

Ch 1

Simplify the following.

1. $12 \times (-3) \times 2 \div 6 + 5$ 2. $(-2 + 13) \times (-2) + 16 \div (-4)$ 3. $8 + (-4) \times 6 \div 3 - 10 \times (-2)$

4. $\frac{5}{4} \div \frac{-1}{8} + \left(\frac{-1}{-3}\right)$ 5. $\frac{-5}{6} \div \left(\frac{1}{3} + \frac{-3}{4}\right) - \frac{1}{2}$ 6. $\left(\frac{5}{6} - \frac{1}{2}\right) \times \frac{-1}{4} \div \frac{3}{8}$

7. $\left(\frac{-3}{5}\right)\left(\frac{1}{3}\right) + \left(\frac{-1}{-5}\right) \div 2$ 8. $-\frac{5}{6} + \left(\frac{4}{3}\right)\left(\frac{2}{3}\right)$ 9. $\left(-\frac{2}{3}\right)^2 \div \frac{2}{9} - \left(-\frac{4}{5}\right)$

10. $-\frac{3}{5} + \left[\frac{1}{3} \times \left(-\frac{3}{4}\right)\right]$ 11. $-1\frac{3}{7} \times \frac{1}{2} + \left(-3\frac{1}{7}\right)$

12. $2\frac{1}{4} - \left(-3\frac{7}{8} + 5\right)\left(\frac{4}{9} - 3\right)$

13. Order the following from least to greatest. Show on a number line:

$$-3.4, -\frac{4}{3}, 0.9, -\frac{1}{2}, -0.4$$

Ch 2

1. Determine the volume of a cube with side length of 13 cm.

2. Simplify $(2^3 \times 4^2)^2$ 3. Simplify $\left(\frac{5^5}{5^2}\right)^3$ 4. Evaluate $\sqrt{\frac{25}{49}}$

5. Calculate the side length of a square with an area of 8.1 cm^2 .

6. Express $\sqrt{\frac{42}{61}}$ to 2 decimal places.

7. Complete the table.

<i>Power</i>	<i>Base</i>	<i>Exponent</i>	<i>Repeated Multiplication</i>	<i>Value</i>
-3^5				

8. Evaluate the following. Answer in fraction form if necessary. (No decimals)

a) $\sqrt{\frac{144}{49}}$ b) $-(-4)^3$ c) $(-4)^0$ d) $\left(-\frac{1}{2}\right)^3$
e) $\left(-\frac{2}{3}\right)^4$ f) $\left(-\frac{1}{5}\right)^4$ g) -7^0 h) $(-1)^{50}$

9. Evaluate:

a) $4^2 - 2^3 \times 10 \div 2 + 3$ b) $(3^3 - 2)^0 \times 12 \div 2$
c) $6^3 + 5^2 - 2^5$ d) $7^2 - 2^3 \times 9 \div 3 + 8^0$

10. Express 16^5 as a power with a base of 2.

11. Express the following as a single power with the **lowest** base. Show all steps – answers produced by calculator only will not receive full marks.

a) 27^4 b) $\left(\frac{9^{10}}{9^8}\right)^3$ c) $25^8 \div 5^4$

12. A cube has a volume of 729 cm^3 . Determine the length of one side and express your answer as a power with the lowest possible base.

13. Express as a single power, where possible.

a) $(2^4)^5 \div (2^3)^3$ b) $\frac{(3^2 \times 5^3)^4}{(3^3 \times 5^7)}$ c) $\frac{(10^4)(10^5)^3}{10^{11}}$
d) $\left(\frac{5^3}{2^4}\right)^2$ e) $(6^2 \times 2^2)^4$ f) $(9^3 \times 3^4)^3$

14. Determine the value of the missing number.

a) $8^6 = (2^2)^{\square}$ b) $49^2 = 7^{\square}$ c) $36^2 = \square^4$

15. A cube has a side length of 8 cm.

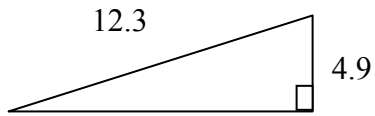
- a) Show the volume of the cube as a power, with the lowest base.
b) Show the surface area as a power, lowest base.

