"SOME OF EVERYTHING"

FINAL REVIEW

Complete this review package to help ensure you are ready for Math 10C!

Operations with positive and negative numbers

Multiplying and Dividing positive and negative numbers:
- If the signs are the same (both positive or both negative) the answer will be positive.
- If the signs are different (one positive and one negative), the answer will be negative.

1. $3.7 \times (-8.6) =$
2. $(-4.6) \times 9.2 =$
3. $22 \times 3.9 =$
4. $8.3 \times 5.3 =$
5. $(-7.2) \times (-3.5) =$

6. $5.3 \times 55 =$
7. $(3.2) \times (-5.1) \times (1.2) =$
8. $(-6.4)(3.1)(-5) =$
9. $(4.1)(-4.7)(7.4) =$
10. $(8.4)(-7.6)(-2.6) =$

11. $(-20) \div 5 =$
12. $\frac{-157.5}{10.5} =$
13. $10.8 \div (-1.2) =$
14. $\frac{73.8}{-8.2} =$
15. $(93.6) \div (-3.6) =$

16. $\frac{-84.5}{-6.5} =$
17. $122.1 \div (-3.3) =$
18. $\frac{99.4}{7.1} =$
19. $(-25.6) \div 6.4 =$
20. $\frac{-88.4}{-6.8} =$

Adding and Subtracting positive and negative numbers:

Adding a positive number	$3 + 5 = 8$	**Addition** (move to the right on a number line)
Subtracting a negative number	$2 - (-8) = 10$	
Subtracting a positive number	$7 - 4 = 3$	**Subtraction** (move to the left on a number line)
Adding a negative number	$9 + (-5) = 4$	

1. $10 + (-6) =$
2. $(-7) + (-3) =$
3. $5.4 - 3.6 =$
4. $7.2 + (-1.6) =$
5. $-8.6 - 4.1 =$
6. $-2.8 + 1.5 =$

7. $17.6 + 8.3 =$
8. $5.7 - 9.2 =$
9. $9.6 + (-9.7) =$
10. $21.6 - 25.4 =$
11. $85.7 + (-17.2) =$
12. $123 - 654 =$

13. $(-95.4) + (-45.9) =$ 15. $14.573 + (-4.753) =$

14. $1032.4 - 85.2 =$ 16. $67.381 - 45.972 =$

17. $(-12.7) + (-8.1) - (-6.4) + 15.6 =$

18. $18.7 - (-7.1) + 26.4 - (-8.5) + (-19.8) - 8.6 =$

19. $15.7 + (-8.9) - 5.6 + 7.1 - (4.8) =$

20. $(4.5) + 8.1 - 7.6 - (-9.2) + 6.2 - 4.2 + (8.9) - 2.9 =$

More Practice – the more you practice mental math, the better you will get and the faster you will get without having to resort to using your calculator.

- Roll several dice and add, subtract, or multiply the values without using a calculator.
- Using a deck of cards, flip up two or more cards and add or multiply the values together. For an extra challenge, let the black cards be positive numbers and the red cards be negative. You can also flip them into fractions to add, subtract, multiply or divide.
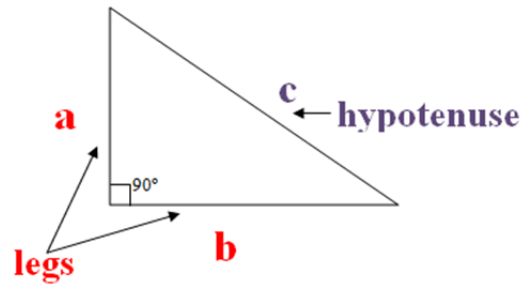
Pythagorean Theorem

Helpful Reference:
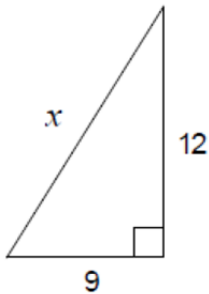www.mathsisfun.com/pythagoras.html

Tips:
- Identify and label each side
- Fill in the blanks in your formula
- Solve for the unknown
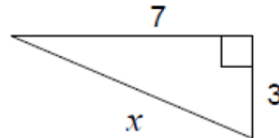- Remember to take the square root to find the final answer!

$$a^2 + b^2 = c^2$$

Solve for the unknown side in each of these triangles. Round to the nearest tenth if necessary.
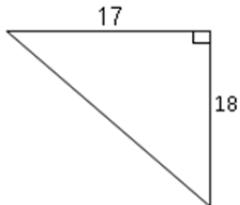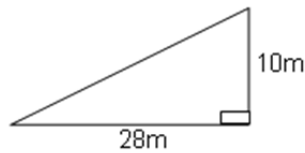
1.

x

12

9

2.

7

x

3
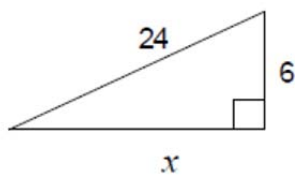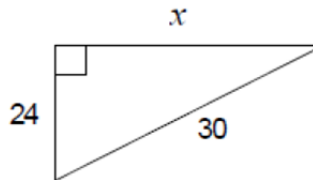
3.

17

18

4.

10m

28m

5.

24

6

x

6.

x

24

30

7.

54

32

8.

12m

19
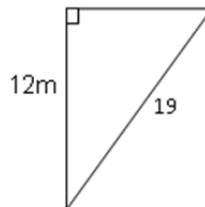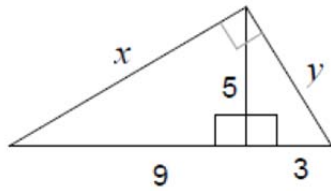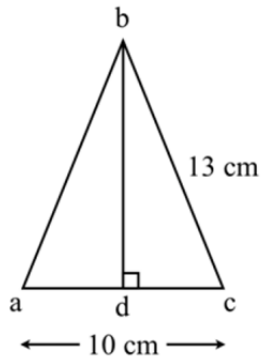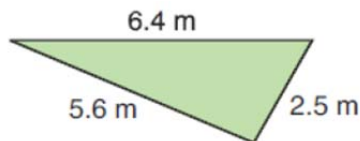
9.

10. What is the length of **bd**?

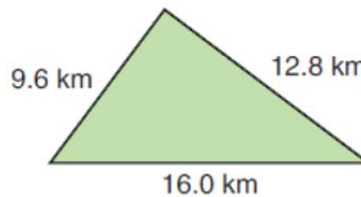11. a = 12 ; b = 5; c = _____

12. a = 15 ; b =_____ ; c = 17

13. a = _____ ; b = 2 ; c = 4

14. Are these right triangles? How do you know?

a)

b)

15. To get from point A to point B you must avoid walking through a pond. To avoid the pond, you must walk 34 meters south and 41 meters east. To the *nearest meter*, how many meters would be saved if it were possible to walk through the pond?

Fraction Operations

Simplify the following fractions:

1. $\frac{15}{18} =$

2. $\frac{42}{70} =$

3. $\frac{39}{52} =$

4. $\frac{65}{80} =$

5. $\frac{132}{96} =$

6. $\frac{102}{255} =$

Multiplying and dividing fractions. Your final answer should always be in simplest form:

1. $\frac{6}{5} \cdot \frac{4}{5} =$

2. $\frac{8}{9} \cdot \frac{12}{16} =$

3. $\frac{14}{20} \cdot \frac{5}{8} =$

4. $\frac{6}{7} \cdot \frac{21}{9} =$

5. $\frac{15}{24} \cdot \frac{12}{10} =$

6. $\frac{18}{22} \cdot \frac{4}{6} =$

7. $\frac{6}{5} \div \frac{4}{5} =$

8. $\frac{8}{9} \div \frac{12}{16} =$

9. $\frac{14}{20} \div \frac{5}{8} =$

10. $\frac{6}{7} \div \frac{21}{9} =$

11. $\frac{15}{24} \div \frac{12}{10} =$

12. $\frac{18}{22} \div \frac{4}{6} =$

Adding and Subtracting fractions. Your final answer should always be in simplest form:

1. $\frac{7}{10} + \frac{9}{10} =$

2. $\frac{4}{9} + \frac{7}{3} =$

3. $\frac{3}{4} + \frac{5}{6} =$

4. $\frac{6}{7} + \frac{3}{4} =$

5. $\frac{7}{15} + \frac{5}{6} =$

6. $\frac{1}{21} + \frac{3}{14} =$

7. $\frac{16}{20} - \frac{5}{30} =$

8. $\frac{10}{11} - \frac{10}{55} =$

9. $\frac{12}{27} - \frac{2}{6} =$

10. $\frac{5}{6} - \frac{4}{21} =$

11. $\frac{3}{6} - \frac{1}{9} =$

12. $\frac{3}{14} - \frac{4}{21} =$

Exponent laws

Exponent Law	Example
Product Law $x^a \cdot x^b = x^{a+b}$	$2^4 \cdot 2^5 = 2^9$
Quotient Law $\dfrac{x^a}{x^b} = x^{a-b}$	$\dfrac{5^6}{5^2} = 5^4$
Power of a Power $(x^a)^b$	$(3^5)^2 = 3^{10}$
Power of a Product $(x \cdot y)^a = x^a \cdot y^a$	$(4m)^2 = 4^2 \cdot m^2 = 16 \cdot m^2$
Power of a Quotient $\left(\dfrac{x}{y}\right)^a = \dfrac{x^a}{y^a}$	$\left(\dfrac{7}{9}\right)^2 = \dfrac{7^2}{9^2} = \dfrac{49}{81}$
Zero Power $x^0 = 1$	$523^0 = 1$

Simplify each of the following into a single power. Do not evaluate:

1. $4^4 \cdot 4^7 =$

2. $52^3 \cdot 52^7 =$

3. $1492^{18} \cdot 1492^{22} \cdot 1492^{15} =$

4. $1867^3 \cdot 1867^6 \cdot 1867^9 =$

5. $\dfrac{7^9}{7^4} =$

6. $\dfrac{h^{12}}{h^5} =$

7. $\dfrac{987^{65}}{987^{43}} =$

8. $\dfrac{2016^{365}}{2016^{244}} =$

9. $(3^5)^7 =$

10. $(p^3)^8 =$

11. $(432^{18})^{37} =$

12. $(m^4)^{13} =$

13. $(3 \cdot 7)^8 =$

14. $(5 \cdot c)^2 =$

15. $(2 \cdot w)^7 =$

16. $(9 \cdot x \cdot y)^5 =$

17. $\left(\dfrac{9}{4}\right)^2 =$

18. $\left(\dfrac{x}{5}\right)^3 =$

19. $\left(\dfrac{17}{29}\right)^6 =$

20. $\left(\dfrac{100}{256}\right)^{512} =$

21. $5^0 =$

22. $827^0 =$

Simplify each expression using the exponent laws:

1. $(2^2)^2 \cdot (2^3)^4 =$

2. $\dfrac{4^7 \cdot 4^0}{4^3} =$

3. $\dfrac{7^5 \cdot 7^{12}}{(7^2)^3 \cdot 7^4} =$

4. $23^6 \cdot (23^3)^5 \cdot 23^2 =$

5. $\left(\dfrac{243^8 \cdot 243^9}{243^4}\right)^0 \cdot 243^5 =$

6. $x^5 \cdot x^3 \cdot (x^7)^3 =$

7. $(2x)^5 \cdot (4y)^3 =$

8. $\dfrac{2y^3 \cdot 3xy^2}{3x^2 y^4} =$

9. $\left(\dfrac{12m^7 \cdot 4m^5}{6m^2}\right)^2 =$

10. $\left(\dfrac{5w^6}{2w^3}\right)\left(\dfrac{6w^3}{9w}\right)^2 \left(\dfrac{3w^8}{10w^5}\right)$

Order of operations - BEDMAS

What is the first step for each of the following?

1. $(7 + 90 \div 9) + 56 \div 7$

2. $10 - 7 + 12 \div 6 + 60 \div 6$

3. $10 + 5 + 7^2 + 6^2 + 8$

4. $10 + 7 + 8^3 + (10 + 50 \div 10)$

5. $9 + 5 + 36 \div 4 + 54 \div 9$

6. $10 + 12 \div 6 + 6^3 + 2^3$

7. $5 + 20 \div 4 + 56 \div 8$

8. $9 + (10 \div 2 + 3^2) + 5$

9. $8 + (90 \div 9 \times 5) \times 6$

10. $8 + 7^3 + 2 \times 2 + 14 \div 2$

Order of Operations

Brackets ( )
Exponents n^x
Divide $\div$ ⎤ in the order
Multiply $\times$ ⎦ they appear
Add + ⎤ in the order
Subtract - ⎦ they appear

Evaluate using the order of operations.

1. $51 - 21 \times 2 =$

2. $9 - (10 \div (-2) - 5) =$

3. $40 \div 1 + 3 - (3 \times 7) + 7 - 5 =$

4. $(4 + 9 + 16 \div 4) - 8 - 3 \times 5 =$

5. $(15 \div 5 + 6 + 9) \times 4 \times 2 + 7 =$

6. $(5 - 6 \times 9 + 6) \times 9 + 3 - 85 =$

7. $4 - 9 + (7 \times 11) \times 5 + 7 + 8 =$

8. $(60 \div 3 + 4 \times 7 \times 9) \times 2 - 8 =$

9. $(9 \times 36 \div 6 - 5 \times 3) + 2 + 6 =$

10. $(9 - 84 \div 2 \times 5 + 5 + 6) + 2 =$

Equation solving

1. $5x - 5 + 6x = 72$

2. $3(b - 6) + 8 - b = -2$

3. $4(2d) - 18 - 3d = 32$

4. $3y - 4y - 2y = -13$

5. $2(7h) + 9 - 3h = -24$

6. $2(2m) - 4 - 2m = 14$

7. $-k + 5 + 2(k + 7) = 12$

8. $3y - 4(y + 2) = 10$

9. $4(c + 5) - 2c = 12$

10. $2(2x) + 6 - 3x = -3$

Polynomials

Adding and Subtracting Polynomials

1. $(3x + 4) + (4x + 7) =$

2. $(9x + 2) + (7x - 5) =$

3. $(5x^2 + 3x + 2) + (9x^2 - 7x - 3) =$

4. $(4x^2 - 5x - 6) + (5x^2 + 2x - 7) =$

5. $(6x^2 + 1) + (8x^2 + 2x - 7) =$

6. $(13y^2 + 8y - 11) + (13y^3 + 4y^2 - 2) =$

7. $(4y^5 + 3y^4 - 2y^2 + 6) + (5y^3 - 7y + 5) =$

8. $(8m^2 + 3m^3 + 1) + (7m + 3m^2 - 5) =$

9. $(a^2 + a - 2) + (9a^2 - a - 2) =$

10. $(6k^2 - 6k + 3) + (12k^2 - 12k + 6) =$

11. $(4q^2 - 19q + 15) + (-18q^2 + 15q + 16) =$

12. $(7x + 4) - (3x + 2) =$

13. $(9x + 6) - (4x - 3) =$

14. $(8x^2 - 8x + 5) - (4x^2 + 4x - 7) =$

15. $(7x^2 - 2x + 3) - (6x^2 + 9x + 8) =$

16. $(16n^2 + 14n - 17) - (11n^2 - 6n - 6) =$

17. $(13p^2 - 21p - 16) - (24p^2 + 3p + 11) =$

18. $(63f^2 + 81f - 55) - (34f^2 + 96f - 87) =$

19. $(76g^2 + 53g - 61) - (-24g - 47g + 39) =$

20. $(86m^2 - 23m + 35) - (44m^2 + 19m - 7) =$

Multiplying Polynomials

1. $2(5x + 4) =$

2. $3(4x + 7) =$

3. $8(2x^2 + 6x - 5) =$

4. $4(4t^2 + 12t - 7) =$

5. $6(8h^2 - 4h + 9) =$

6. $2x(3x^2 + 5x - 7) =$

7. $3c(5c^2 - 7c + 1) =$

8. $5.1y(9.2y^2 + 6.2y - 8.7) =$

9. $12t(56t^2 + 13t - 23) =$

10. $2.3h(83h^2 - 74h - 41) =$

Dividing Polynomials

1. $\dfrac{(6x^2 + 14x + 8)}{2} =$

2. $\dfrac{(27t^2 - 15t + 12)}{3} =$

3. $\dfrac{(24k^2 + 44k - 76)}{4} =$

4. $\dfrac{16x^2 + 22x}{2x} =$

5. $\dfrac{(105f^2 - 80f)}{5f} =$

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. $\dfrac{5}{4} \div \dfrac{-1}{8} + \left(\dfrac{-1}{-3}\right)$

