

Chapter 1

1. Create and solve a linear system of equations that models the following problems. Show a proper solution including *let statements and closing sentences*.

- a) Bart's cell phone package costs \$15 a month with an additional charge of \$0.10 per minute. Lisa's pays \$10 a month plus \$0.12 per minute. When would their monthly bills be the same?
b) Frasier invested \$1200 in an RRSP. He invested part of the money in a technology fund that pays interest at 15% per year. He puts the remainder in savings bonds that pay 5% interest per year. If he earned \$160 in interest in one year, how much did he invest in each fund?

2. Solve the following system graphically:

$$y = -2x + 8$$

$$3x - 4y = 12$$

3. Solve the following system using elimination:

$$6x - 8y = -58$$

$$4x + 5y = 13$$

4. For the following system of equations, determine, **without solving**, the number of solutions the system has:

$$2x + y = 12$$

$$15x + 3y = 18$$

5. Evaluate $3a^2 - b$ if $a = -\frac{1}{2}$, $b = \frac{2}{3}$.

6. Solve each of the following:

a) $y + 2(y - 1) = 4y + 7$

b) $\frac{1}{4}(3x - 1) = \frac{2}{5}(x + 4)$

7. Which of the following points lie on the line $y = \frac{2}{3}x - 4$:

- a) $A(3, -2)$ b) $B(-3, -2)$ c) $C(6, 0)$ d) $\left(5, \frac{2}{3}\right)$

Chapter 1 Review: P. 118 #1,2,4,12,13,15-23,25.

Chapter 2

- A straight path is to be built between the points $A(-35, 32)$ and $B(29, -16)$ where the grid units are in metres.
 - How long is the path?
 - If a bench is to be placed at the halfway point on the path, what are the coordinates where the bench would be placed?
- A fish catching a small insect on the surface of a still pond causes a circular ripple. The radius of the circle increases at a constant rate of 4cm/s.
 - Write an equation that represents the ripple exactly 5 seconds after the fish catches the insect.
 - How long would it take the ripple to reach the edge of a rock that is exactly 1 metre east and 0.75 metres north of the point where the fish caught the insect?
- A triangle is formed by joining the vertices $A(1, 1)$, $B(4, 5)$ and $C(9, -5)$. Using lengths and slopes, determine the type of triangle it is.
- A circle has its centre at the origin and passes through the points $P(-1, 13)$ and $Q(1, k)$. If point Q is in the first quadrant:
 - Determine the value of ' k '.
 - Determine the equation of the perpendicular bisector of PQ . Show that it passes through the centre of the circle.
- A house is to be connected to a new water main that runs along the grid following the path of the line $y = \frac{2}{3}x - 1$. The connection point on the house lies on the same grid with coordinates at $(2, 9)$ where the units of the grid are in metres. What length of plastic pipe would be required to connect to the water main at the closest point.

6. Determine the circumcentre of the triangle formed by the points $T(-1,9)$, $U(21,3)$ and $S(-5,-3)$.

Chapter 2 Review: P. 205 #1–12,14–23.

Chapter 3

1. Expand and simplify:

a) $(x+4)(x-7)$ b) $(2x-9)(3x-5)$ c) $-4(x+6)^2$

2. Factor each expression:

a) $x^2 - 3x - 28$ b) $81x^2 - 25$ c) $25x^2 - 20x + 4$ d) $24x^2 + x - 10$

3. Sketch the graph of each of the following. Clearly label the zeros and the vertex.

a) $y = (x-6)(x+2)$ b) $y = -(x-1)(x-9)$

4. Solve each of the following:

a) $x^2 + 7x + 12 = 0$ b) $x^2 - 2x = 48$ c) $5x^2 + 4x = 2 - 5x$

5. The accountants at Hitech Shoe Company have determined that the relation $P = -2x^2 + 20x - 42$ accurately models the company's profit in a three month period. P represents the profit, in hundred thousand dollar units, and x represents the number of shoes they sell, in hundred thousand units.

- Sketch a graph that represents this relationship.
- Determine the range in the number of pairs of shoes they must sell to yield a profit.
- How many pairs of shoes must they sell to maximize their profit?
- What is this maximum profit?
- If their profit was \$600 000, how many pairs of shoes did they sell?

