Jeddah Knowledge International School

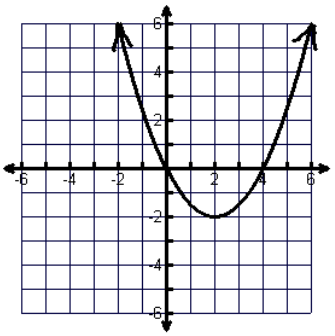
MATHEMATICS
SUMMER Pack
Grade 10 Going to Grade 11

Name: _____

Section: _____

Functions

1) Find the domain and range. Decide whether it is a graph of a function.



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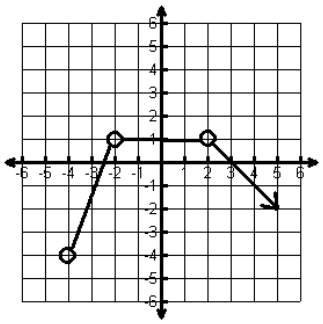

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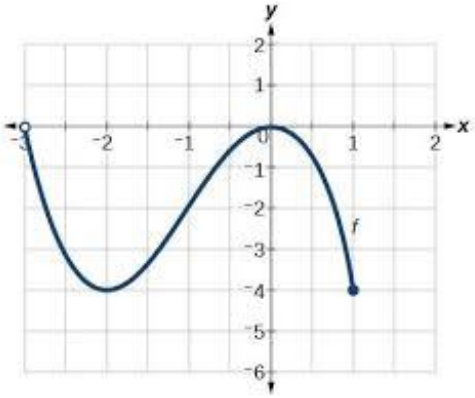

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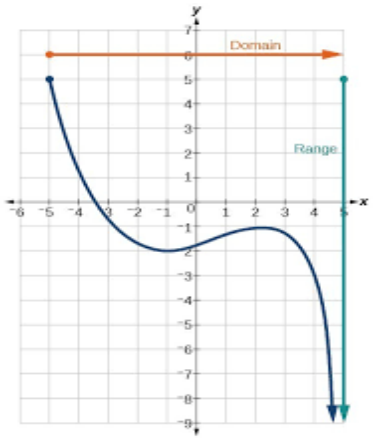

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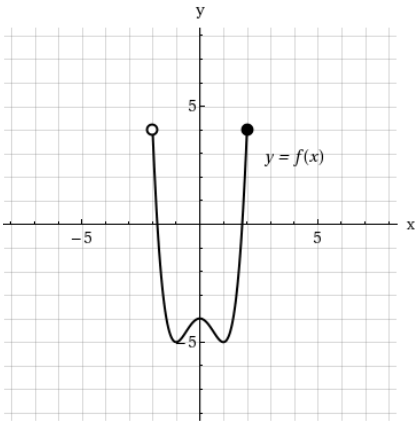

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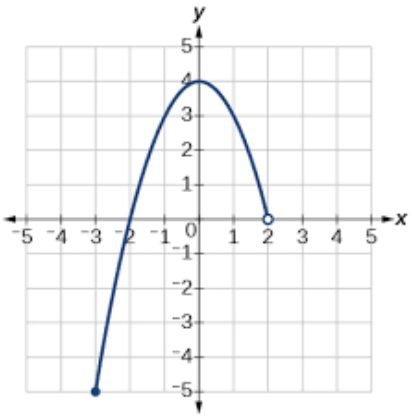


Domain:
Range:
Function:

Function Notation

2) Evaluate the following expressions given the functions below:

$g(x) = -3x + 1$ $f(x) = x^2 + 7$ $h(x) = \frac{12}{x}$ $j(x) = 2x + 9$

a. $g(10) =$ **b.** $f(3) =$ **c.** $h(-2) =$

d. $j(7) =$ **e.** $h(a)$ **f.** $g(b+c)$

h. Find x if $g(x) = 16$ **i.** Find x if $h(x) = -2$ **j.** Find x if $f(x) = 23$

3)

If $f(x) = -3x + 8$, find $f(5)$.