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

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

7. $\left(\dfrac{-3}{5}\right)\left(\dfrac{1}{3}\right) + \left(\dfrac{-1}{-5}\right) \div 2$

8. $-\dfrac{5}{6} + \left(\dfrac{4}{3}\right)\left(\dfrac{2}{3}\right)$

9. $\left(-\dfrac{2}{3}\right)^2 \div \dfrac{2}{9} - \left(-\dfrac{4}{5}\right)$

10. $-\dfrac{3}{5} + \left[\dfrac{1}{3} \times \left(-\dfrac{3}{4}\right)\right]$

11. $-1\dfrac{3}{7} \times \dfrac{1}{2} + \left(-3\dfrac{1}{7}\right)$

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

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

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

Ch 2

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

2. Simplify $\left(2^3 \times 4^2\right)^2$

3. Simplify $\left(\dfrac{5^5}{5^2}\right)^3$

4. Evaluate $\sqrt{\dfrac{25}{49}}$

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

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

7. Complete the table.

Power	Base	Exponent	Repeated Multiplication	Value
-3^5				

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

a) $\sqrt{\dfrac{144}{49}}$ b) $-(-4)^3$ c) $(-4)^0$ d) $\left(-\dfrac{1}{2}\right)^3$

e) $\left(-\dfrac{2}{3}\right)^4$ f) $\left(-\dfrac{1}{5}\right)^4$ 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) $\left(\dfrac{9^{10}}{9^8}\right)^3$ 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) $\left(2^4\right)^5 \div \left(2^3\right)^3$ b) $\dfrac{\left(3^2 \times 5^3\right)^4}{\left(3^3 \times 5^7\right)}$ c) $\dfrac{\left(10^4\right)\left(10^5\right)^3}{10^{11}}$

d) $\left(\dfrac{5^3}{2^4}\right)^2$ e) $\left(6^2 \times 2^2\right)^4$ f) $\left(9^3 \times 3^4\right)^3$

14. Determine the value of the missing number.

a) $8^6 = \left(2^2\right)^{\square}$ 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) $\left(\dfrac{1}{3}\right)^{-4}$

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

12.3

4.9
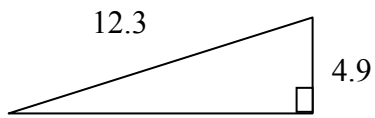
Ch 3

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 ΔCAT is similar to ΔODG.

A   3

2.4

C

3.2

T

D   4.5

3.6

O

4.8

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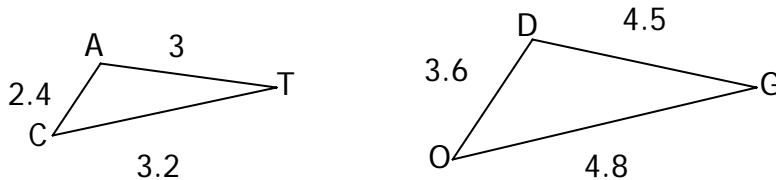
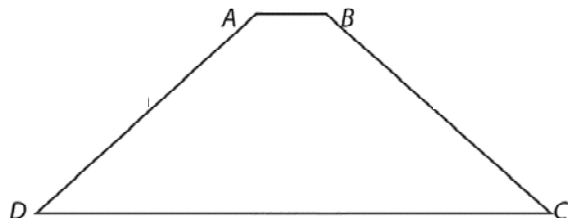3. Measure the dimensions of the rectangles and determine if they are similar. Show work and explain your answer.

A   B

D   C

E   F

H   G

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

17

15

8

D

21

E

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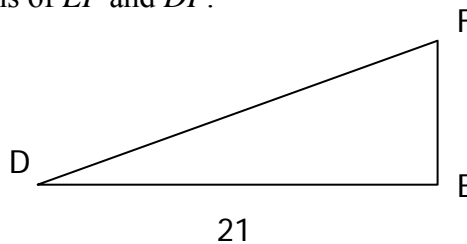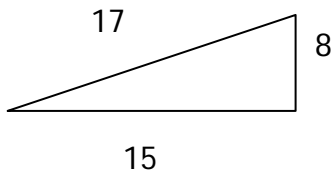
5. A person 1.8 m tall has a shadow 2.52 m long. At the same time, a lamppost has a 3.5m shadow. Calculate the height of the lamppost.

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

A   B

D   C

Ch 4

1. Find the surface area of the following composite shapes

a)

13 cm

12 cm

6 cm

4 cm

5 cm

b)

20 cm

30 cm

15 cm

40 cm

50 cm

c)

8 cm

3 cm

6 cm

12 cm

21 cm

8 cm

24 cm

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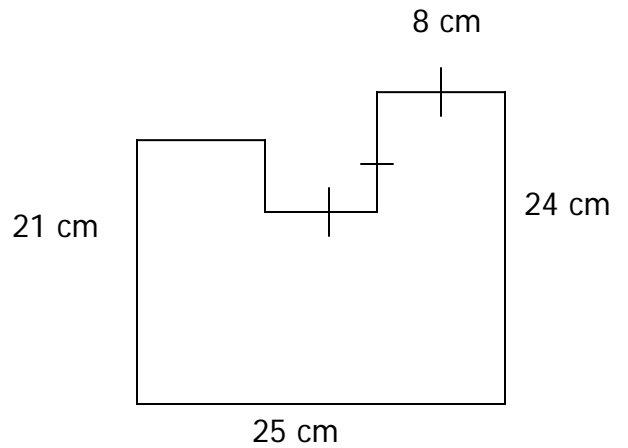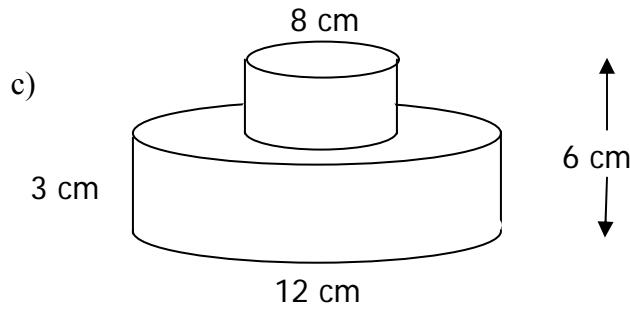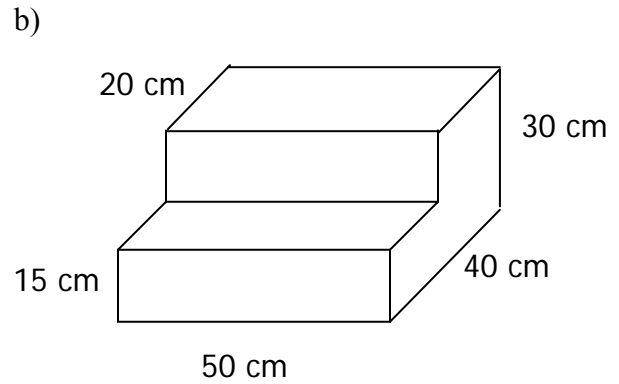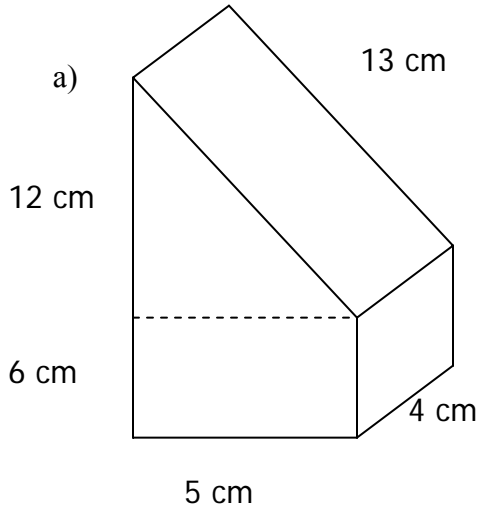
2. Find the area of the composite shape to the right.

