FINAL EXAM REVIEW

POLYNOMIALS

1. Classify each polynomial by degree and by number of terms.

a) $3x^2 - 2x$ b) $4a^2b^3$ c) $8 + 2y^4 + 3y^3$ d) $4x^5 - 2x^3 + x^2 + 4$

2. Evaluate the expression for the given values of the variables.

a) $2x^2 - 4xy - 5y^2$ for $x = -3$, $y = 2$

3. Simplify:

a) $(6y - 2) + (2y + 8)$ b) $(8 + 6x) - (9 + x)$

c) $(3x^2 + 2x - 6) + (2x^2 - 4x + 7)$ d) $(5a^2b + 2ab - 3b^2) - (6a^2b - 3ab + b^2)$

e) $(3ab)(-2ab^2)(2a^3)$ f) $(-6x^2yz)(-5y^3z)$

g) $\frac{-21x^2y^2z}{-7xy^2z}$ h) $\frac{-32p^2q^4}{8p^2q^3}$

4. Expand and Simplify

a) $4m(m^2 - mn - n^2) - 2n(6m^2 + mn + 4n^2)$

5. Expand and Simplify

a) $2(m - 3)(m + 8)$ b) $3(6x - 2y)(2x - 3y)$

c) $(y - 4)(y - 3) - (y - 2)(y - 5)$ d) $6(m - 2)(m + 3) - 3(3m - 4)$

6. Expand

a) $(x + 4)^2$ b) $(y - 7)^2$ c) $(x - 5)(x + 5)$ d) $(5m + 2n)(5m - 2n)$

7. Expand and Simplify

a) $3(2b - 1)^2 - 2(4b - 5)^2$ b) $4x^2 - (2 - 3x)^2 + 6(2x - 1)(2x + 1)$

8. Factor

a) $2ax + 10ay - 8az$ b) $3x^3y^2 - 12x^2y^3 + 18x^2y + 15xy^2$

c) $3x(y - z) - 2(y - z)$ d) $4t(r + 6) - (r + 6)$

9. Factor by grouping

a) $3x^2y - 6x^2 - 2y + y^2$ b) $4ab^2 - 12a^2b - 3bc + 9ac$

10. Factor completely

a) $x^2 - 5x + 6$ b) $a^2 + 6a + 5$ c) $x^2 - 5xy - 66y^2$

d) $m^2 + 12mn + 32n^2$ e) $4x^2 - 16x - 48$ f) $2x^2 - 16x - 66$

11. Factor completely

a) $3y^2 + y - 4$ b) $20x^2 - 7x - 6$ c) $18y^2 + 15y - 18$

d) $8m^2 + 6m - 20$ e) $15x^2 - 13xy + 2y^2$ f) $9x^2 + 3xy - 20y^2$

12. Factor completely

a) $x^2 - 25$ b) $49 - 64m^2$ c) $81x^2 - 121p^2$

d) $16a^4 + 40a + 25$ e) $4x^2 - 36$ f) $36x^2 - 81y^2$

13. Sketch each parabola and state the direction of the opening, the coordinates of the vertex, the equation of the axis of symmetry, the domain and range, and the maximum or minimum value.

a) $y = (x + 3)^2 - 2$ b) $y = -(x - 4)^2 - 3$

c) $y = 2(x - 1)^2 + 1$ d) $y = -\frac{1}{2}(x + 2)^2 + 7$

14. Write an equation for a parabola with vertex (3 , -1) and a = -2

15. Without graphing, state whether each function has a maximum or a minimum. Then, write each function in the form $y = a(x - h)^2 + k$ and find the minimum or maximum value and the value of x for which it occurs.

a) $y = 3x^2 - 18x + 1$ b) $y = -4x^2 - 32x - 11$

c) $y = -7x^2 + 84x + 19$ d) $y = 4x^2 - 20x + 7$

16. A ball is thrown upward with an initial velocity of 18 m/s. Its height, h metres after t seconds, is given by the equation $h = -5t^2 + 18t + 1.8$ where 1.8 represents the height at which the ball is released by the thrower.

a) What is the maximum height the ball will reach?
b) How much time elapses before the ball reaches the maximum height?
c) How long is the ball in the air, to the nearest tenth of a second?

17. Phil wants to make the largest possible rectangular vegetable garden using 18 m of fencing. The garden is right behind the back of his house, so he has to fence it on only three sides. Determine the dimensions that maximize the area of the garden.

18. A pizza company's research shows that a $0.25 increase in the price of a pizza results in 50 fewer pizzas being sold. The usual price of $15 for a three-item pizza results in sales of 1000 pizzas. Write the algebraic expression that models the maximum revenue for this situation.

19. The length of a rectangle is 2 m more that the width. The area is 48 m^2. Find the dimensions of the rectangle.

20. The sum of the squares of three consecutive integers is 77. Find the integers.

21. The hypotenuse of a right triangle is 15 cm. The other two sides have a total length of 21 cm. Find the lengths of the two unknown sides.

