

**Review Packet Chapters 1, 2, 3, & 5****Short Answer**

- Evaluate the given expression if  $a = \frac{3}{5}$ ;  $b = -2$ ;  $c = 0.7$ ; and  $d = 7$ .  
 $(a + b)^2 + 5dc$
- Evaluate the given expression if  $a = \frac{4}{7}$ ;  $b = -4$ ;  $c = 9$ ; and  $d = 0.3$ . Round to the nearest hundredth.  
 $\frac{3c + 14a}{2d}$
- Find the value of  $\frac{1}{a} + \frac{1}{b^n}$  if  $n = 5$ ;  $b = -\frac{1}{4}$ ; and  $a = 1000$ .
- Name the sets of numbers to which all of the following numbers belong. Then arrange the numbers in order from least to greatest.  
 $3.\overline{78}$ ,  $3.7\overline{8}$ ,  $3.7$ ,  $3.78$ ,  $3.\overline{8}$
- Andrea sells two types of cookies to raise money for the band. The money she gets from selling one type of cookie is \$4.00 and for the second type is \$3.50. If she sells 30 cookies of the first type and 25 of the second type, how much money will she raise? Use the properties of real numbers to find how much money Andrea raised.
- A general study on the consumption of tea and coffee suggests that the number of people who like tea is 6 more than 40% of the number of people who like coffee. The survey questions were asked of the age groups listed in the table below.

Age group	Number of people who like coffee
20-25	120
25-30	125
30-35	130

Write and solve an inequality to determine the minimum number of people who like tea in the 20-25 age group.

11. A laboratory equipment manufacturer allows some amount of acceptable error. In this case the difference in volume does not exceed 0.1 milliliters. The burettes used for titration experiment in laboratories are assumed to deliver 50.0 milliliters. Use this information to write an inequality and solve it to determine, minimum and maximum volume of a manufactured burette.
12. Daniel pays \$389 in advance on his account at the athletic club. Each time he uses the club, \$7 is deducted from the account. Write a linear function to calculate the value remaining in his account after  $x$  visits to the club. Use the linear function to find the value remaining in the account after 11 visits.
13. In economics, the volume of a market is given by the product of the average price of a stock and how much of that stock is sold. If the sale of a stock is given in hundreds multiplied by 11 minus the average price in dollars, write and solve the function to find the volume of the market when the average stock price is \$8.
14.  $f(x) = \frac{3}{4}x + 3$
15. A pyramid-shaped tower is 35 meters high and 25 meters wide. Find the slope of the tower.
16. A pyramid-shaped tower is 35 meters high and has a slope of 1.3. Find the width of the base of the tower.
17. An incense stick is 7.2 inches tall and burns at a rate of 2.30 inches per hour. Write an equation that can be used to find the height after  $x$  hours.
18. A construction company received the details listed in the table below from the two suppliers after bidding for the machinery to be used in a project.

	Supplier A	Supplier B
<b>Machine Cost</b>	\$500	\$700
<b>Transportation Cost (per mile)</b>	\$7	\$5

Find the distance for which the two suppliers charge the same amount for the machinery.

19. The table below shows the study times and test scores for a number of students. Create a scatter plot, a line of fit and describe the correlation for the given data.

<b>Study Time (min)</b>	11	14	20	27	34	39	41	45
<b>Test Score</b>	58	62	67	71	71	75	72	77

20. The production trends of company X and Y show an annual increment of 3000 units and 1700 units respectively. If the data shows a production of 52,000 units for company X and 64,000 units for company Y in 2000, write equations to represent the annual production of company X and Y after  $x$  years past 2000. Also, find if production of company X will be more than the production of Y in 2008.

Use the table to answer the following questions.