If $h(x) = \frac{-2x+5}{4}$, find $h\left(\frac{3}{2}\right)$.

If $h(x) = \frac{-5x+2}{3}$, find $h(1)$.

Composite Functions

4) If $f(x) = x^2$ and $g(x) = x - 4$ find:

a) $f\,(g(2))$

b) $f\,(g(-3))$

c) $g\,(f(2))$

d) $f\,(g(3))$

e) $g\,(f(-2))$

f) $f\,(g(0.5))$

g) $g\,(f(a))$

h) $f\,(g(a-b))$

5)

Let $f(x)=2x^2+5x-1$ and $g(x)=4x+2$. Find and simplify each function below. *Show all work.*

a. $f(g(-3))$ b. $g(f(-5))$

_____ _____

Let $f(x)=\frac{1}{5}x-3$ and $g(x)=-5x+8$. Find and simplify each function below. *Show all work.*

a. $f(g(2))$ b. $g(g(-3))$

Inverse Functions

6) Find the inverse of each function.

a) $f(x) = -5x + 11$

b) $f(k) = 7k - 15$

c) $f(m) = -4m$

d) $g(t) = (5 + t)^2$

e) $h(d) = 7d$

f) $m(x) = -7(x + 4)^2$

g) m(x) = $\frac{8+5x}{2}$

h) $t(x) = \frac{5}{11}x + 2$

Working Area:

Quadratic Functions

7) Solve the quadratic equations blow.

$x^2 + 16x - 48 = 0$

$16x^2 + 5 = 40x$

$x^2 + 7x + 6 = 0$

$3x + x^2 - 1 = 0$

$x^2 + 13x = -42$

$2x^2 + x - 6 = 0$

$x^2 + 8x - 4 = 0$

$x^2 + x - 30 = 0$

$x^2 + 16 = 12x$

$5x^2 = 5x$

Working Area:

8) Use the quadratic formula to solve for x.

$7x^2 + 10x + \frac{25}{7} = 0$

$3x^2 + 3x + \frac{3}{4} = 0$

$4x^2 + 10x + \frac{25}{4} = 0$

$3x^2 + x + \frac{1}{12} = 0$

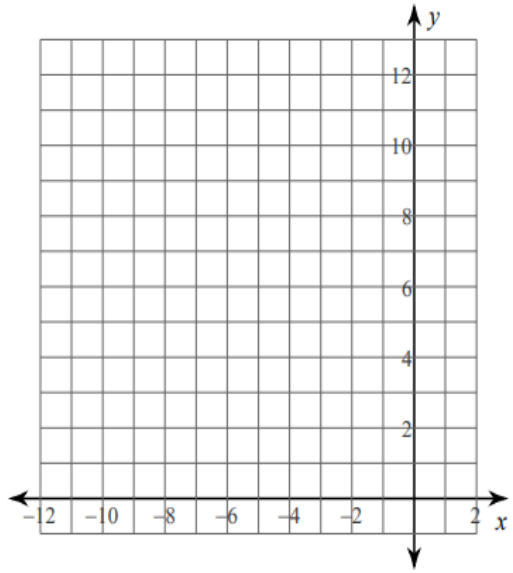
$x(x + 2) = 143$

$(x + 1)(x + 2) = 30$

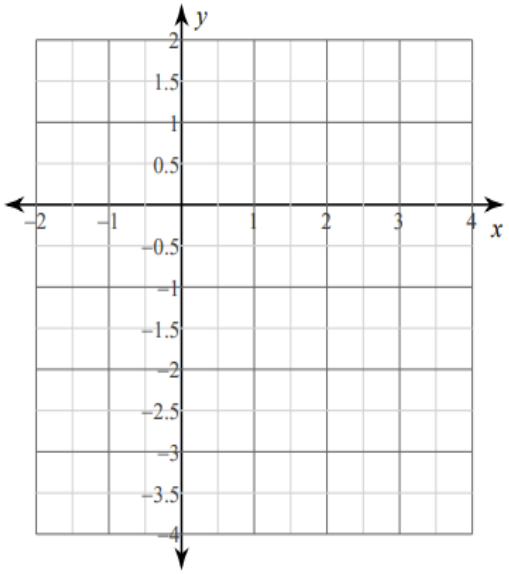
Working Area

9) Graph the following Quadratic functions:

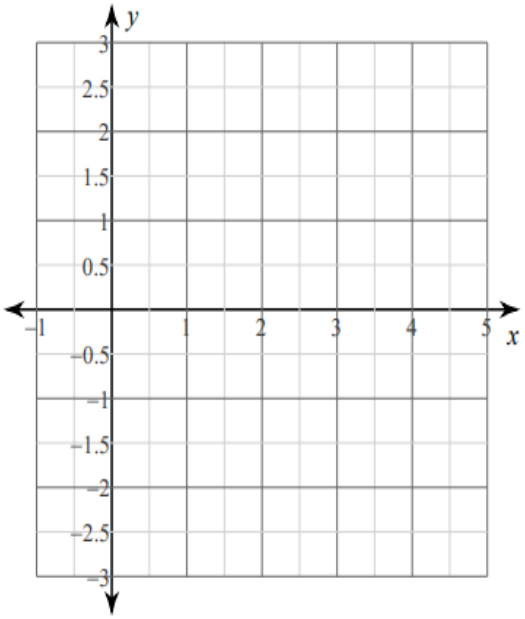
1) $y = 3x^2$



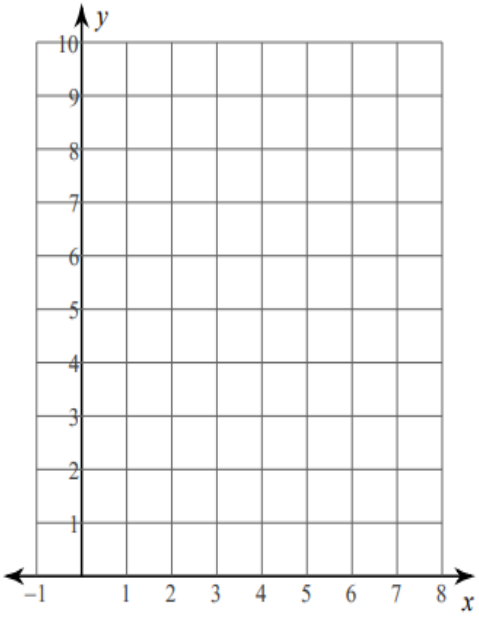
2) $y = -\frac{1}{2}x^2$



3) $y = -x^2 + 2x + 1$



4) $y = 2x^2 - 16x + 33$



Algebraic Fractions:

1. Write each fraction in simplest form:

(a) $\frac{30}{66}$ **(b)** $\frac{5x^4}{15x}$ **(c)** $\frac{12xy^4}{18x^3y^2}$ **(d)** $\frac{5m^2n}{10m^3n^3}$ **(e)** $\frac{12a^4b^6}{2a^3b^4}$

Working Area:

2. Write each fraction in simplest form:

(a) $\frac{5x - 15}{x^2 - 9}$ **(b)** $\frac{a^2 - 5a + 6}{3a^2 - 6a}$

(c) $\frac{3x^2 + 14x - 5}{3x^2 + 2x - 1}$ **(d)** $\frac{5p - 15}{p^2 - 4}$

Working Area:

3. Simplify:

1. $\frac{3}{5x} - \frac{1}{10x}$ 2. $\frac{8}{5x} - \frac{4}{15x}$ 3. $\frac{1}{4x} + \frac{1}{5x}$