16. Simplify into expressions containing positive exponents

a) 4^{-3} b) $(-2)^{-5}$ c) -5^{-2} d) $\left(\frac{1}{3}\right)^{-4}$

17. The area of a square is 51.84 cm^2 . Find the side length of the square.

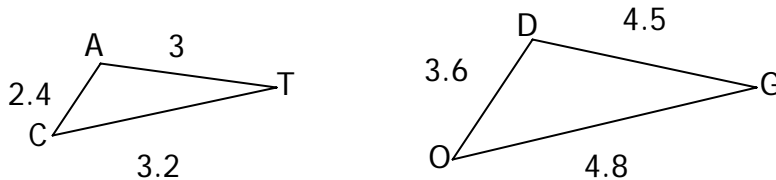
18. Determine the length of the missing side of the right triangle



Ch 3

1. Shane drew a scale drawing of a rectangular field that is 80m by 110m. He used a scale in which 1 cm represents 2.5 m. Determine the dimensions of the scale drawing.

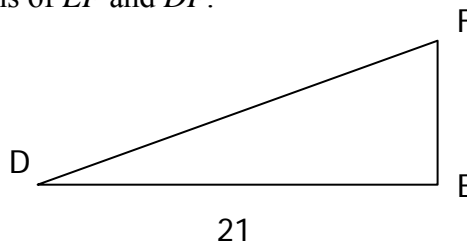
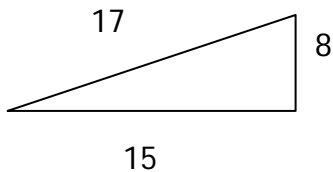
2. Show that $\triangle CAT$ is similar to $\triangle ODG$.



3. Measure the dimensions of the rectangles and determine if they are similar. Show work and explain your answer.



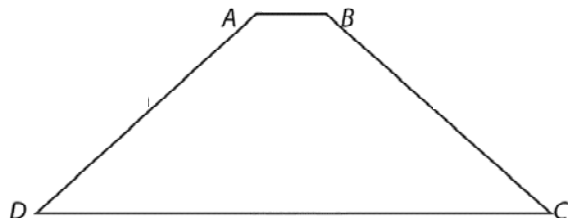
4. $\triangle ABC \sim \triangle DEF$. Determine the lengths of EF and DF .



5. A person 1.8 m tall has a shadow 2.52 m long. At the same time, a lamppost has a 3.5m shadow. Calculate the height of the lamppost.