Product	Price/unit (Year 2004)	Average Price (increment/unit/year)
Product A	\$17	\$0.50
Product B	\$16	\$1.25
Product C	\$20	\$0.20
Product D	\$19	\$0.60

21. Use the information given in the table to write equations that represent the price of product A and product B,  $x$  years after 2004. Graph both the equations. Do you think that the price of product A will be more than product B in 2007?
22. A food product consists of carbohydrates and fat. The total amount of carbohydrates and fat present in the product is 23 grams. The amount of carbohydrates is 3 grams less than the amount of fat. Write and solve a system of equations to find the amount of carbohydrates and fat present in the product.
23. The sum of the ages of a father and son is 42 years. Five years later the age of the father will be 10 more than five times the age of the son. Write and solve a system of equations that represent the present ages of the father and the son.
24. Andrea has \$130 in her piggy bank. The money is in \$10 and \$1 bills. She has a total of 40 bills in her piggy bank. Write and solve a system of equations that represent the number of bills of each type that Andrea has in her piggy bank.
25. A rectangular frame is to be designed in such a way that the sum of three times the length and four times the width is less than or equal to 80 inches and the length of the frame is a maximum of 15 inches. Write a system of inequalities to represent the dimensions of the frame.
26. Alloy A and B consist of copper and bronze. One-gram of alloy A consists of 0.28 gram of copper and 0.72 gram of bronze and one gram of alloy B consists of 0.60 gram of copper and 0.40 gram of bronze. If 75 grams of copper and 65 grams of bronze are available, write and graph the system of inequalities that represents the number of each type of alloy formed.
27. Julie is preparing two kinds of punch, X and Y. A liter of punch X requires 550 milliliters of grape juice and 450 milliliters of apple juice and a liter of punch Y requires 250 milliliters of grape juice and 750 milliliters of apple juice. If Julie has 2 liters of grape juice and 3 liters of apple juice, write and graph the system of inequalities to represent the liters of each type of punch that can be made. List two different combinations of punch that can be made.

28. A car manufacturing company produces two models of cars, A and B. The profit on car A is \$2000 per car and on car B is \$3000 per car. The company can produce a maximum of 3000 cars of type A and 2000 cars of type B per year. If the company can produce a maximum of 15,000 cars per year, write a system of inequalities required to find the maximum profit.
29. A garment company makes two types of woolen sweaters and can produce a maximum of 700 sweaters per week. Each sweater of the first type requires 2 pounds of green wool and 4 pounds of pink wool to produce a single sweater. The second type of sweater requires 4 pounds of green wool and 3 pounds of pink wool. The profit earned on the first type of sweater is \$5 and on the second type is \$7. If the company has 50 pounds of green wool and 80 pounds of pink wool, write a system of inequalities to represent the possible number of sweaters of each type that can be made per week. Draw a graph showing the feasible region and list the coordinates of the vertices of the feasible region. Also, find the maximum profit.
30. The sum of the ages of Anna, Emma, and Karen is 27 years. Anna is 2 years older than Karen, and Emma is 4 years younger than Anna. Write a system of equations that represents the ages of Anna, Emma, and Karen.
31. A bag contains 19 red, green, and white balls. The number of red balls is five more than the number of white balls and the number of green balls is 3 less than the number of red balls. Write and solve a system of equations that represents the number of red balls, green balls, and white balls.
32. Julie took her math final exam. It had short answer questions, essay questions, and multiple-choice questions. The exam had 25 questions worth 75 total points. The number of short answer questions was 2 more than the number of essay questions. If each short answer was worth 2 points, each essay question was worth 4 points, and each multiple-choice question was worth 5 points, write and solve a system of equations to represent the number of short answer questions, essay questions, and multiple-choice questions on Julie's math exam.
33. A music store sells regular CDs for \$8.50. On average, the store sells 90 CDs every day. For each 50-cent increase in the price of regular CDs, the sales of CDs will go down by 5. What should the CD price be to get the most income from CD sales?
34. The cost of admission to Water World is \$7.50. The owner wants to raise the admission cost. For every \$1 increase in the admission cost, the number of visitors to the park will drop by 25 per day. Currently, an average of 225 people visit the water park each day. Find the amount by which the admission cost to the water park should be increased to obtain maximum income.
35. The path of the water from a sprinkler is modeled by a quadratic function  $h(d) = -2d^2 + 6d + 4$ , where  $h(d)$  is the height of water, in feet, at a distance of  $d$  feet from the jet. Find how far from the sprinkler the water hits the ground.
36. The height of a pebble dropped from a cliff 604 feet high is described by the formula  $h(t) = 604 - 16t^2$ . How long will the pebble take to reach a height of 348 feet?
37. The sales revenue  $p$  of a company is described by  $p(x) = 20,000 + 5x^2$ , where  $x$  is the number of units sold. Find the number of units sold if the company's revenue is \$32,500.