6. Simplify or evaluate, as required:

a) $\left(\frac{2}{5}\right)^{-2}$ b) $4^0 + 4^{-1}$ c) $(-3x^3y^4)^2$ d) -5^2 e) $(x^4)^2 \div x^3$ f) $\frac{a^3b^4c}{a^{-2}bc^2}$ g) $\frac{2^2 - 2^{-1}}{2}$

Chapter 3 Review: P 319 #4–9,11–17.

Factor fully each of the following: (Review on Factoring)

1. $11x + 121y - 44z$

2. $11y^2 - 22y + 11$

3. $49 - 77x$

4. $49 - 64y^2$

5. $m^2 - 32m + 256$

6. $10x^2 - 11x - 6$

7. $9p^2 - 169$

8. $a^2 - a - 72$

9. $15b^2 + 224b - 15$

10. $5 - 500k^2$

11. $26 - 39w$

12. $4 - 5m - 6m^2$

13. $2k^2 - k - 1$

14. $9x^2 - 121$

15. $7 + 10a + 3a^2$

16. $m^2 - m - 210$

17. $(x+y)^2 - z^2$

18. $6a^2 + 9a + 3$

19. $49m^2 - 28mn + 4n^2$

20. $4p^2 + 23p + 15$

21. $3x^2y - 27xy^3$

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22. $16 - 4(x + y)^2$

23. $p^2q^2 - 14pqr + 48r^2$

24. $2m^3 - 8mn^2$

25. $24x^3y + 16x^2y^2 - 40x^2yz$

26. $y(x - 2) + 3(x - 2)$

27. $7a + 7b + xa + xb$

28. $px + qx + py + qy$

29. $2x^2 + 7x + 5$

30. $x^2 + 7xy + 12y^2$

31. $x^3 + 2x^2 - 24x$

32. $(x - 1)^2 + x - 1$

33. $a^3b^2 - a^2b^3$

34. $20x^2 - 19xy - 6y^2$

35. $13x^2 + 10x - 3$

36. $11y^2 - 22xy$

37. $2a(x + 3) + b(x + 3)$

38. $(y + 1)^2 - y - 1$

39. $2 - 11y + 12y^2$

40. $3x^2 + 4xy + y^2$

41. $7xy - 3xz - 7wy + 3wz$

42. $x^3 - 5x^2 + 4x$

43. $2x^8 - 7x^4 + 5$

44. $5y^2 - 2y - 7$

45. $(x - 2)^2 + x^2 - 2x$

46. $3x^3 - 6x^2 - 5x + 10$

47. $a^2 - 4a - 21$

48. $b^2 - 17b + 30$

49. $7x^2 + 4x - 11$

50. $6x^2 - 17x + 7$

51. $24a^2 + 23ab + 5b^2$

52. $(y + 3)^2 - 2y^2 - 6y$

53. $6y^2 - 3y$

54. $6x^2 + 12y - 9xy - 8x$

55. $5a^2 - 5a - 60$

56. $10y^2 + 51y + 27$

57. $5y^2 + 33xy - 56x^2$

58. $a^2x^2 - ax$

59. $4y^3 - 16y^2 - 48y$

60. $27x^2 - 6x - 16$

Chapter 4

1. Determine the quadratic relation, in vertex form, for each of the following:

a) has its vertex at $(5, 8)$ and passes through the point $(11, -46)$.

b) has zeros at -3 and 7 and passes through the point $(5, -8)$.

c) has standard equation of $y = 2x^2 + 12x - 17$.

2. Sketch the graphs of the following. Clearly show the 5 points.

a) $y = 2(x + 3)^2 - 6$

b) $y = -\frac{1}{2}x^2 + 11$

3. Determine the roots of the following equations. Express your answers accurate to two decimal places, where appropriate:

a) $3(t - 7)^2 - 15 = 0$

b) $2x^2 + 4x - 30 = 0$

c) $3x^2 - 2x - 11 = x^2 - 5x$

4. A model rocket is launched from a 5 metre high pad straight up into the air with an initial velocity of 150 m/s. The height of the rocket h , in metres, is modelled by $h = -5t^2 + 150t + 5$, where t is the elapsed time in seconds.
- What is the maximum height of the rocket?
 - For what length of time was the rocket above 730 metres?
5. For each of the following, state the vertex, direction of opening, min/max value, equation of axis of symmetry and shape compared to $y = x^2$:

a) $y = -2(x+1)^2$

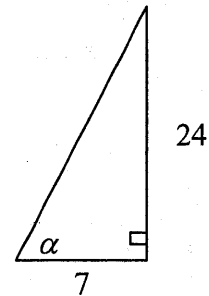
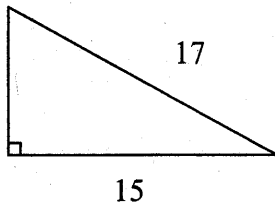
b) $y = \frac{1}{2}x^2 + 2x$

c) $y = x^2 - 6x + 9$

Chapter 4 Review: P. 416 #1,2,3a,4-6,9,10,12,13,15-18.

Chapter 5

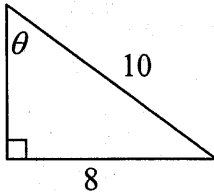
1. Find the length of the unknown side and state the three trigonometric ratios for the marked acute angles:



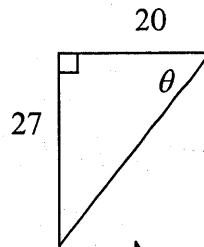
2. If $\cos \theta = \frac{5}{13}$, determine the other 2 trig ratios for θ .

3. Find the measure of the indicated angle accurate to the nearest tenth:

a)

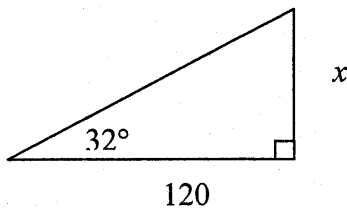


b)

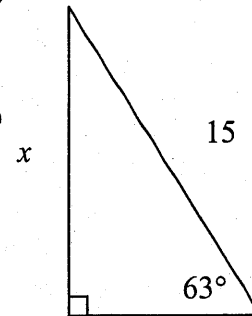


4. Find the length of the indicated side accurate to the nearest tenth:

a)



b)



5. Solve for θ , (to the nearest degree), given that:

a) $\sin \theta = 0.468$

b) $\tan \theta = 1.897$

c) $\cos \theta = 0.263$

d) $\tan \theta = 0.263$

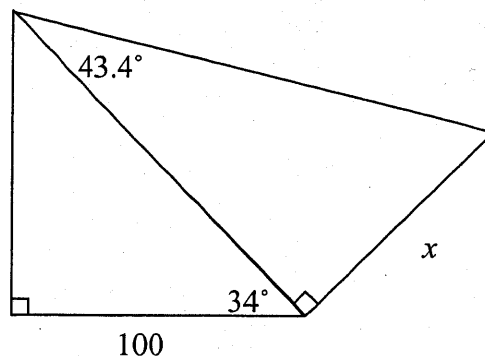
6. Solve the following triangles:(all answers expressed to the nearest tenth)

a) $\triangle ABC$, $\angle A = 90^\circ$, $a = 153$, $b = 107$

b) $\triangle DEF$, $\angle E = 90^\circ$, $\angle D = 35.1^\circ$, $f = 100$

c) $\triangle ABC$, $\angle A = 90^\circ$, $\angle B = 25^\circ$, $a = 5.65$

7. Determine the value of x in the following diagram: (accurate to 1 decimal place)



8. A flagpole casts a shadow of 300 m when the angle of elevation of the sun is 55° . Determine the height of the flagpole to the nearest metre.

9. From a point 120 m from the base of a building, the angles of elevation of the top and bottom of a flagpole attached to the roof of the building are 40° and 35° respectively. Calculate the height of the flagpole.
State all answers accurate to one decimal place!