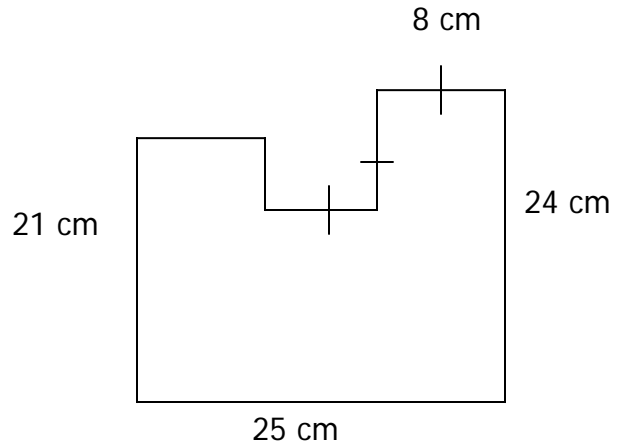
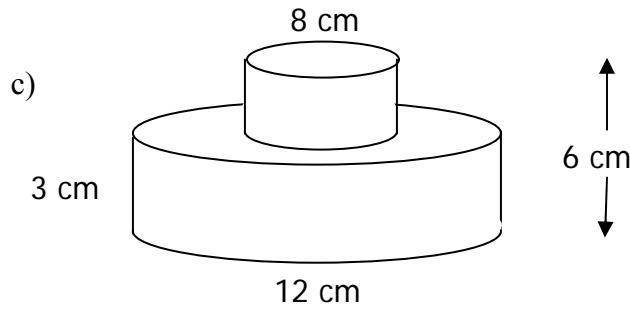
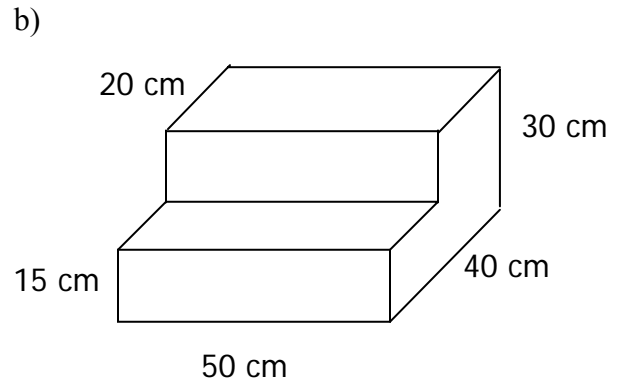
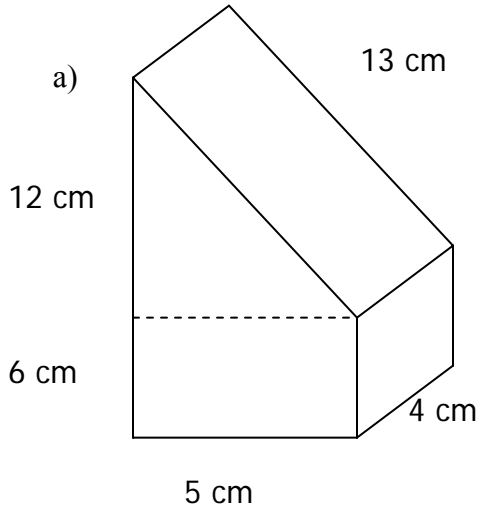
6. Draw a similar shape using the following scale factors. Show your work, the measures of the angles, and the lengths of each side.

- a) A reduction by a scale factor of 80%.
- b) An enlargement by a scale factor of 1.5



Ch 4

1. Find the surface area of the following composite shapes



2. Find the area of the composite shape to the right.

Ch 5

1. Dan mows the grass at a golf course. He charges \$8 per hour plus a flat fee of \$12. If h represents the number of hours he works, and C represents his total fee, determine the equation that represents what he charges.

2. Determine the relation that matches the table of values:

x	1	2	3
y	4	8	12

3. Determine the relation that matches the table of values:

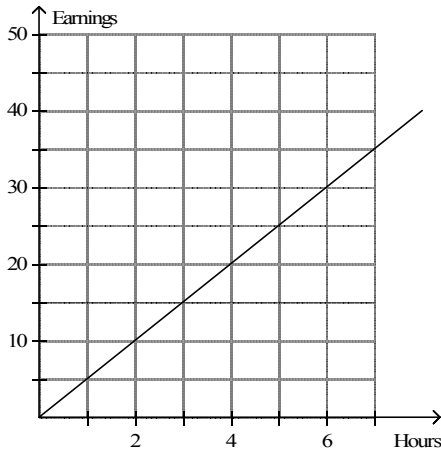
x	1	2	3
y	8	6	4

4. Determine the rate of change for the relation $y = 2x - 5$.

5. Graph and label the following using a table of values:

- a) $y = -2x + 4$ b) $2x - y = 5$ c) $x = 4$

6. Determine which situation matches the graph.



- A. David earns \$5/h tutoring. C. Sandra earns \$4/h babysitting.
 B. Eric earns \$6.50/h painting. D. Henry earns \$4.50/h mowing lawns.