38. A rocket is launched with an initial velocity of 107 feet per second from the top of a cliff 63 feet high. Its height is described by  $h(t) = -16t^2 + 107t + 63$ . How long will the rocket take to hit the ground?
39. The volume of a box is 400 cubic meters. If the width of the box is 2 meters and its length is 10 meters more than its height, find the length and height of the box.
40. A ladder 20 feet long is leaning against a wall and reaches the top of the wall. If the height of the wall is 4 feet more than the distance between the foot of the ladder and the base of the wall, find the height of wall.
41. The current flowing through an electrical circuit is  $3 + 5j$  amps. The current flowing through another circuit connected in series is  $1 - 4j$  amps. Find the total current flowing through the two circuits.
42. In an AC circuit, the voltage  $E$ , current  $I$ , and impedance  $Z$  are related by the formula  $E = I \cdot Z$ . The current in a circuit is  $3 - 2j$  amps, and the impedance is  $5 + j$  ohms. What is the voltage?
43. The frame of a square picture is 3 inches wide. The area of the picture excluding the frame is seven-tenths of the total area of the framed picture. Find the dimensions of the picture without the frame.
44. The ratio of boys and girls in Mr. Alexander's class is  $\frac{x-8}{12}$  and in Mr. Blake's class is  $\frac{7}{x}$ . If the two classes have same ratio of boys and girls, find the value of  $x$ .
45. The window of a building is in the shape of a parabola that can be modeled by the equation  $h(w) = -2w^2 + 12$ , where  $h(w)$  is the height of the window and  $w$  is the width in feet. Find the width of the window at a height of 8 feet.
46. A rocket is fired with a velocity of 60 m/s at a vertical angle of 30 degrees. The equation  $h(t) = 30t - 4.9t^2$  gives the height of the rocket at  $t$  seconds after the launch. Will the rocket ever reach a height of 50 meters? Explain your reasoning.
47. A tractor is suddenly switched off, but it continues to move. Its path is modeled by the equation  $d(t) = 2t^2 - 4t$ , where  $d(t)$  is the distance covered by the tractor in  $t$  seconds. The tractor finally stops after covering a distance of 0.5 feet. Find out how long the tractor is in motion after it is switched off.
48. The height of a stone thrown with an initial speed of 15 meters per second from a cliff 490 meters above the ground is given by the equation  $h(t) = -4.9t^2 + 15t + 490$ . The related quadratic equation is  $-4.9t^2 + 15t + 490 = 0$ . Find the discriminant.
49. The trajectory of a rocket launched from the top of a cliff can be modeled by a quadratic equation. The rocket reaches a maximum height of 250 feet at a horizontal distance of 4 feet from the cliff. The rocket touches the ground at a horizontal distance of 9 feet from the cliff. Determine a quadratic function that models the height  $h(d)$  of the rocket at any given distance  $d$  feet from the cliff.
50. Jack is launching a toy rocket. He launched the rocket three times at different vertical angles. Below are the three functions describing the paths of the toy rocket for the three different angles. Find the launch angle with which the rocket attained the greatest height.  
Angle A:  $h(t) = -16.24(t - 2.02)^2 + 70.15$   
Angle B:  $h(t) = -16.18(t - 2.18)^2 + 70.29$   
Angle C:  $h(t) = -16.13(t - 2.07)^2 + 70.09$
51. A factory building is supported by a arch-shaped parabola of steel. This parabola can be modeled by the quadratic function  $y = -0.025(x - 60)^2 + 105$  where  $y$  represents the height of the arch and  $x$  represents the horizontal distance from one end of the base in meters. What is the highest point of the parabolic arch? At what distance from either end of the base does it occur?