10. Solve $\triangle ABC$ given that:

a) $\angle C = 90^\circ, a = 8, b = 12$

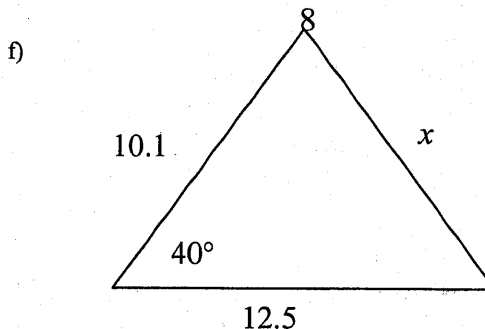
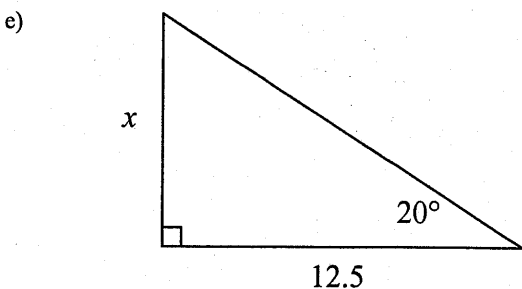
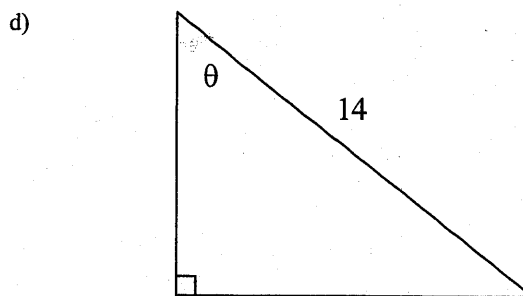
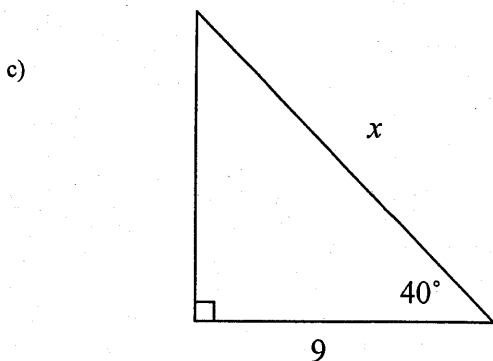
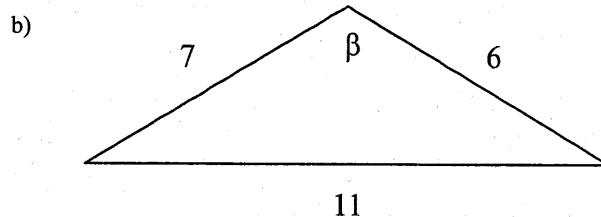
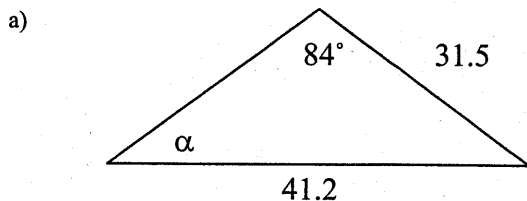
d) $\angle B = 31^\circ, \angle C = 81^\circ, a = 9$

b) $\angle A = 90^\circ, \angle B = 32^\circ, a = 12$

e) $a = 8, b = 7, c = 6$

c) $\angle A = 80^\circ, b = 3, c = 8$

11. In each of the following triangles, determine the value of the marked unknown:



12. In a given right triangle, $\tan \theta = \frac{2}{3}$. Determine the values of the other two primary trig ratios. Express your answer in square root form

13. The angle of depression of a ship from the "look-out" deck of a lighthouse is 16° . How far is the ship from the base of the lighthouse if the deck is 22.5 metres above the ground?

14. From a point A, the angle of elevation of the top of a tower is 28° . From another point B, on the opposite side of the tower, the angle of elevation is 35° . Assuming that the tower and the two points are in a direct line on level ground, determine the height of the tower, given that the distance between A and B is 410 metres.

15. Determine the area of $\triangle ABC$ if $\angle B = 32^\circ$, $a = 31.5 \text{ cm}$ and $c = 26.3 \text{ cm}$.
16. Two cars leave the same town. The first car leaves at 2:30 and drives due east at 90 km/h. The second car leaves at 3:00 and drives in a direction $N30^\circ W$ (30° west of due north), at a speed of 110 km/h. How far apart are the cars at 5:00?
17. A ladder is in an unsafe position if it makes an angle of less than 14.5° with the wall. A 10 metre ladder is placed with its base 3 metres from the bottom of the wall. Is the ladder in a safe position?
18. Determine the area of a triangle which has sides with lengths 17 cm, 29 cm and 23 cm.

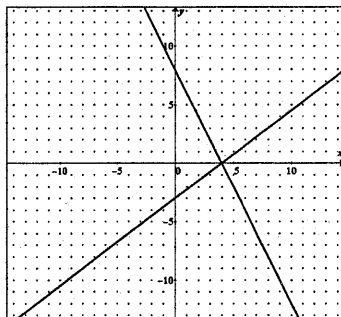
Chapter 5 Review: P. 512 #1–13, 15–18.