4. $\frac{2}{x} + \frac{3}{2x}$ 5. $\frac{1}{x^2} + \frac{1}{x}$ 6. $\frac{1}{xy} + \frac{1}{x}$ 7. $\frac{y}{x} - \frac{x}{y}$

8. $\frac{1}{xy} + \frac{1}{xz} + \frac{1}{yz}$ 9. $\frac{1}{x} + \frac{1}{(x+1)}$ 10. $\frac{1}{x} - \frac{1}{(x+1)}$

Working Area:

4. Multiply and simplify the following algebraic fractions:

a) $\frac{3}{s} \times \frac{s}{7}$ b) $\frac{r^2}{s^2} \times \frac{s}{r}$ c) $\frac{3}{x^2} \times \frac{x}{7}$ d) $\frac{12p^3}{q^2} \times \frac{q^5}{4p^4}$

Working Area:

5. Divide and simplify the following algebraic fractions:

a) $\frac{3}{x} \div \frac{y}{7}$ b) $\frac{y}{7} \div \frac{3}{x}$ c) $\frac{x}{3} \div \frac{7}{y}$ d) $\frac{7}{y} \div \frac{x}{3}$

e) $\frac{a^3b^6c^4}{7} \div \frac{a^2b^6c^5}{x}$ f) $\frac{K_0}{5A} \div \frac{K_0}{5A}$ g) $5 \div \frac{z}{7}$ h) $\frac{x}{2y} \div 4$

Working Area:

Exponential Functions and Logarithmic Functions:

1. Write the following equations in exponential form:

(1) $\log_3 81 = 4$ (2) $\log_7 7 = 1$ (3) $\log_{\frac{1}{2}} \frac{1}{8} = 3$ (4) $\log_3 1 = 0$

(5) $\log_4 \frac{1}{64} = -3$ (6) $\log_6 \frac{1}{36} = -2$ (7) $\log_x y = z$ (8) $\log_m n = \frac{1}{2}$

Working Area:

2. Write the following equalities in logarithmic form:

(1) $8^2 = 64$ (2) $10^3 = 10000$ (3) $4^{-2} = \frac{1}{16}$ (4) $3^{-4} = \frac{1}{81}$

(5) $\left(\frac{1}{2}\right)^{-5} = 32$ (6) $\left(\frac{1}{3}\right)^{-3} = 27$ (7) $x^{2z} = y$ (8) $\sqrt{x} = y$

Working Area:

3. Express the following expressions:

Given that $\log 2 = x$, $\log 3 = y$ and $\log 7 = z$, express the following expressions in terms of x, y, and z.

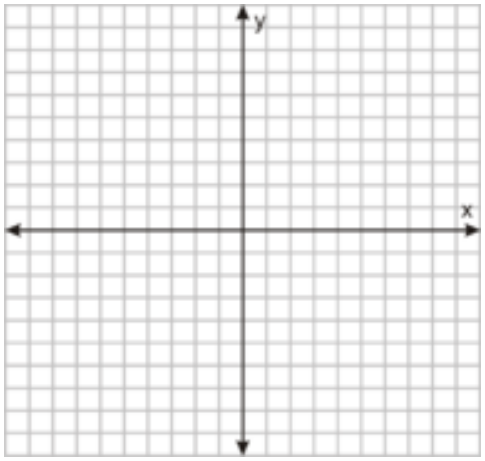
(1) $\log 12$ (2) $\log 200$ (3) $\log \frac{14}{3}$ (4) $\log 0.3$

Working Area:

4. Graph the following functions:

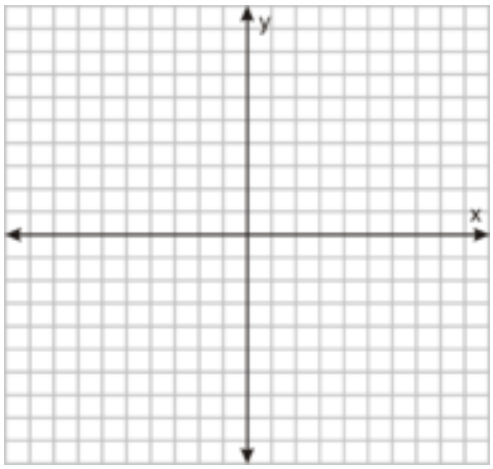
1. $f(x) = 3^x$

x					
y					



2. $f(x) = Log_3 x$

x					
y					



Sequences:

1. State whether the given sequences are arithmetic or geometric sequences or neither:

a. 8, 16, 24, 32, 40… _____

b. 2, 5, 9, 14, 20… … _____

c. 2, 4, 6, 8, 10… … _____

d. 100, 80, 70, 65… … _____

e. 31, 32, 33, 36… … _____

2. Find the term indicated for each geometric sequence:

a. 1, 3, 9, …. (u_7)

b. 18, -6, 2, …. (u_5)

c. 2, -8, 32, …. (u_8)

d. -6, -12, -24, … (u_9)

Working Area:

3. Find the first four terms of the sequence with *nth* term:

a. $u_n = 8 \times 3^n$	b. $u_n = n\,(n+1)$

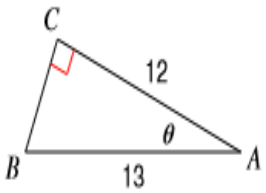
4. Find a formula for the general term u_n of the arithmetic sequence: 3, 6, 9, 12, ….
5. Find a formula for the general term u_n of the geometric sequence: 2, 4, 8, 16, ….

Working Area:

Trigonometry in Right Triangles

1- Find the measure of each angle indicated. Round to the nearest tenth.

1)



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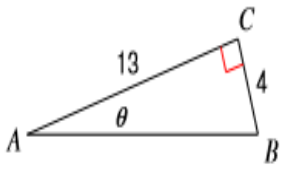

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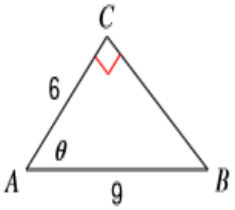

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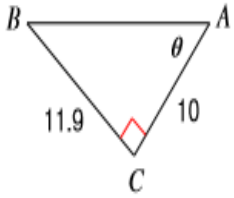

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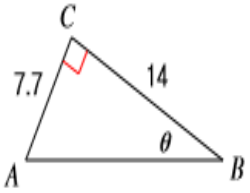

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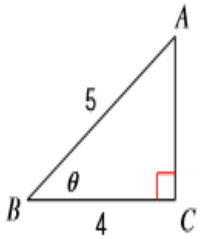

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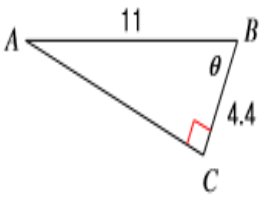

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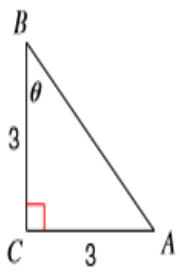
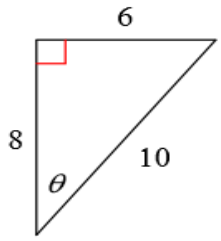


Working Area:

2- Find the values of the three trigonometric functions for each triangle. Give exact answers.

1)



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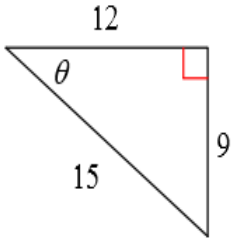
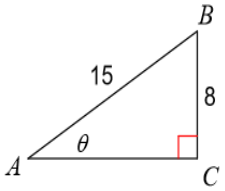


3- Find the measure of each angle indicated. Round to the nearest tenth.

