**PreCalculus Math 11 – Final Exam Review**

**Unit 1 – Factoring/Solving Quadratics**

1. Which function is *not* quadratic?

|  |  |  |  |
| --- | --- | --- | --- |
| **A** |  | **C** |  |
| **B** |  | **D** |  |

1. Solve .
2. Determine the roots of the quadratic equation .
3. A rectangle has dimensions  and , where *x* is in centimetres. If the area of the rectangle is 72 cm2, what is the value of *x*, to the nearest tenth of a centimetre?
4. Solve 
5. Find the roots of **
6. Find the roots of the quadratic function ** by completing the square.
7. Use the quadratic formula to find the real zeros of the equation *x*2 + 4*x* – 21 = 0.

9. Solve 3*x*2 = 8*x* – 4 by:

**a)** factoring

**b)** completing the square

**c)** using the quadratic formula

10. Find the *x*-intercepts of the quadratic function *y* = 3*x*2 – 10*x* + 6.

11. Factor each of the following:

a.  b.  c.  d. 

e.  f.  g.  h. 

12. A uniform border on a framed photo has an area four times that of the photo. What are the outside dimensions of the border if the dimensions of the photo are 30 cm by 20 cm?

13. The Parthenon, in Athens, is a temple to the Greek goddess Athena, and was built in about 447 B.C.E. It has a rectangular base with a perimeter of approximately 202 m and an area of 2170 m2. Find the dimensions of the base, to the nearest meter.

14. The sum of the squares of two consecutive odd integers is 1570. Find the integers.

15. The driving distance from Winnipeg, Manitoba to Billings, Montana is 1200 km. A moving van made the round trip in 31 hours, excluding loading/unloading time. The average speed from Winnipeg to Billings was 5 km/h slower than the average speed of the return trip to Winnipeg. What was the average speed of each trip?

16. A patrol boat took 2.5 hours for a round trip 12 km up-river and 12 km back down-river. The speed of the current was 2 km/h. What was the speed of the boat in still water?

**Unit 2 – Quadratic Functions**

17. Graph each of the following functions and find:

i) the vertex; ii) the equation of the axis of symmetry; iii) the Domain and Range; iv) maximum or minimum value; v) x and y-intercepts

a. y = -x2

b. y = 2x2 – 6

c. y = (x – 1)2 + 2

d. y = - (x + 5)2 + 2

e. y = 3(x + 2)2 – 8

18. Given the following information, write an equation for the parabola:

a. Vertex (-1, 4); passing through point (-2, 2)

b. Vertex (-2, 3); y-intercept -1

c. Passes through the points (-3, 4), (6, 6), and (5, 4)

19. Write each of the following general form quadratic functions in standard form (must complete the square to do so!!!):

a. y = x2 – 2x + 3

b. y = -x2 + 8x – 12

c. y = 3x – x2

d. y = 2x2 + 8x + 6

e. y = - x2 + 2x + 4

20. Find two numbers whose difference is 10 and whose product is a minimum.

21. Two numbers have a sum of 34. Find the numbers if the sum of their squares is a minimum.

22. A park has an arch over its entrance. The curve of the arch can be graphed on a grid with the origin on the path directly under the center of the arch. The arch can be modeled by the function

h(d) = -1.17d2 + 3, where h(d) meters is the height, and d meters is the horizontal distance from the center of the arch.

a. What is the maximum height of the arch?

b. If the ends of the arch are at the level of the path, how wide is the arch to the nearest tenth of a m?

c. At a horizontal distance of 0.5m from the center of the arch, how high is the arch, to the nearest tenth?

23. The captain of a riverboat cruise charges $36 per person, including lunch. The cruise averages 300 customers per day. The captain is considering increasing the price. A survey of customers indicates that for every $2 increase, there would be 10 fewer customers. What increase in price would maximize revenue for the captain?

24. A farmer wants to make a rectangular corral along the side of a large barn and has enough materials for 60 m of fencing. Only three sides must be fenced, with the barn wall forming the fourth side. What dimensions should the farmer choose to maximize the area?

**Unit 3 – Radicals**

To review sections 1.2 – 1.5, re-do p.9-11 #1-7; p.16-19 #1-8; p. 23-26 #2-7; and p.33-38 #2-9. Any problems that the math department re-writes onto this sheet would essentially be a repeat of those questions anyway…pay close attention to the instructions with respect to variables either being positive numbers or real numbers.

Section 1.6 – Solving Radical Equations Review:

Solve each of the following:

a.  b.  c.  d. 

e.  f.  g. 

h.  i. 

**Unit 4 – Rational Expressions/Equations**

**Unit 5 – Absolute Value Eq’ns/Fxns; Rational Fxns; Reciprocal Fxns**

**Unit 6 – Linear-Quadr.Systems/Quadr.-Quadr. Systems; Inequalities**

**Unit 7 – Trigonometry**

**Unit 8 – Sequences and Series**