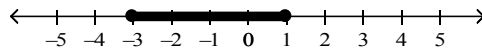
7. Solve the following equations

a) $\frac{x}{2} + \frac{x}{5} = 21$ b) $4(x-1) = 2x+5$ c) $\frac{2x}{3} - 4 = 6$ d) $5x - 3 + 2x = x - 4x + 7$

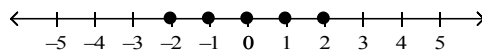
8. The perimeter of a rectangle is 58 cm. The length is 5 cm more than the twice the width. Determine the dimensions of the rectangle.

9. Determine which inequality matches the statement: A number is greater than or equal to 5.

10. Determine the inequality that matches the number line.



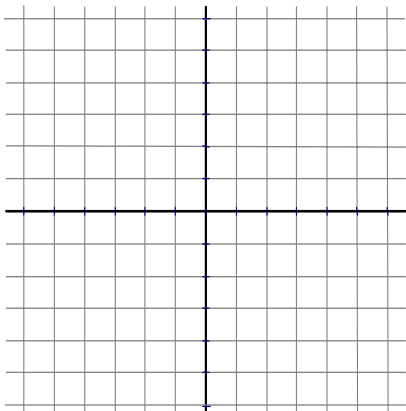
11. Determine which inequality matches the number line.



12. Solve and graph the solution to the following inequalities

a) $5x - 3 > 2$ b) $4x + 7 \geq 2x - 1$ c) $\frac{x}{2} + 3 \leq 1$

13. For the linear relation $y = 3x - 1$, create a table of values then graph on the grid provided.



x	y
-1	
0	
1	
2	

14. A linear relation passes through (3, 4) and (7, 6). What is the rate of change?
15. Solve the following equations.
a. $4x - 27 = -5$ b. $-10 - 2x - 4x = 8 + 3x$
16. Graph the following inequalities.
a. $x \leq -4$, where x is an Integer b. $-1 < x \leq 3$, where x is a Real Number
17. Solve and graph the following inequalities.
a. $6x - 1 \geq 11$, where x is an Integer b. $-2a > 4a - 12$, where x is a Real Number
18. Bill is twice Andrea's age. Seven years ago, the sum of their ages was 31. Write and solve an equation to determine Andrea's current age.
19. A rectangle has a perimeter of 52 cm. It is 8 cm longer than it is wide. Write and solve an equation to determine the dimensions of the rectangle.

Ch 6

1. Determine the degree of the polynomial $4x^2 - 3x + 5$.
2. Determine the coefficient of x in the polynomial $5 - 2x$.
3. Determine the constant term in the polynomial $7 + x - 3x^2$.
4. Evaluate the polynomial $6x^2 - 7x - 10$ if $x = 3$.
5. Determine the sum $(-7x^2 - 3x + 1) + (4x^2 + 3x - 6)$.
6. Subtract $(-12x + 5) - (-2x^2 + 9x - 4)$.
7. Determine the product of $3x$ and $(5x - 4)$.
8. Determine the product of $(4x + 2)(x - 3)$.
9. Determine the quotient of $(10x^3 - 15x^2 + 25x) \div (-5x)$.
10. Determine the missing factor in $(?)(5x - 3) = -10x + 6$.

11. Complete the table for each polynomial.

	<i>Degree</i>	<i># of terms</i>	<i>Coefficients</i>	<i>Variables</i>
a) $2x^3y - 7xy$				
b) $-2ab^2 - ab + b^5$				
c) $3x^2yz + 4yz - 8z^2$				

12. Simplify the polynomial $-5x^2 + 3x + x^2 - 5x + 10$.

13. Determine the sum $(2x^2 + 4x - 5) + (-6x^2 + x + 3)$.

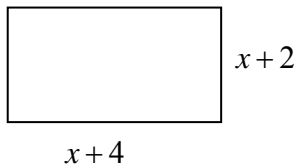
14. Determine the difference of $(4x^2 - 3x - 1) - (-5x^2 + 7x + 2)$.