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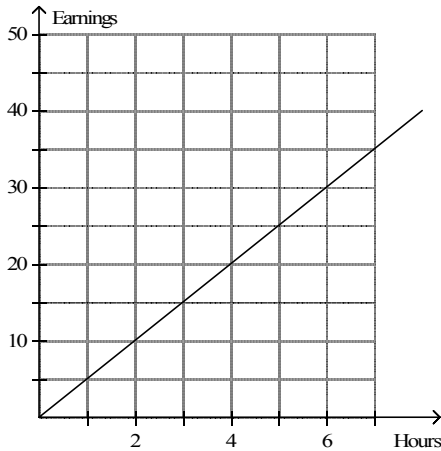
A. David earns \$5/h tutoring. C. Sandra earns \$4/h babysitting.
B. Eric earns \$6.50/h painting. D. Henry earns \$4.50/h mowing lawns.

7. Solve the following equations

a) $\dfrac{x}{2}+\dfrac{x}{5}=21$ b) $4(x-1)=2x+5$ c) $\dfrac{2x}{3}-4=6$ 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.
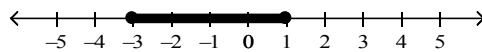
11. Determine which inequality matches the number line.
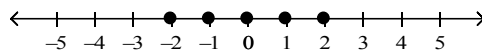
12. Solve and graph the solution to the following inequalities

a) $5x-3>2$ b) $4x+7\ge 2x-1$ c) $\dfrac{x}{2}+3\le 1$

13. For the linear relation $y=3x-1$, create a table of values then graph on the grid provided.
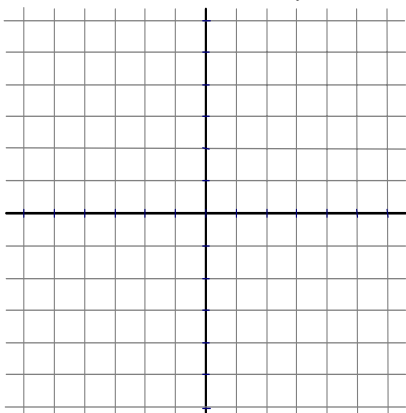
x	y
-1	
0	
1	
2	

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. $x \le -4$, where x is an Integer   b. $-1 < x \le 3$, where x is a Real Number

17. Solve and graph the following inequalities.
   a. $6x - 1 \ge 11$, 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 $\left(-7x^2 - 3x + 1\right) + \left(4x^2 + 3x - 6\right)$.

6. Subtract $\left(-12x + 5\right) - \left(-2x^2 + 9x - 4\right)$.

7. Determine the product of 3x and (5x − 4).

8. Determine the product of $\left(4x + 2\right)\left(x - 3\right)$

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.

	Degree	# of terms	Coefficients	Variables
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 $\left(2x^2 + 4x - 5\right) + \left(-6x^2 + x + 3\right)$.

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

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

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

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

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

$x + 2$

$x + 4$
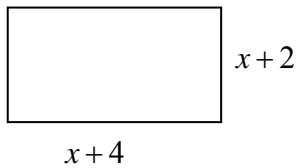
19. Express the area of this rectangle as a polynomial and simplify.

$5x$

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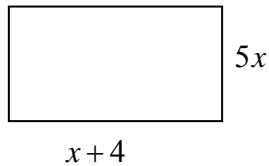
20. A rectangle has a perimeter of $(16x + 24)$ cm. If the width is $(3x + 4)$ cm. find the length.

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.

$3x - 2y$

$?$

$x - 5y$
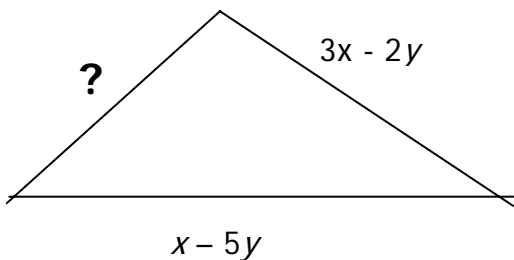
1. A rectangular playground has dimensions 24 m by 16 m. What are the dimensions of a playground drawing that has a scale factor of $\frac{1}{200}$.

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?
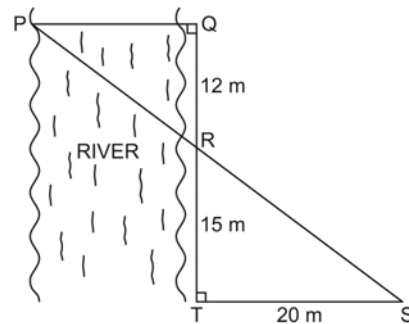
4. Draw the image of ΔPAM after each reflection below. Write the coordinates of the larger shape formed by ΔPAM and its reflection images. Draw the lines of symmetry of the larger shape.

   a) Reflect ΔPAM in the y-axis.
   b) Reflect ΔPAM in the x-axis.
   c) Reflect ΔPAM in the line $y = x$.
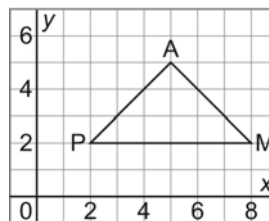
5. Which polygons have rotational symmetry? State the order of rotation and the angle of rotation symmetry for each.
   a)
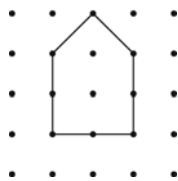
   b)

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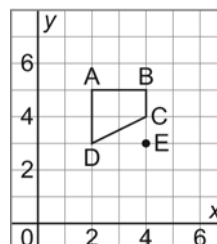
7. For each pair of shapes, determine whether they are related by line symmetry, by rotational symmetry, by both line and rotational symmetry, or by neither. Describe the symmetry, if any.

a)

b)
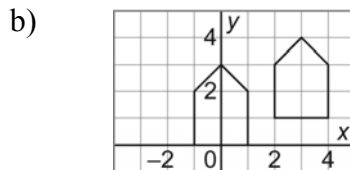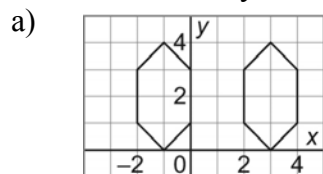
Ch 9

1. What is the value of x and y in the diagram to the right?
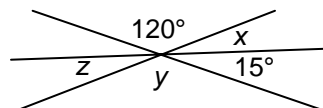
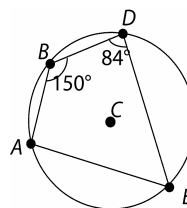2. In the diagram to the right, what is the value of angle a?
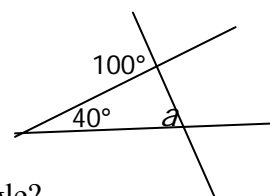
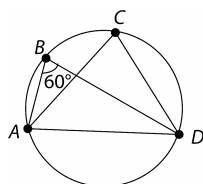3. If two angles of a triangle are 55° and 95°, what is the third angle?

4. Determine the measure of the central angle subtended by **arc AB**. The radii divide the circle into equal parts.
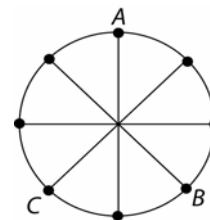
5. Determine the measure of $\angle E$ in the circle:

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

7. In the circle to the right, PR = 50, OQ = 15. What is the length of diameter?
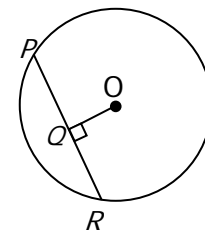
Find the values of each of the angles. State a geometric reason for your answer.