22. State the roots of each equation

a) $(x - 2)(x + 7) = 0$ b) $(3x + 1)(2x - 3) = 0$

c) $7x(x - 5) = 0$ d) $(2x + 5)(2x + 5) = 0$

23. Solve the following equations

a) $x^2 - 6x + 8 = 0$ b) $6t^2 = t + 35$

c) $\frac{5a^2}{4} - 5 = \frac{15a}{4}$ d) $(3x - 1)^2 = 25$

24. Sketch the graphs of the following quadratic functions by locating the x-intercepts, and then finding the coordinates of the vertex.

a) $y = (x - 3)(x - 5)$ b) $y = x^2 - 7x + 12$

25. Solving using the quadratic formula. Round to the nearest hundreth, if necessary.

a) $x^2 - 8x + 12 = 0$ b) $20x^2 + 27x = 14$

c) $3x^2 - 6x - 8 = 0$ d) $4x(x + 8) = 3$

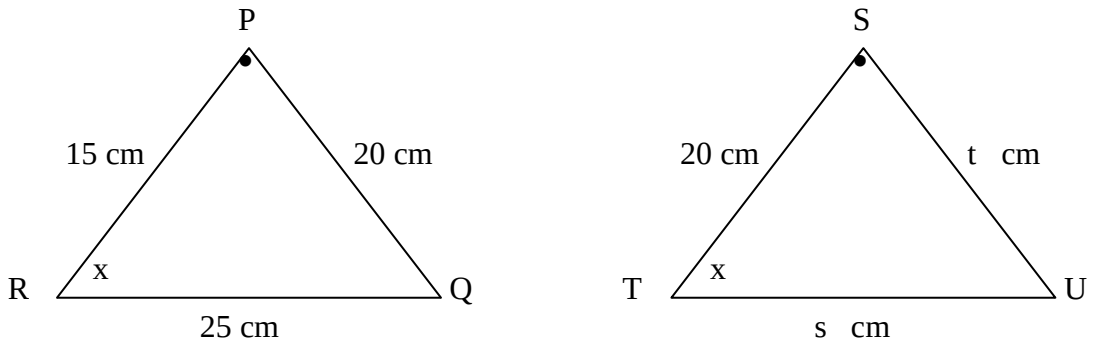
26. The sum of the squares of three consecutive odd integers is 875. Find the integers.

27. The length and width of a rectangle are 6 m and 4 m. When each dimension is increased by the same amount, the area of the new rectangle is 50 m^2. Find the dimensions of the new rectangle, to the nearest tenth of a metre.

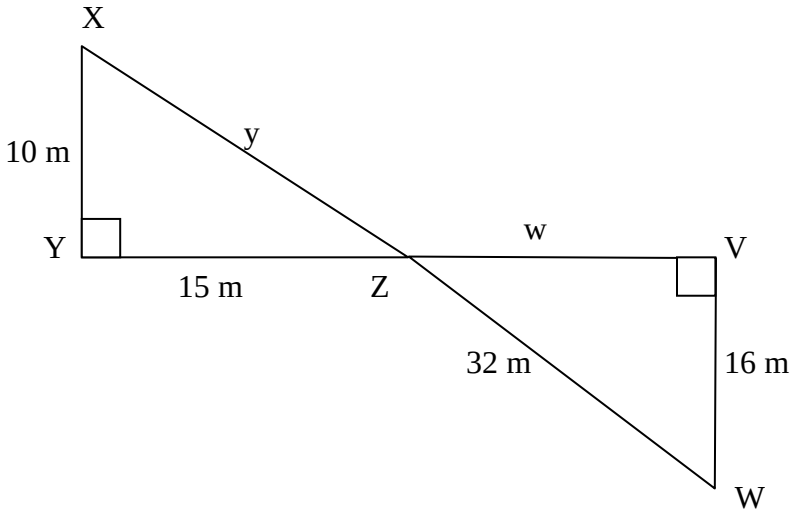
28. A rectangular skating rink measures 40 m by 20 m. It is to be doubled in area by extending each side by the same amount. Determine how much each side should be extended, to the nearest tenth of a metre.

29. The triangles in each pair are similar. Find the unknown side lengths.

a)



b)



30. $\Delta PQR \sim \Delta KLM$. PQ = 4 cm and KL = 6 cm. The area of ΔPQR is 12 cm^2. Find the area of ΔKLM.