15. Determine the product of $(-3x)(-6x^2 + 2x - 5)$.

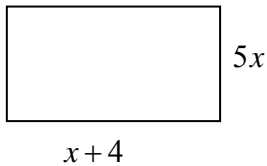
16. Determine the product of $(3x - 5)(x + 4)$.

17. Determine the quotient of $(24x^3y^2 + 8x^2y^2 - 12x) \div (-4x)$.

18. Express the perimeter of this rectangle as a polynomial and simplify.

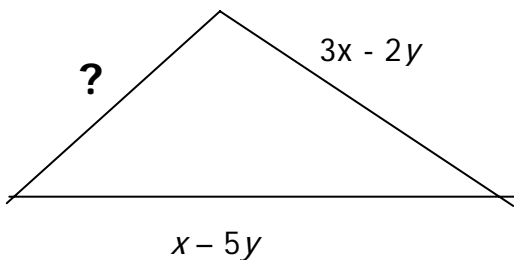


19. Express the area of this rectangle as a polynomial and simplify.



20. A rectangle has a perimeter of $(16x + 24)$ cm. If the width is $(3x + 4)$ cm. find the length.

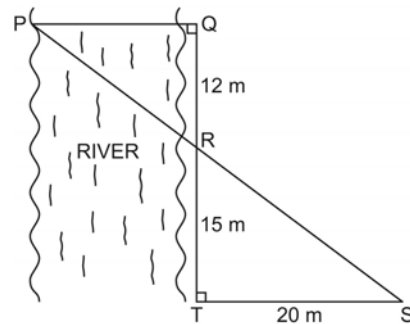
21. The perimeter of the triangle below is $12x - 8y$. Show an expression that determines the length of the missing side and then simplify completely.



Ch 8

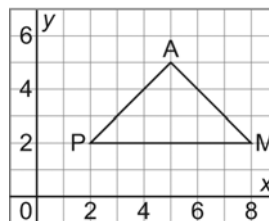
1. A rectangular playground has dimensions 24 m by 16 m. What are the dimensions of a playground drawing that has a scale factor of $\frac{1}{200}$.
2. A reduction of each object is to be drawn with the given scale factor. Determine the corresponding length in centimetres on the scale diagram.
 - a) Fishing rod length 280 cm, scale factor $\frac{1}{50}$
 - b) Boogie board length 1.5 m, scale factor 0.05
 - c) Jogging route 10 km, scale factor 0.000 02

3. A surveyor wants to determine the width of a river. She measures distances and angles on land, and sketches this diagram. What is the width of the river, PQ?



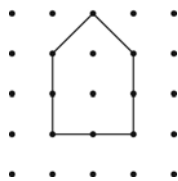
4. Draw the image of $\triangle PAM$ after each reflection below. Write the coordinates of the larger shape formed by $\triangle PAM$ and its reflection images. Draw the lines of symmetry of the larger shape.

- a) Reflect $\triangle PAM$ in the y -axis.
- b) Reflect $\triangle PAM$ in the x -axis.
- c) Reflect $\triangle PAM$ in the line $y = x$.



5. Which polygons have rotational symmetry? State the order of rotation and the angle of rotation symmetry for each.

a)

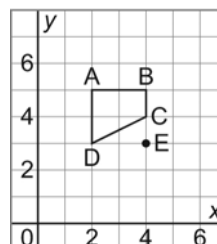


b)

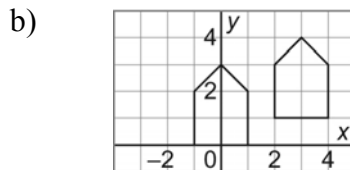
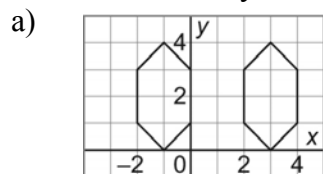


6. Draw the rotation image for each transformation of quadrilateral ABCD.

- a) 180° about vertex B
- b) 90° clockwise about vertex A
- c) 90° counterclockwise about point E
- d) 180° about the origin

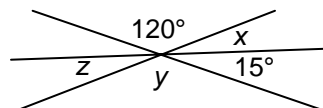


7. For each pair of shapes, determine whether they are related by line symmetry, by rotational symmetry, by both line and rotational symmetry, or by neither. Describe the symmetry, if any.