3)



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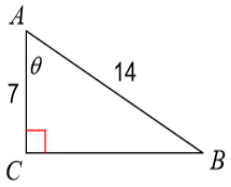

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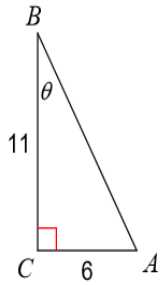

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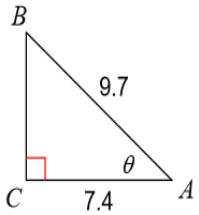

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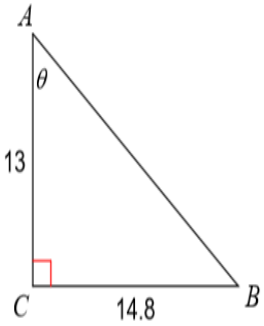

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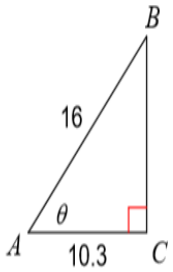

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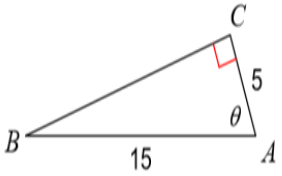

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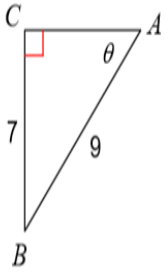

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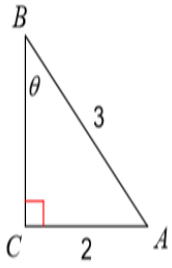


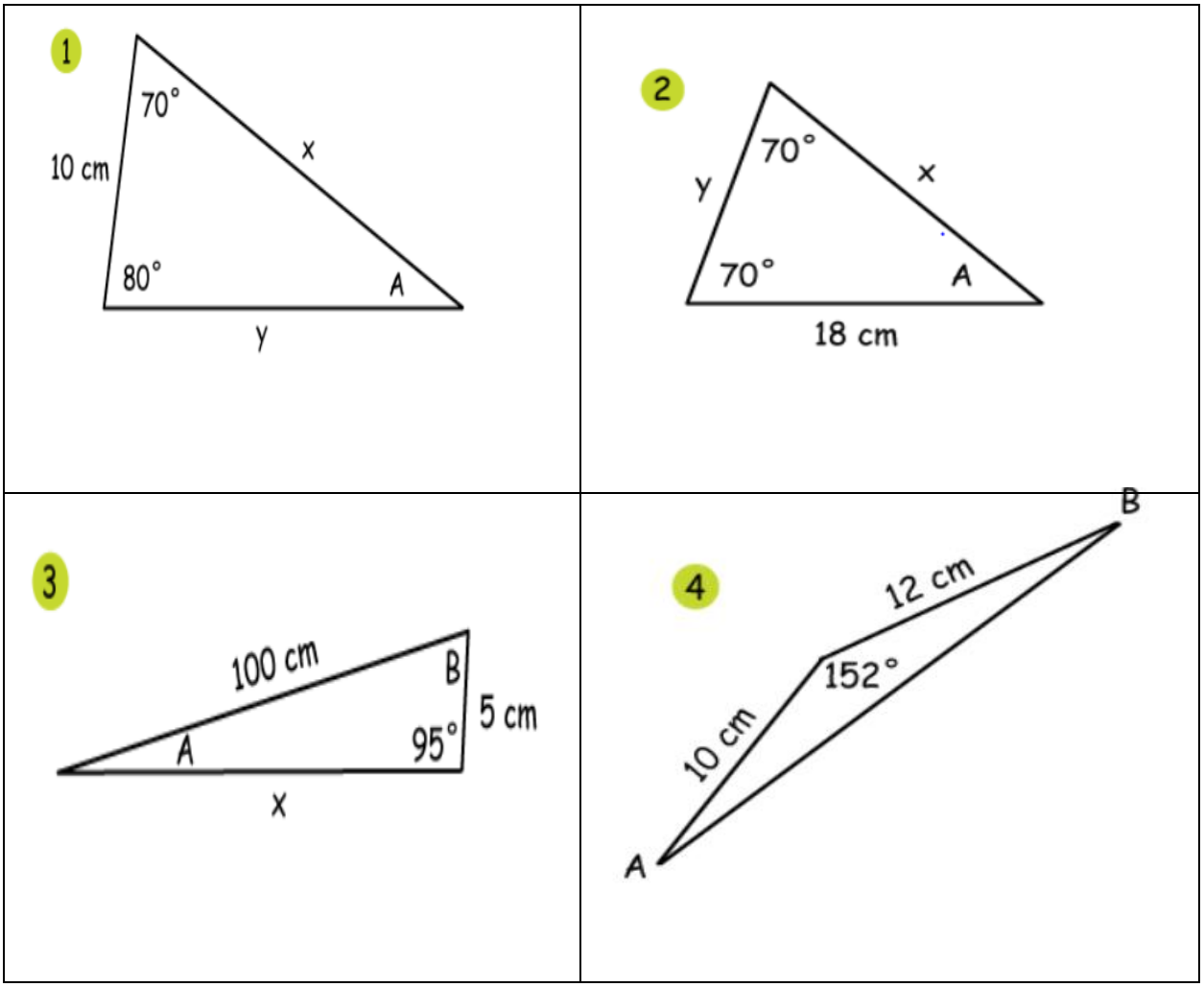
14)