8.

$\angle x =$ _____ _____

$\angle y =$ _____ _____

9.

$\angle x =$ _____ _____

$\angle y =$ _____ _____

10.
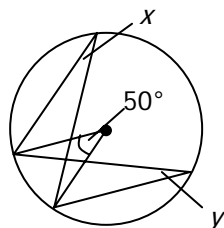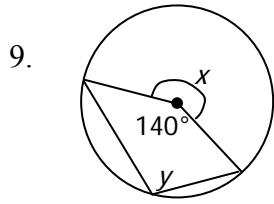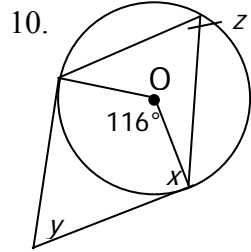
$\angle x =$ _____ _____

$\angle y =$ _____ _____

$\angle z =$ _____ _____
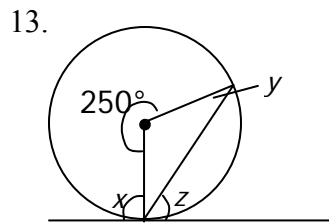
Find the values of each of the indicated angles.

11.

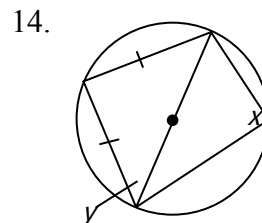$\angle x =$ _____

12.
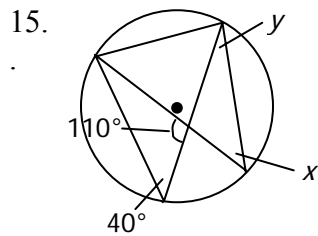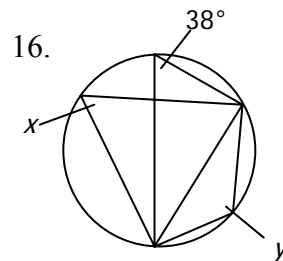
$\angle x =$ _____ $\angle y =$ _____

13.

$\angle x =$ _____ $\angle y =$ _____ $\angle z =$ _____
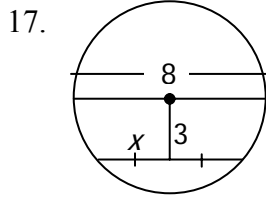
14.

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

15.

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

16.
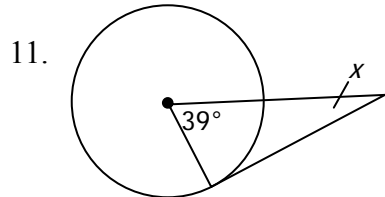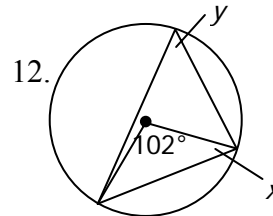
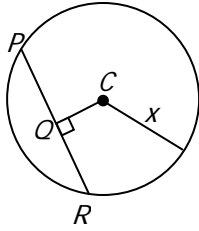$\angle x =$ _____ $\angle y =$ _____
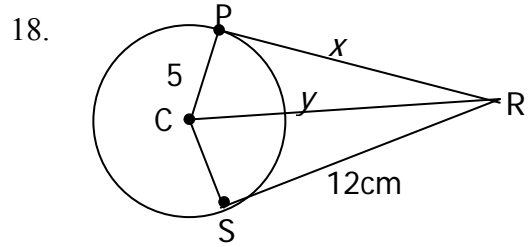
Find the length of the indicated side.

17.

$X=$ _____

18.

$X =$ _____ $y =$ _____

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

$X =$ _____

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

$X =$ _____ $y =$ _____
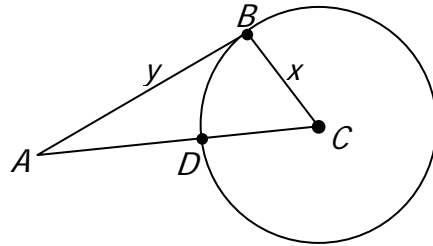
21. In the circle shown, $XZ = 18$ cm and $CY = 5$ cm. What is the length of YW?
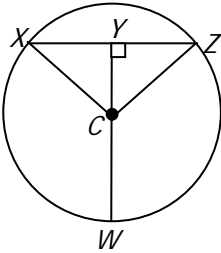
22. The diameter of a large circular pipe is 20 m. There is water running through the pipe; the water covers only the bottom part of the pipe. The width of the water's surface across the pipe is 13 m. How deep is the water?

23. Solve for x.
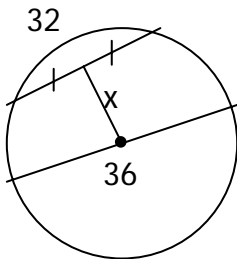
PM 9 ANSWER KEY

_Ch 1_

1. -7   2. -26   3. 20   4. $\dfrac{-29}{3}$ 5. $\dfrac{3}{2}$ 6. $\dfrac{-2}{9}$ 7. $\dfrac{-1}{10}$

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

_Ch 2_

1. 2197 cm^3 2. 2^{14} 3. 5^9 4. $\dfrac{5}{7}$ 5. 2.85 cm   6. 0.83

7. 3, 5, -(3)(3)(3)(3)(3), -243   8a. $\dfrac{12}{7}$ b. 64   c. 1   d. $\dfrac{-1}{8}$

e. $\dfrac{16}{81}$ f. $\dfrac{1}{625}$ g. -1   h. 1   9a. -21   b. 6   c. 209

d. 26   10. 2^{20} 11a. 3^{12} b. 9^6 c. 5^{12} 12. 9, 3^2

13a. 2^{11} b. $(3^5)(5^5)$ c. 10^8 d. $\dfrac{5^6}{2^8}$ e. $(6^8)(2^8)$ f. 3^{30} 14a. 9

b. 4   c. 6   15a. 2^9 b. $(6)(2^6)$ 16a. $\dfrac{1}{4^3}$ b. $\dfrac{1}{(-2)^5}$ c. $\dfrac{-1}{5^2}$

d. 3^4 17. 7.2 cm   18. 1.28

_Ch 3_

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

5. 2.5m   6. See Key

_Ch 4_

1a. 268 cm^2 b. 8800 cm^2 c. 414.69 cm^2 2. 509 cm^2

_Ch 5_

1. $C=12+8h$ 2. $y=4x$ 3. $y=-2x+10$ 4. 2

5. See Key   6. A   7a. 30   b. $\dfrac{9}{2}$ c. 15   d. 1

8. 8 cm x 21 cm   9. $5\le x$ 10. $-3\le x\le 1, x\in\Re$ 11. $-2\le x\le 2, x\in I$

12a. $1<x$ b. $-4\le x$ c. $-4\ge x$ 13. See Key   14. $\dfrac{1}{2}$ 15a. 5.5   b. -2

16. See Key   17a. $x\ge 2$ b. $2\ge a$ 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. $-6x^2 y^2 - 2xy^2 + 3$
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 ½ of central angles, 25° Inscribed angles ½ of central angles
9. 220° Circle around a point = 360°, 110° Inscribed angles ½ of central angles
10. 90° Tangent to a radii is 90°, 64° Quadrilateral=360°, 58° Inscribed angles ½ of central angs
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

Pm 9 Final Exam Review 2

Simplify the following

1. $10\times(-2)\times4\div5+7$

2. $(-1+17)\times(-2)+15\div(-3)$

3. $9+(-2)\times8\div4-11\times(-3)$

4. $\dfrac{3}{5}\div\dfrac{-7}{10}+\left(\dfrac{-1}{-2}\right)$

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

6. $\left(\dfrac{7}{8}-\dfrac{1}{4}\right)\times\dfrac{-1}{2}\div\dfrac{5}{8}$

7. $\left(\dfrac{-2}{5}\right)\left(\dfrac{1}{3}\right)+\left(\dfrac{1}{-4}\right)\div2$