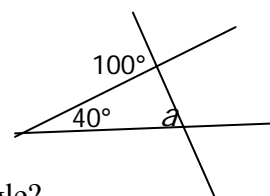


Ch 9

1. What is the value of x and y in the diagram to the right?

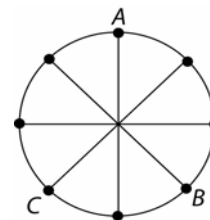


2. In the diagram to the right, what is the value of angle a ?

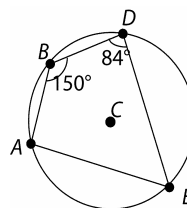


3. If two angles of a triangle are 55° and 95° , what is the third angle?

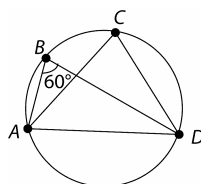
4. Determine the measure of the central angle subtended by **arc AB**. The radii divide the circle into equal parts.



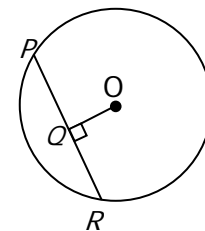
5. Determine the measure of $\angle E$ in the circle:



6. Determine the measure of $\angle C$:

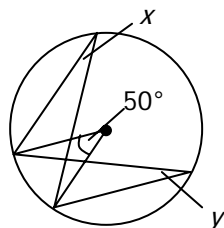


7. In the circle to the right, $PR = 50$, $OQ = 15$. What is the length of diameter?



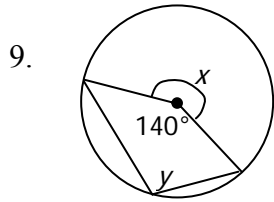
Find the values of each of the angles. State a geometric reason for your answer.

- 8.



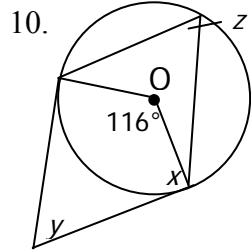
$\angle x =$ _____

$\angle y =$ _____



$\angle x =$ _____

$\angle y =$ _____

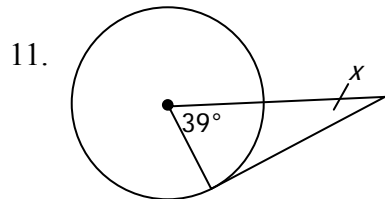


$\angle x =$ _____

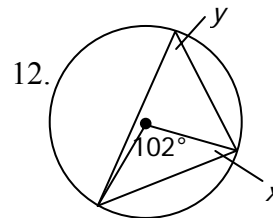
$\angle y =$ _____

$\angle z =$ _____

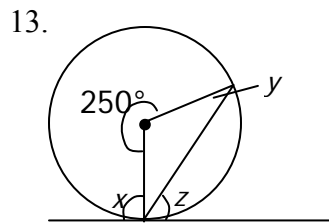
Find the values of each of the indicated angles.