Woking Area:

4- From a point 120 m horizontally from the base of a building, the angle of elevation to the top of the building is 34^0. Find the height of the building

Trigonometry in Non- Right Triangles

1- Find the measures of all missing sides and angles of these triangles:



Working Area:

2- Triangle ABC has m< ABC = 48^0, AB= 10cm, and AC =8cm. Show that m< ACB has two possible sizes. Give each answer correct to 3 significant figures

3- In triangle PQR, PQ is 10 cm, QR is 8 cm and angle PQR is acute. The area of the triangle is 20 cm^2. Find the size of angle $P\hat{Q}R$.

4- The following diagram shows triangle ABC.

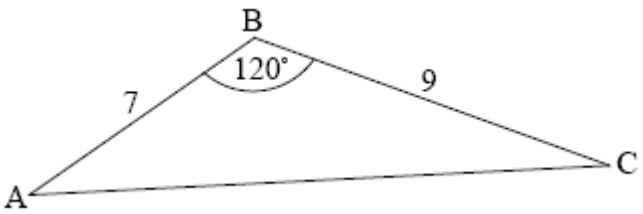


diagram not to scale

AB = 7 cm, BC = 9 cm and $A\hat{B}C = 120°$.

a) Find AC.

b) Find the area of triangle ABC.

5- The diagram below shows a triangle ABD with AB = 13 cm and AD = 6.5 cm.
Let C be a point on the line BD such that BC = AC = 7 cm.

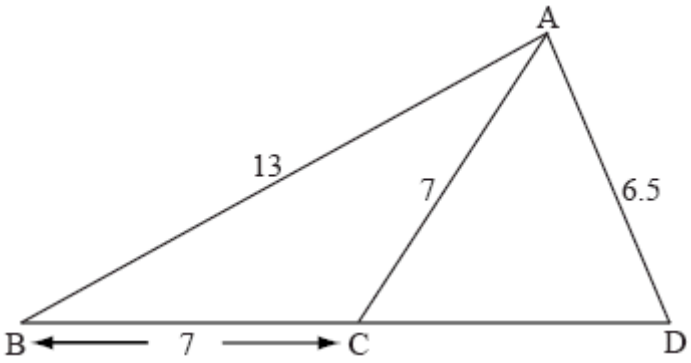


diagram not to scale

(a) Find the size of angle ACB.

(b) Find the size of angle CAD.

End of Summer Pack