8. $-\dfrac{1}{6}+\left(\dfrac{5}{3}\right)\left(\dfrac{-1}{2}\right)$

9. $\left(-\dfrac{2}{5}\right)^{2}\div\dfrac{2}{3}-\left(-\dfrac{7}{10}\right)$

10. $-\dfrac{3}{10}+\left[\dfrac{-1}{3}\times\left(-\dfrac{3}{5}\right)\right]$

11. $2\dfrac{1}{7}\times\dfrac{-1}{3}+\left(-1\dfrac{2}{7}\right)$

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

13. Order the following from least to greatest. Show on a number line
$-2.5,-\dfrac{5}{3},0.95,-1\dfrac{1}{2},-0.8$

14. Determine the volume of a cube with side length of 8 cm.

15. Simplify $\left(2^{5}\times4^{3}\right)^{2}$

16. Simplify $\left(\dfrac{5^{3}}{5}\right)^{4}$

17. Evaluate $\sqrt{\dfrac{81}{49}}$

18. Calculate the side length of a square with an area of $5.2\,cm^{2}$

19. Express $\sqrt{\dfrac{32}{19}}$ to 2 decimal places :

20. Complete the table.

Power	Base	Exponent	Repeated Multiplication	Value
2^7				

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

a) $\sqrt{\dfrac{121}{36}}$

b) $-(-2)^3$

c) $(2\times3^4)^0$

d) $\left(-\dfrac{2}{5}\right)^2$

e) $\left(-\dfrac{1}{4}\right)^3$

f) $(-0.2)^3$

g) -5^0

h) $(-1)^{98}$

22. Evaluate:

a) $5^2 - 2^5 \div 8 \times 2 + (-1)$

b) $(4^2-1)^0 \times 10 \div (-5)$

c) $(-3)^2 + 2^2 - 3^3$

d) $5^2 - 2^3 \times 6 \div 3 + 2^0$

23. Express 32^3 as a power with a base of 2.

24. 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) 9^5

b) $\left(\dfrac{8^6}{4^7}\right)^3$

c) $27^4 \div 9^6$

25. . A cube has a volume of $512\,cm^3$. Determine the length of one side and express your answer as a power with the lowest possible base.

26.. Express as a single power, where possible.

a) $(3^6)^5 \div (3^4)^3$

b) $\dfrac{(2^3 \times 7^5)^4}{(2^4 \times 7^2)^3}$

c) $\dfrac{(10^5)(10^2)^4}{10^8}$

d) $\left(\dfrac{5^4}{3^2}\right)^3$

e) $(2^3 \times 3^5)^4$

f) $(3^2 \times 27^2)^2$

27. . Determine the value of the missing number.

a) $16^3 = \left(2^6\right)^{\square}$

b) $36^2 = 6^{\square}$

c) $16^2 = \square^4$

28. . A cube has a side length of 25 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.

c) Another cube has a **volume** of 5^4 cm^3. How many times greater is the volume of the larger cube?

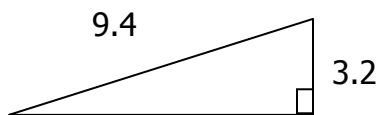29. Simplify into expressions containing positive exponents

a) 3^{-5}

b) $(-4)^{-2}$

c) -2^{-6}

d) $\left(\dfrac{2}{3}\right)^{-3}$

30. The area of a square is $41.94\, cm^2$. Find the side length of the square.

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

9.4

3.2

32. Ryan drew a scale drawing of a rectangular field that is 80m by 120m. He used a scale in which 1 cm represents 2.5 m. Determine the dimensions of the scale drawing.
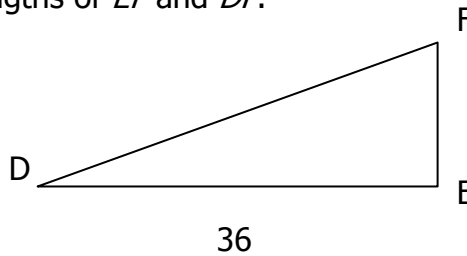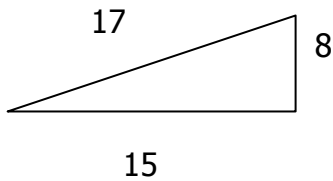
33. Show that ΔCAT is similar to ΔODG.

6

4

4.2

2.8

6

9
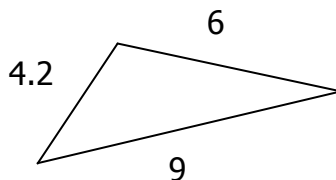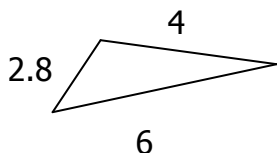
34. Measure the dimensions of the rectangles and determine if they are similar. Show work and explain your answer.

A   B
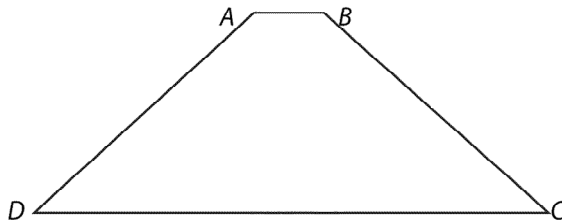
E   F

H   G

D   C
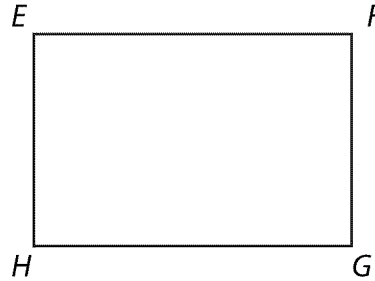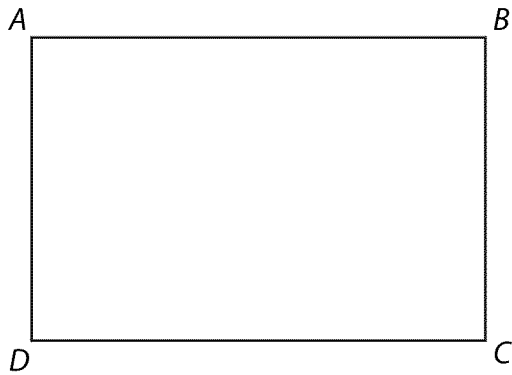
35. $\triangle ABC \sim \triangle DEF$. Determine the lengths of *EF* and *DF*.

F

17

8

D

E

15   36

36. 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.

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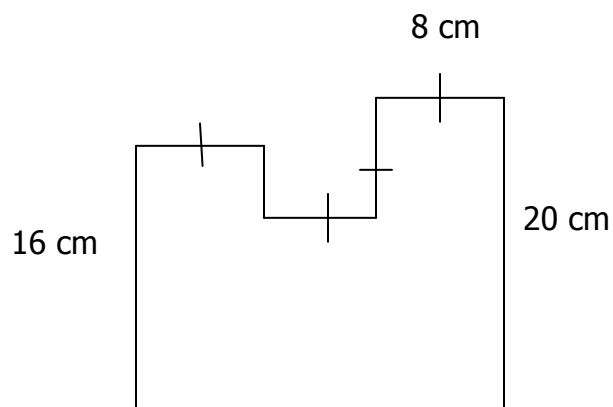
A   B

D   C

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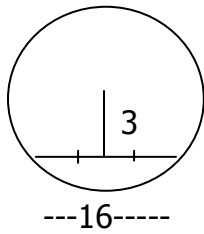
b) An enlargement by a scale factor of 1.5

38. Find the surface area of the following composite shapes
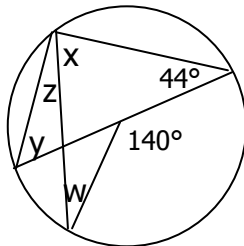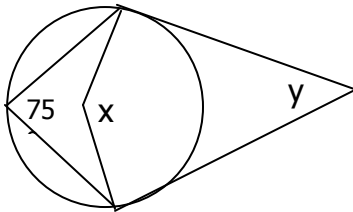
a)