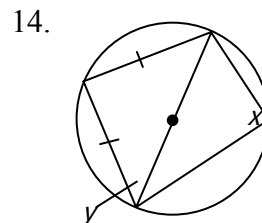
$\angle x =$ _____



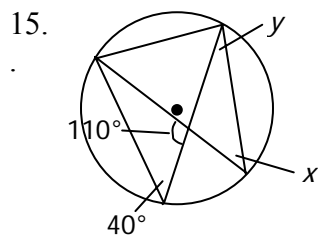
$\angle x =$ _____ $\angle y =$ _____



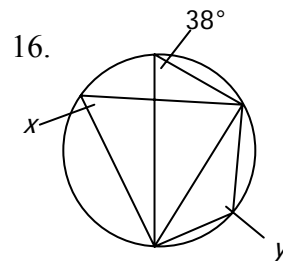
$\angle x =$ _____ $\angle y =$ _____ $\angle z =$ _____



$\angle x =$ _____ $\angle y =$ _____

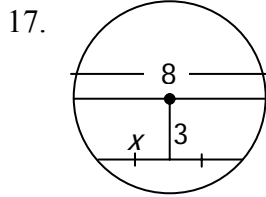


$\angle x =$ _____ $\angle y =$ _____



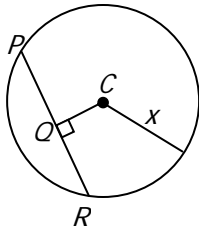
$\angle x =$ _____ $\angle y =$ _____

Find the length of the indicated side.

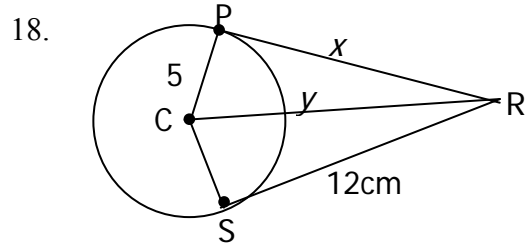


$x = \underline{\hspace{2cm}}$

19. Given: $CQ = 6$ cm, $PR = 16$ cm

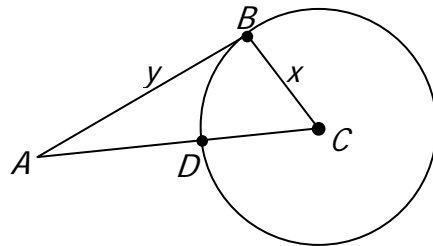


$x = \underline{\hspace{2cm}}$



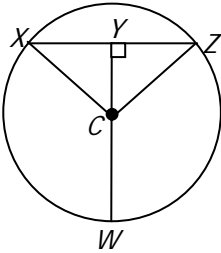
$x = \underline{\hspace{2cm}}$ $y = \underline{\hspace{2cm}}$

20. Given: $AC = 12$ m, $AD = 7$ m



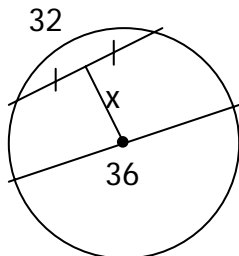
$x = \underline{\hspace{2cm}}$ $y = \underline{\hspace{2cm}}$

21. In the circle shown, $XZ = 18$ cm and $CY = 5$ cm. What is the length of YW ?



22. The diameter of a large circular pipe is 20 m. There is water running through the pipe; the water covers only the bottom part of the pipe. The width of the water's surface across the pipe is 13 m. How deep is the water?

23. Solve for x .



PM 9 ANSWER KEY

Ch 1

1. -7 2. -26 3. 20 4. $\frac{-29}{3}$ 5. $\frac{3}{2}$ 6. $\frac{-2}{9}$ 7. $\frac{-1}{10}$
8. $\frac{1}{18}$ 9. $\frac{14}{5}$ 10. $\frac{-17}{20}$ 11. 12. $\frac{41}{8}$ 13. -3.4, $\frac{-4}{3}$, $\frac{-1}{2}$, -0.4, 0.9