# HALG2 Rev Pkt Ch 1, 2, 3 & 5 KEY

① 26.46    ② 58.33    ③ -1023.999    ④ Q, R; 3.7, 3.78, 3.78, 3.78, 3.8

⑤ \$207.50    ⑥ 7167.97 m<sup>2</sup>    ⑦ 10 visits    ⑧  $|x - 1250| = 25$   
 $x =$  life of bulb in hours  
 max; max = 1275; min = 1225

⑨  $7n + 6 \geq 10n + 7; n \leq -\frac{1}{3}$   
 ⑩  $x \geq 6 + 0.4(120); \text{min} = 54$     ⑪  $|x - 50.0| \leq 0.1; \text{max} = 50.1 \text{ ml}; \text{min} = 49.9 \text{ ml}$

⑫  $f(x) = 389 - 7x, x = \# \text{ visits}; \$312$     ⑬  $g(p) = 100p(11 - p); p = \text{avg price}; 2400$   
 $g = \text{volume of mkt}$

⑭ -4, 3    ⑮ 2.8    ⑯ 53.85    ⑰  $y = -2.3x + 7.2$

⑱ 100 miles    ⑲ positive correlation    ⑳  $y = 52,000 + 3000x$   
 $y = 64,000 + 1700x$   
 $x = \text{annual production}$   
 $y = \# \text{ of years}$

㉑  $y = 17 + .50x$   
 $y = 16 + 1.25x$   
 NO

㉒  $x + y = 23$      $x = \text{carbs}$   
 $x + 3 = y$      $y = \text{fat}$   
 $x = 10$      $y = 13$

NO

㉓  $x + y = 42$   
 $x + 5 = 10 + 5(y + 5)$   
 $x = \text{father's age} = 40$   
 $y = \text{son's age} = 2$

㉔  $x + y = 40$   
 $x + 10y = 130$   
 $x = \# \$1 \text{ bills} = 30$   
 $y = \# \$10 \text{ bills} = 10$

㉕  $l \geq 0, w \geq 0$   
 $3l + 4w \leq 80$   
 $l \leq 15$

㉖  $x \geq 0, y \geq 0$   
 $.72x + .40y \leq 65$   
 $.28x + .60y \leq 75$

㉗  $x \geq 0, y \geq 0$   
 $550x + 250y \leq 2000$   
 $450x + 750y \leq 3000$

㉘  $x \geq 0, x + y \leq 15000$   
 $y \geq 0$   
 $x \leq 3000$      $x = \text{type A}$   
 $y \leq 2000$      $y = \text{type B}$

㉙  $x \geq 0, y \geq 0, 2x + 4y \leq 50;$   
 $4x + 3y \leq 80; x + y \leq 700$   
 $p = 5x + 7y$   
 $x = \# \text{ sweaters 1st type}$   
 $y = \# \text{ sweaters 2nd type}$

㉚  $x + y + z = 27$   
 $x = 2 + z$   
 $y + 4 = x$   
 $x = \text{Anna's age}$   
 $y = \text{Emma's age}$   
 $z = \text{Karen's age}$

㉛  $x + y + z = 19$   
 $x = 5 + z$   
 $y + 3 = x$   
 $x = \# \text{ red} = 9$   
 $y = \# \text{ green} = 6$   
 $z = \# \text{ white} = 4$

㉜  $x + y + z = 25; 4x + 2y + 5z = 75$   
 $y = x + 2$   
 $x = \# \text{ essay ?'s} = 11$   
 $y = \# \text{ short ans. ?'s} = 13$   
 $z = \# \text{ mult-choice ?'s} = 1$

㉝ \$8.75

㉞ 4 m

㉟ increase by 754

㊱ 50 units

㊲ 3 ft

㊳ 7.2 m

㊴  $l = 20 \text{ m}; h = 10 \text{ m}$

㊵ 16 ft

㊶ 4 jumps

㊷ 17-7; volts



(43) 30.7 in \* 30.7 in    (44) 14    (45) 1.4 ft    (46) NO

(47) 2.1 k    (48) 9829    (49)  $h(d) = -10(x-4)^2 + 250$

(50) LB    (51) 105m, 60m