13 cm

12 cm

6 cm

4 cm

5 cm

b)

20 cm

30 cm

15 cm

40 cm

50 cm

c)

6 cm

6 cm

4 cm

10 cm
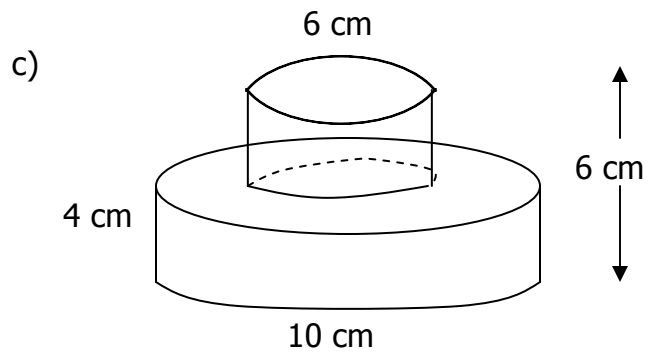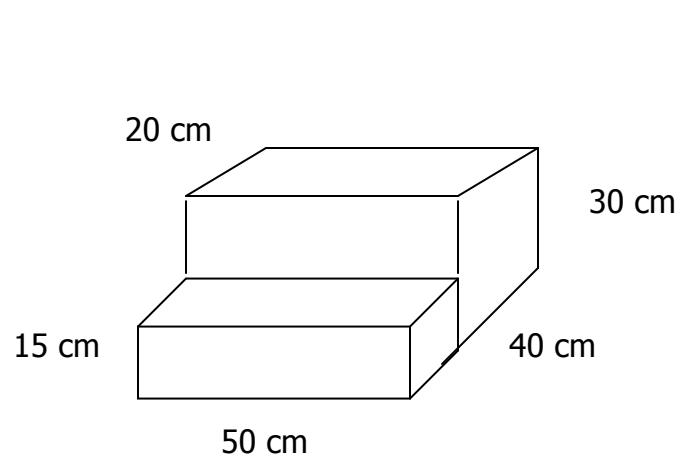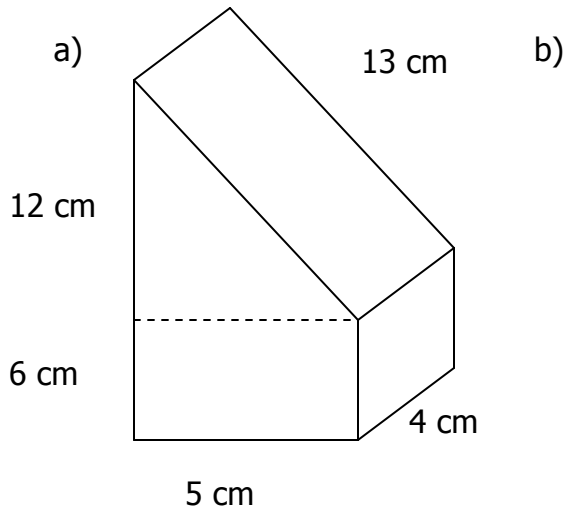
39. Find the area of the composite shape

8 cm

16 cm

20 cm

40. Find the diameter of the circle below


```
        3
___|___
---16-----
```

41. Find the values of the missing angles, below

x
z
44°
y
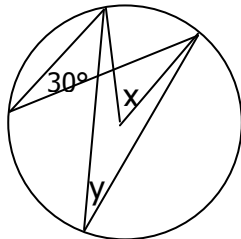140°
w

42. Find the values of the missing angles, below

75   x   y

43. Find the value of x for the diagram below

10

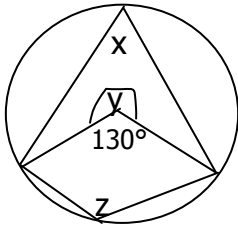x   2
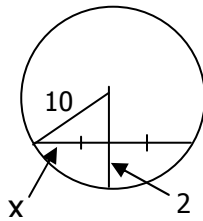
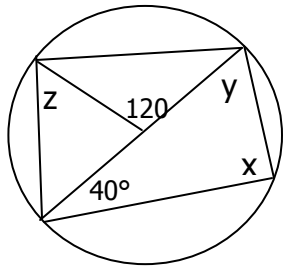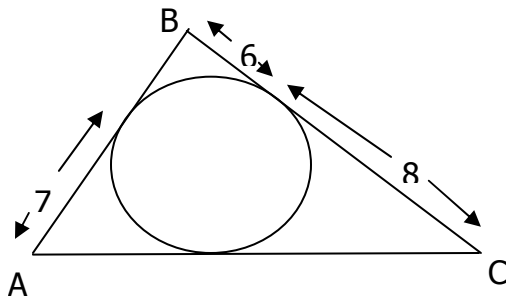44. Find the unknown angles for the diagram below

30°   x

y

45. Find the measures of the missing angles in the diagram below

46. Find the measures of the angles in the diagram below

47. Find the perimeter of ΔABC

48. Dave mows the grass at a golf course. He charges $6/h plus a flat fee of $10. If
   h represents the number of hours he works, and *C* represents his total fee,
   determine the equation that represents what he charges.

49. Determine the relation that matches the table of values.

x	1	2	3
y	7	9	11

50. Determine the relation that matches the table of values.
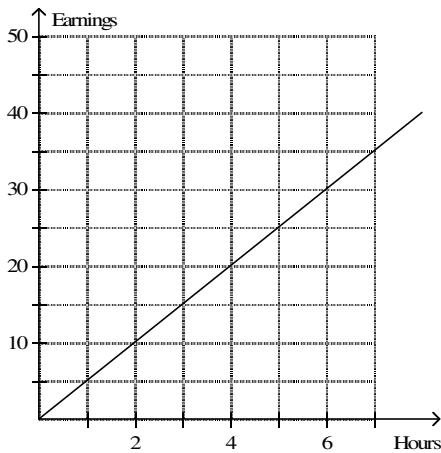
x	1	2	3
y	7	4	1

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

52. Ben has $120 in his account. Each month he deposits $15. Let t represent the time in months and A represent the account balance. Create a table from t = 0 to 6 then graph. What is the rate of change?

53. Graph and label $x - 2y = 4$ using a table of values

54. Graph and label x = 3
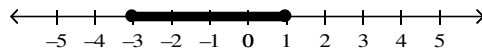
55. Determine which situation matches the graph.

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.
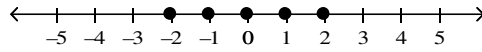
56. Solve the following equations

a) $\dfrac{x}{3} - \dfrac{x}{2} = -2$.   b) $3(x+2) = x - 4$ c) $\dfrac{3x}{2} + 1 = 5$ d) $4x + 5 - x = 2x - 4x + 8$

57. The perimeter of a rectangle is 48 cm. The length is 15 cm less than the twice the width. Determine the dimensions of the rectangle.
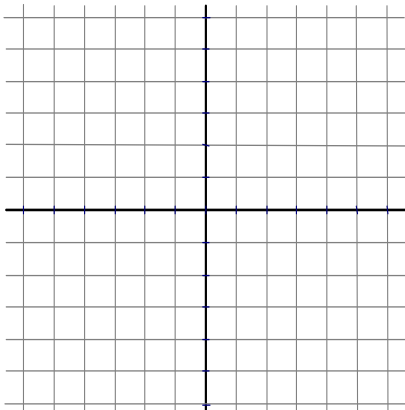
58. Determine the inequality that matches the number line.

59. Determine which inequality matches the number line.

60. For the linear relation $y = 2x + 3$, create a table of values then graph on the grid provided.

x	y
-1	
0	
1	
2	

61. A linear relation passes through (-1, 3) and (2, 9). What is the rate of change?

62. Graph the following inequalities.

a. $x \leq -4$, where x is an Integer   b. $-1 < x \leq 3$, where x is a Real Number

63. 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

64. Jesse is three times Ryan's' age. In five years, the sum of their ages will be 42. Write and solve an equation to determine Ryan's current age.