31. Use a calculator to find each angle, to the nearest thousandth.

a) tan 84° b) sin 21° c) cos 43°

32. Find $\angle$ K, to the nearest degree.

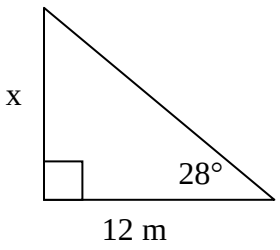
a) tan $\angle$ K = 2.750 b) sin $\angle$ K = 0.208 c) cos $\angle$ K = 0.174

33. Find $\angle$ Q, to the nearest degree.

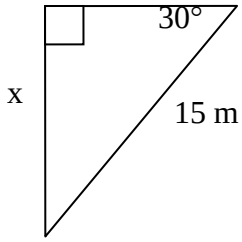
a) $\tan \angle Q = \frac{5}{4}$ b) $\sin \angle Q = \frac{5}{8}$ c) $\cos \angle Q = \frac{6}{13}$

34. Calculate x, to the nearest tenth of a metre.

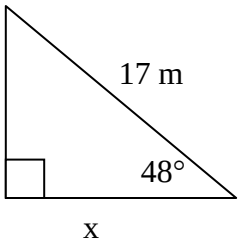
a)



b)

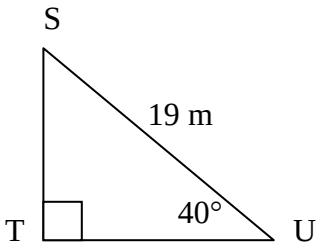


c)

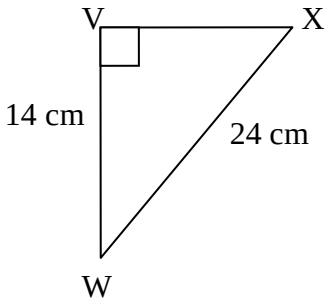


35. Solve each triangle. Round each side length to the nearest tenth of a unit, and each angle, to the nearest degree.

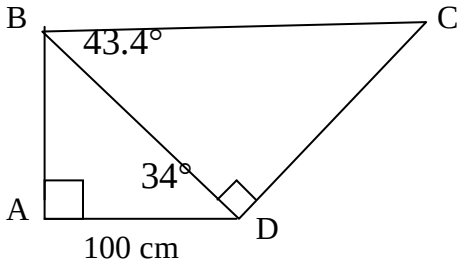
a)



b)



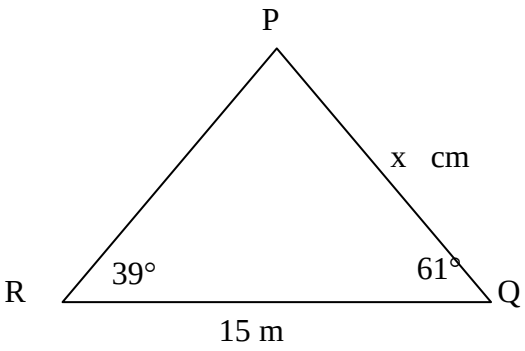
36. Find BC, to the nearest centimetre.

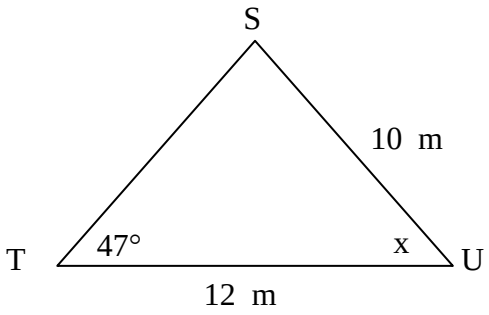


37. From the window of one building, Sam finds the angle of elevation of the top of a second building is 41° and the angle of depression of the bottom is 54°. The buildings are 56 m apart. Find, to the nearest metre, the height of the second building.

38.

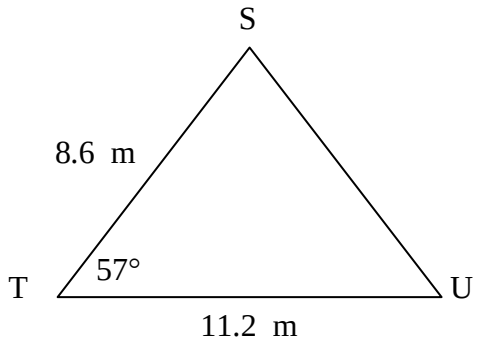
39. Find all unknowns.

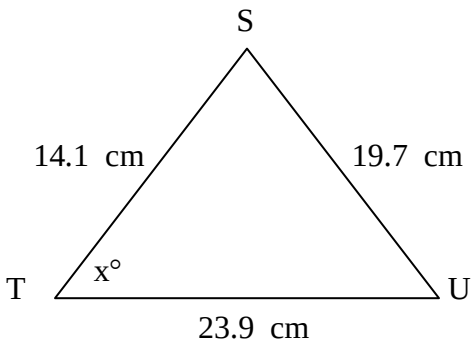




40. In ΔABC , $\angle A = 50°$, $a = 9$ m , and $b = 8$ m. Find $\angle B$?

41. Solve the triangles.





42. In ΔKLM , k = 54.2 cm , l = 45.7 cm , and m = 36.9 cm. Find $\angle$ K?

43. Solve ΔWXY , w = 120 m , x = 77 m , and y = 115 m