Chapter 6 Review: P. 578 #4–11.

Answers – Chapter 1:

1. a) The cell phone plans cost the same when 250 minutes of calls are placed. The cost is \$40.00.
b) He invested \$1000 in the technology fund and \$200 in savings bonds.

2.



The point of intersection is $(4, 0)$.

3. The solution is $(x, y) = (-3, 5)$.

4. Since their slopes are different, there will be one solution.

5. $\frac{1}{12}$

6. a) $y = -9$ b) $x = \frac{37}{7}$

7. A and C

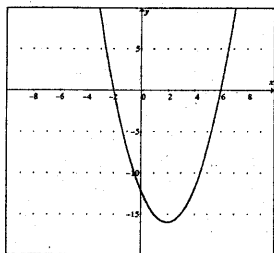
Answers – Chapter 2:

1. The length of the path is 80 metres and the bench should be at $(-3, 8)$.
2. The equation is $x^2 + y^2 = 400$ and it will take 31.25 seconds for the ripple to reach the rock.
3. The triangle is a right triangle.
4. a) $k = 7$ b) the equation is $y = 2x$ which passes through the origin.
5. The pipe should be $\sqrt{52}$ or approximately 7.2 metres long.
6. The circumcentre is $\left(\frac{49}{6}, -\frac{13}{18}\right)$.

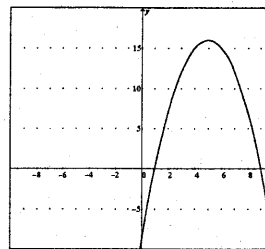
Answers – Chapter 3:

1. a) $x^2 - 3x - 28$ b) $6x^2 - 37x + 45$ c) $-4x^2 - 48x - 144$
2. a) $(x - 7)(x + 4)$ b) $(9x - 5)(9x + 5)$ c) $(5x - 2)^2$ d) $(3x + 2)(8x - 5)$

3. a)



b)

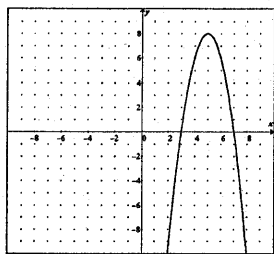


4. a) $x = -3$ or $x = -4$

b) $x = 8$ or $x = -6$

c) $x = -2$ or $x = \frac{1}{5}$

5. a)



b) they must sell between 300 000 and 700 000.

c) the maximum profit occurs when they sell 500 000 pairs.

d) the maximum profit is \$800 000.

e) they sold either 400 000 or 600 000 pairs.

6. a) $\frac{25}{4}$

b) $\frac{5}{4}$

c) $9x^6y^8$

d) -25

e) x^5

f) $\frac{a^5b^3}{c}$

g) $\frac{7}{4}$

Answers: (Review on Factoring)

1. $11(x+11y-4z)$

2. $11(y-1)^2$

3. $7(7-11x)$

4. $(7+8y)(7-8y)$

5. $(m-16)^2$

6. $(5x+2)(2x-3)$

7. $(3p+13)(3p-13)$

8. $(a-9)(a+8)$

9. $(15b-1)(b+15)$

10. $5(1+10k)(1-10k)$

11. $13(2-3w)$

12. $(4+3m)(1-2m)$

13. $(2k+1)(k-1)$

14. $(3x+11)(3x-11)$

15. $(7+3a)(1+a)$

16. $(m-15)(m+14)$

17. $(x+y+z)(x+y-z)$

18. $3(a+1)(2a+1)$

19. $(7m-2n)^2$

20. $(p+5)(4p+3)$

21. $3xy(x-9y^2)$

22. $4(2+x+y)(2-x-y)$

23. $(pq-8r)(pq-6r)$

24. $2m(m+2n)(m-2n)$

25. $8x^2y(3x+2y-5z)$

26. $(x-2)(y+3)$

27. $(a+b)(x+7)$

28. $(p+q)(x+y)$

29. $(x+1)(2x+5)$

30. $(x+3y)(x+4y)$

31. $x(x-4)(x+6)$

32. $x(x-1)$ (don't expand!)

