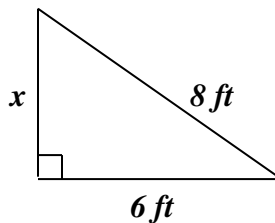
25)  $i^{37}$

26)  $i^{27}$

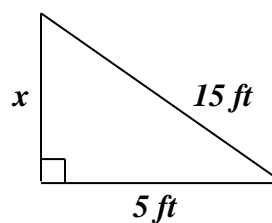
27)  $i^{50}$

**IV. Find the length of the unknown side(s) of the triangle. Write your answer as a decimal rounded to the nearest tenth. (See section 8.1)**

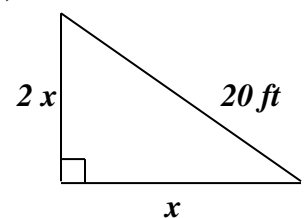
28)



29)



30)



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**V. Use the formula  $A = P(1+r)^t$  to solve the following problems. (See section 8.1)**

31) Find the rate  $r$  at which \$ 200 grows to \$ 233.28 in 2 years.

32) Find the rate  $r$  at which \$ 20,000 grows to \$ 24,420.50 in 2 years.

33) Find the rate  $r$  at which \$ 600 grows to \$766.14 in 2 years.

**VI. Solve the following equations by completing the square. Find all real or complex solutions. Note: Completing the square method must be used. (See section 8.1)**

34)  $x^2 - 6x - 3 = 0$       35)  $3x^2 + 6x + 1 = 0$       36)  $x^2 - 4x + 8 = 0$       37)  $2x^2 + 8x = -18$

**VII. Use the Quadratic Formula to solve the equations below. Find all real or complex solutions. (See section 8.2)**

38)  $z^2 - 6z + 27 = 0$       39)  $4x^2 - 3 = 8x$       40)  $2y^2 + y = 21$       41)  $2y^2 + 3 = 0$

**VIII. Solve the inequalities and graph each solution on the real number line. Write your answers in interval notation. (See section 8.5)**

42)  $x^2 - 2x - 8 \leq 0$       43)  $5x^2 - 35x > 0$       44)  $2x^2 + 3x - 20 < 0$

45)  $x^2 + 4x - 12 > 0$       46)  $\frac{x+2}{3-2x} > 0$       47)  $\frac{-x-6}{x+1} \leq -2$

48)  $\frac{2x-4}{x-7} \geq 1$       49)  $\frac{8x+6}{2x+3} \leq 3$       50)  $\frac{2x+1000}{x+1000} \leq 1$

**IX. For the following quadratic equations, find the: a) vertex b) x-intercepts c) y-intercept d) Graph. Include a scale. (See section 8.3)**

51)  $y = (x+2)^2 - 4$       52)  $y = (x-1)^2 + 3$       53)  $y = -(x-3)^2 + 1$

54)  $y = x^2 - 4x + 4$       55)  $y = -x^2 + 2x + 15$       56)  $y = -x^2 - 2x$

# MATH D UNIT 4 REVIEW ANSWERS

1)  $12 + 2\sqrt{h} - 2h$     2)  $6z - 7\sqrt{z} - 20$     3)  $5 + 12x\sqrt{5} + 36x^2$     4)  $-\frac{2\sqrt[3]{9y^2}}{y}$   
 5)  $\frac{3\sqrt[3]{4a^2}}{a}$     6)  $\frac{3\sqrt[3]{9x}}{x}$     7)  $-4 + 2\sqrt{6}$     8)  $\frac{7 - 3\sqrt{3}}{2}$     9)  $8 + 5\sqrt{3}$

10)  $x = 65$     11)  $x = 8$     12)  $x = 6$   
 13)  $h = -5, h = -4$     14)  $m = 4$     15)  $x = 9$

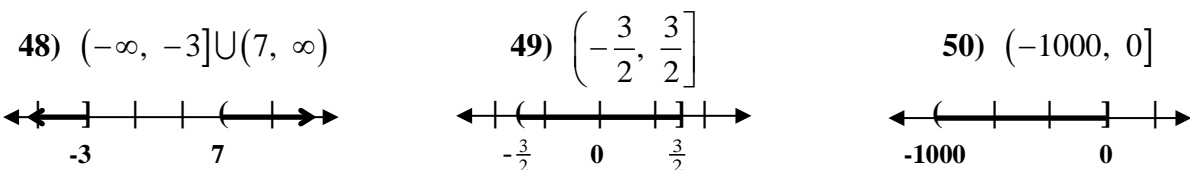
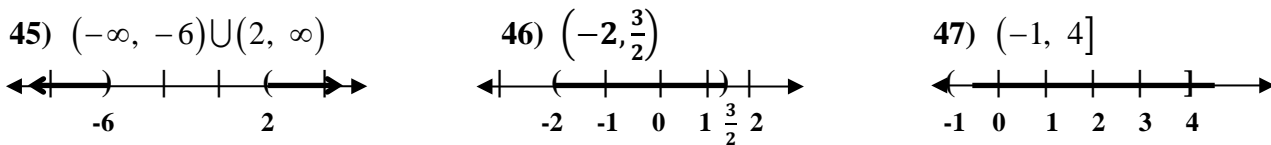
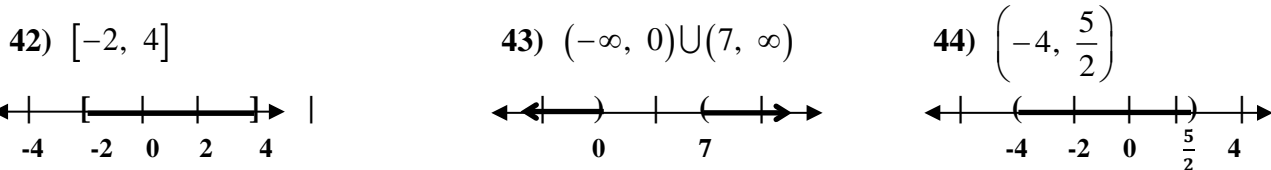
16)  $x = \frac{49}{16}$     17)  $L = \frac{gT^2}{c^2}$     18)  $z = \frac{y}{24x^2}$