65. Determine the degree of the polynomial $3xy^4 - 2x^2y + 5x$.

66. Determine the coefficient of x in the polynomial $4 - x$.

67. Determine the constant term in the polynomial $5 - x + 2x^3$.

68. Evaluate the polynomial $3x^2 + 2x - 8$ if x = 5.

69. Determine the sum $(5x^2 - 2x + 7) + (3x^2 - 2x - 5)$.

70. Subtract $(5x^2 - 11x - 6) - (-x^2 + 7x - 3)$.

71. Determine the product of -2x and (7x − 3).
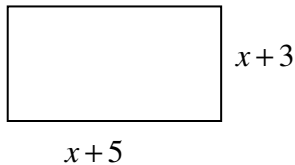
72. Determine the product of $(3a - 1)(a + 4)$

73. Determine the quotient of $(16x^3y - 12x^2y^2 + 24xy) \div (-4xy)$.

74. Determine the missing factor in (? $)(-2x + 5) = 10x - 25$.

75. Complete the table for each polynomial.

	Degree	# of terms	Coefficients	Variables
a) $2x^4y^2 - 7xy^3$				
b) $-2a^5b^2 - ab^3 + 4b^6$				
c) $3x^2yz + 4yz - 8z^2$				

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

$x+3$

$x+5$

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

78. The perimeter of the triangle below is $15x - 6y$. Show an expression that determines the length of the missing side and then simplify completely.

?   9x – 7y

2x+3y
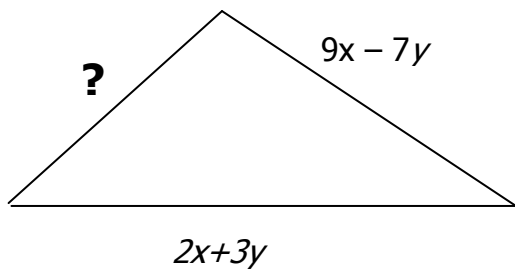
79. The diameter of a large circular pipe is 24 m. There is water running through the pipe; the water covers only the bottom part of the pipe. The width of the water's surface across the pipe is 16 m. How deep is the water?

Math 9   Final Exam Review 2---Key

1) -9   2) -37   3) 38   4) $-\dfrac{5}{14}$ 5) $\dfrac{3}{4}$

6) $-\dfrac{1}{2}$ 7) $-\dfrac{31}{120}$ 8) -1   9) $\dfrac{47}{50}$ 10) $-\dfrac{1}{10}$

11) -2   12) $\dfrac{101}{72}$ 13) -2.5, $-\dfrac{5}{3}$, $-1\dfrac{1}{2}$, -0.8, 0.95

14) 512 cm^3 15) 2^{22} 16) 5^8 17) $\dfrac{9}{7}$ 18) ≈ 2.28 cm.

19) 1.30   20) 2; 7; 2 x 2 x 2 x 2 x 2 x 2 x 2; 128

21) a) $\dfrac{11}{6}$ b) 8   c) 1   d) $\dfrac{4}{25}$ e) $-\dfrac{1}{64}$ f) -0.008   g) -1   h) 1

22) a) 16   b) -2   c) -14   d) 10   23) 2^{15} 24) a) 3^{15} b) 2^{12} c) 1

25) 2^3 26) a) 3^{18} b) 7^{18} c) 10^5 d) $\dfrac{5^{12}}{3^6}$ e) $2^{12}\times 3^{20}$ f) 3^{16}

27) a) 2   b) 4   c) 4   28) a) 5^6 b) 6×5^4 c) 5^2

29) a) $\dfrac{1}{3^5}$ b) $\dfrac{1}{(-4)^2}$ c) $\dfrac{1}{-2^6}$ d) $\left(\dfrac{3}{2}\right)^3$ 30) ≈ 6.48 31) 8.84

32) 32 cm by 48 cm   33) $\dfrac{9}{6}=\dfrac{6}{4}=\dfrac{4.2}{2.8}$ 34) 6:4 = 1.5   4:2.8 = 1.43   Not similar
$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ $1.5=1.5=1.5$

35) EF = 19.2, DF = 40.8   36) 2.5 m high   37)

38) a) 268 cm^2 b) 8800 cm^2 c) 320.44 cm^2

39) 608 cm^2 40) 17.09   41) x = 70, y = 46, z = 20, w = 26

42) x = 150, y = 30   43) x = 6   44) x = 60, y = 30

45) x = 65, y = 230, z = 115   46) x = 90, y = 50, z = 60

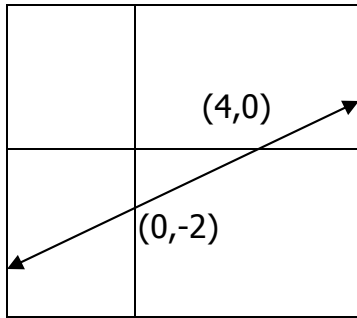47) P = 42   48) C = 6h + 10   49) y = 2x + 5

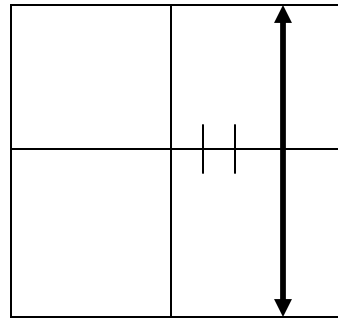50) y = -3x + 10   51) r/c = 5   52) A = 15t + 120; r/c = 15
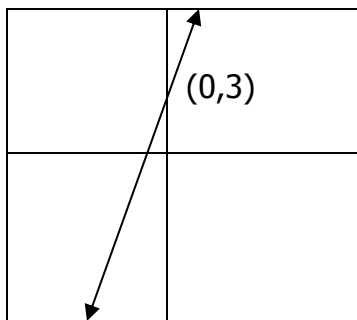
53)

(4,0)

(0,-2)

54)

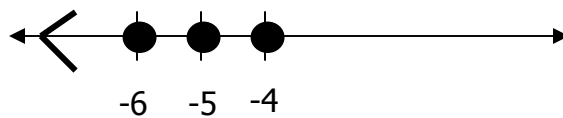55) Choice A   56) a) x = 12   b) x = -5   c) x = $\frac{8}{3}$ d) x = $\frac{3}{5}$

57) 13 by 11   58) $-3 \leq x \leq 1, x \in Rationals$ 59) $-2 \leq x \leq 2, x \in Integers$

60)

(0,3)

61) r/c = 2

62) a)

-6   -5   -4

b)

-1

3

63) a) $x \geq 2$

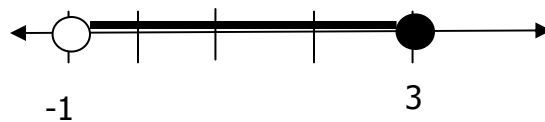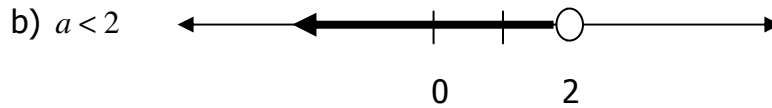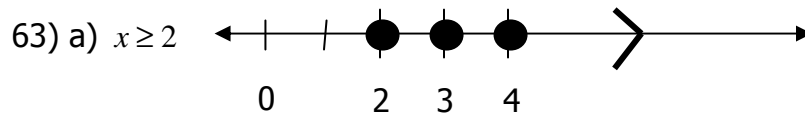b) $a < 2$

64) Ryan is 8 years old

65) degree is 5

66) co-efficient is 1

67) constant is 5

68) 77

69) $8x^2 - 4x + 2$

70) $6x^2 - 18x - 3$

71) $-14x^2 + 6x$

72) $3a^2 + 11a - 4$

73) $-4x^2 + 3xy - 6$

74) (-5)

75) a) 6; 2; 2 and 7; x and y;

b) 7; 3; -2 and 1 and 4; a and b

c) 4; 3; 3 and 4 and 8; x and y and z

76) P = 4x + 16

77) 5x + 8

78) 4x − 2y

79) The water is 3.06 m in depth