33. $a^2b^2(a-b)$

34. $(5x-6)(4x+1)$

35. $(x+1)(13x-3)$

36. $11y(y-2x)$

37. $(x+3)(2a+b)$

38. $y(y+1)$ (don't expand!)

39. $(2-3y)(1-4y)$

40. $(3x+y)(x+y)$

41. $(x-w)(7y-3z)$

42. $x(x-1)(x-4)$

43. $(2x^4-5)(x^2+1)(x+1)(x-1)$

44. $(y+1)(5y-7)$

45. $2(x-1)(x-2)$ (don't expand!)

46. $(x-2)(3x^2-5)$

47. $(a+3)(a-7)$

48. $(b-2)(b-15)$

49. $(x-1)(7x+11)$

50. $(2x-1)(3x-7)$

51. $(3a+b)(8a+5b)$

52. $(y+3)(3-y)$ (don't expand!)

53. $3y(2y-1)$

54. $(2x-3y)(3x-4)$

55. $5(a+3)(a-4)$

56. $(5x+3)(2x+9)$

57. $(y+8x)(5y-7x)$

58. $ax(ax-1)$

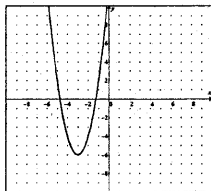
59. $4y(y+2)(y-6)$

60. $(9x-8)(3x+2)$

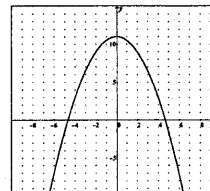
Answers – Chapter 4:

1. a) $y = -\frac{3}{2}(x-5)^2 + 8$ b) $y = \frac{1}{2}(x-2)^2 - \frac{25}{2}$ c) $y = 2(x+3)^2 - 35$

2. a)



b)



3. a) $t \doteq 7.24$ or $t \doteq 4.76$ b) $x = -5$ or $x = 3$ c) $x \doteq 1.71$ or $x \doteq -3.21$

4. a) the maximum height is 1130 metres.
b) the rocket was above 730 metres for about 17.88 seconds.

5.	vertex	direction	min/max	axis of sym	shape
(a)	$(-1, 0)$	down	max 0	$x = -1$	thinner
(b)	$(-2, -2)$	up	min -2	$x = -2$	wider
(c)	$(3, 0)$	up	min 0	$x = 3$	same

Answers – Chapter 5:

1. a) $\frac{8}{17}, \frac{15}{17}, \frac{8}{15}$ b) $\frac{24}{25}, \frac{7}{25}, \frac{24}{7}$

2. $\sin \theta = \frac{12}{13}$; $\tan \theta = \frac{12}{5}$

3. a) 53.1° b) 53.5°

4. a) 75.0 b) 13.4

5. a) 28° b) 62°

c) 75° d) 15°

6. a) 109.4 ; 44.4° ; 45.6° b) 54.9° ; 122.2 ; 70.3

c) 65° ; 2.4 ; 5.1

7. 114.1 8. 428 m

9. 16.7 m

10. a) $c \doteq 14.4$, $\angle A \doteq 33.7^\circ$, $\angle B \doteq 56.3^\circ$

d) $\angle A = 68^\circ$, $b \doteq 5.0$, $c \doteq 9.6$

b) $\angle C = 58^\circ$, $b \doteq 6.4$, $c \doteq 10.2$

e) $\angle A \doteq 75.5^\circ$, $\angle B \doteq 57.9^\circ$, $\angle C \doteq 46.6^\circ$

c) $a \doteq 8.0$, $\angle B \doteq 21.6^\circ$, $\angle C \doteq 78.4^\circ$

11. a) $\alpha \doteq 49.5^\circ$

b) $\beta \doteq 115.4^\circ$

c) $x \doteq 11.7$

d) $\theta \doteq 34.8^\circ$

e) $x \doteq 4.5$

f) $x \doteq 8.1$

12. $\sin \theta = \frac{2}{\sqrt{13}}$ $\cos \theta = \frac{3}{\sqrt{13}}$

13. The ship is about 78.5 metres away.

14. The tower is about 123.9 meters tall.

15. The area of the triangle is about 219.5 square units.

16. The cars are about 385.4 km apart.

17. The ladder is in a safe position because the angle is about 17.5° .

18. The area of the triangle is about 195.4 square units.