19)  $-4\sqrt{6}$     20)  $-5\sqrt{15}$     21)  $-10i$     22)  $-\frac{2}{17} - \frac{9}{17}i$   
 23)  $\frac{8}{41} + \frac{10}{41}i$     24)  $-\frac{5}{13} + \frac{12}{13}i$     25)  $i$     26)  $-i$     27)  $-1$

28)  $x = 5.3 \text{ ft}$     29)  $x = 14.1 \text{ ft}$     30)  $x = \text{short side} = 8.9 \text{ ft}, 2x = \text{long side} = 17.9 \text{ ft}$   
 31)  $r = 8\%$     32)  $r = 10.5\%$     33)  $r = 13\%$

34)  $x = 3 \pm 2\sqrt{3}$     35)  $x = \frac{-3 \pm \sqrt{6}}{3}$     36)  $x = 2 \pm 2i$     37)  $x = -2 \pm i\sqrt{5}$

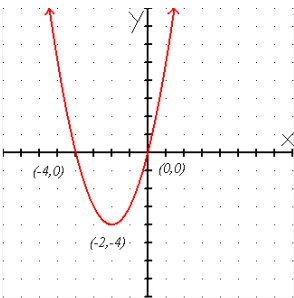
38)  $z = 3 \pm 3i\sqrt{2}$     39)  $x = \frac{2 \pm \sqrt{7}}{2}$     40)  $y = 3, y = -\frac{7}{2}$     41)  $y = \pm \frac{\sqrt{6}}{2}i$



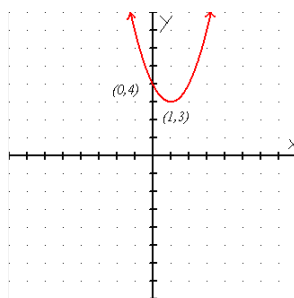
Equation	a) vertex	b) x-intercepts	c) y-intercept
51) $y = (x+2)^2 - 4$	$(-2, -4)$	$(-4, 0), (0, 0)$	$(0, 0)$
52) $y = (x-1)^2 + 3$	$(1, 3)$	<i>none</i>	$(0, 4)$
53) $y = -(x-3)^2 + 1$	$(3, 1)$	$(2, 0), (4, 0)$	$(0, -8)$
54) $y = x^2 - 4x + 4$	$(2, 0)$	$(2, 0)$	$(0, 4)$
55) $y = -x^2 + 2x + 15$	$(1, 16)$	$(-3, 0), (5, 0)$	$(0, 15)$
56) $y = -x^2 - 2x$	$(-1, 1)$	$(-2, 0), (0, 0)$	$(0, 0)$

**Graph:**

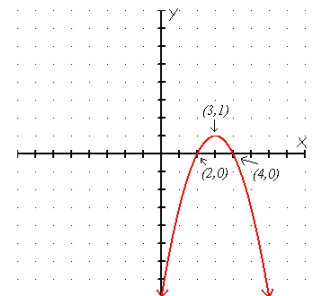
51)  $y = (x+2)^2 - 4$



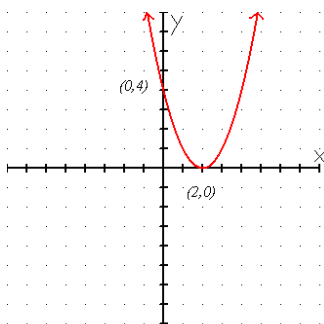
52)  $y = (x-1)^2 + 3$



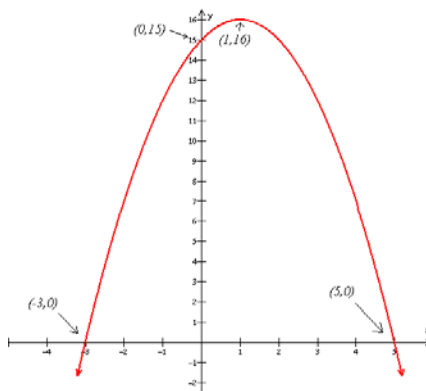
53)  $y = -(x-3)^2 + 1$



54)  $y = x^2 - 4x + 4$



55)  $y = -x^2 + 2x + 15$



56)  $y = -x^2 - 2x$