Ch 2

1. 2197 cm³ 2. 2¹⁴ 3. 5⁹ 4. $\frac{5}{7}$ 5. 2.85 cm 6. 0.83
7. 3, 5, -(3)(3)(3)(3)(3), -243 8a. $\frac{12}{7}$ b. 64 c. 1 d. $\frac{-1}{8}$
e. $\frac{16}{81}$ f. $\frac{1}{625}$ g. -1 h. 1 9a. -21 b. 6 c. 209
d. 26 10. 2²⁰ 11a. 3¹² b. 9⁶ c. 5¹² 12. 9, 3²
13a. 2¹¹ b. (3⁵)(5⁵) c. 10⁸ d. $\frac{5^6}{2^8}$ e. (6⁸)(2⁸) f. 3³⁰ 14a. 9
b. 4 c. 6 15a. 2⁹ b. (6)(2⁶) 16a. $\frac{1}{4^3}$ b. $\frac{1}{(-2)^5}$ c. $\frac{-1}{5^2}$
d. 3⁴ 17. 7.2 cm 18. 1.28

Ch 3

1. 32cm x 44cm 2. $\frac{3.6}{2.4} = \frac{4.5}{3} = \frac{4.8}{3.2} = 1.5$ 3. See Key 4. EF=1.2, DF=23.8
5. 2.5m 6. See Key

Ch 4

- 1a. 268 cm² b. 8800 cm² c. 414.69 cm² 2. 509 cm²

Ch 5

1. $C = 12 + 8h$ 2. $y = 4x$ 3. $y = -2x + 10$ 4. 2
5. See Key 6. A 7a. 30 b. $\frac{9}{2}$ c. 15 d. 1
8. 8 cm x 21 cm 9. $5 \leq x$ 10. $-3 \leq x \leq 1, x \in \mathbb{R}$ 11. $-2 \leq x \leq 2, x \in I$
12a. $1 < x$ b. $-4 \leq x$ c. $-4 \geq x$ 13. See Key 14. $\frac{1}{2}$ 15a. 5.5 b. -2
16. See Key 17a. $x \geq 2$ b. $2 \geq a$ 18. 15 years 19. 9cm x 17cm

Ch 6

1. 2 2. -2 3. 7 4. 23 5. $-3x^2 - 5$ 6. $2x^2 - 21x + 9$
7. $15x^2 - 12x$ 8. $4x^2 - 10x - 6$ 9. $-2x^2 + 3x - 5$ 10. -2
11a. 4,2,2,-7,x,y b. 5,3,-2,-1,1,a,b c. 4,3,3,4,-8,x,y,z
12. $-4x^2 - 2x + 10$ 13. $-4x^2 + 5x - 2$ 14. $9x^2 - 10x - 3$

15. $18x^3 - 6x^2 + 15x$

16. $3x^2 + 7x - 20$

17. $-6x^2y^2 - 2xy^2 + 3$

18. $4x + 12$

19. $5x^2 + 20x$

20. $5x + 8$

21. $8x - y$

Ch 8

1. 12cm x 8cm

2a. 5.6 cm

b. 0.075 cm

c. 0.20 m

3. 16m

4. See Key

5a. 1, 360°

b. 2, 180°

6. See Key

7. See Key

Ch 9

1. 45°, 120°

2. 60°

3. 30°

4. 135°

5. 30°

6. 60°

7. 58.3

8. 25° Inscribed angles $\frac{1}{2}$ of central angles, 25° Inscribed angles $\frac{1}{2}$ of central angles

9. 220° Circle around a point = 360°, 110° Inscribed angles $\frac{1}{2}$ of central angles

10. 90° Tangent to a radii is 90°, 64° Quadrilateral=360°, 58° Inscribed angles $\frac{1}{2}$ of central ang

11. 51°

12. 51°, 39°

13. 90°, 35°, 55°

14. 90°, 45°

15. 40°, 30°

16. 38°, 142°

17. 2.65

18. 12cm, 13cm

19. 10cm

20. 5cm, 10.9cm

21. 15.3cm

22. 2.4m

23. 8.25

Types of questions I need to work on