

Jeddah Knowledge International School



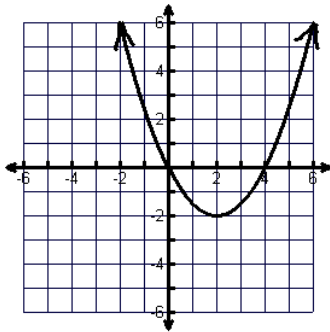
MATHEMATICS SUMMER PACK GRADE 10 GOING TO GRADE 11

Name: _____

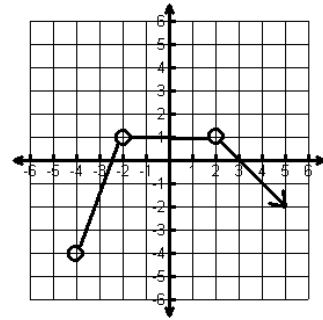
Section: _____

Functions

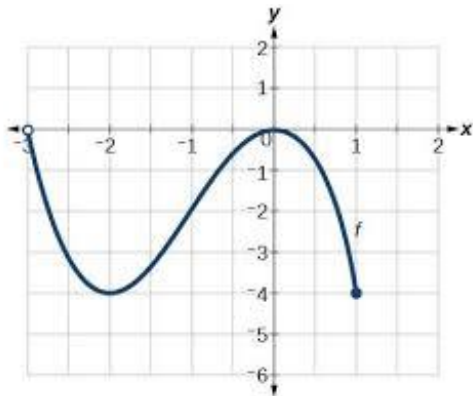
1) Find the domain and range. Decide whether it is a graph of a function.



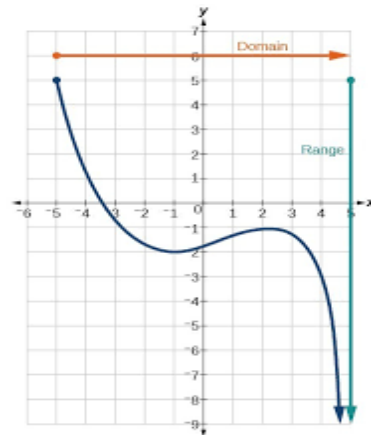
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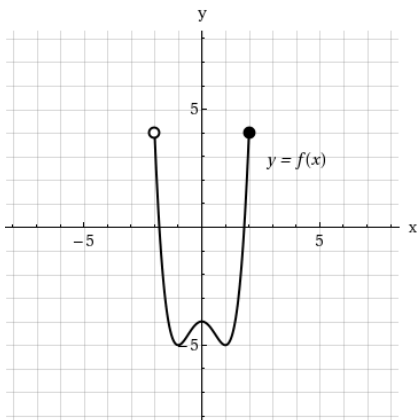
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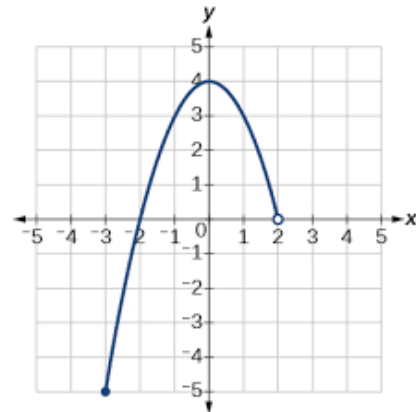
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Function Notation

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 $h(x) = -2$

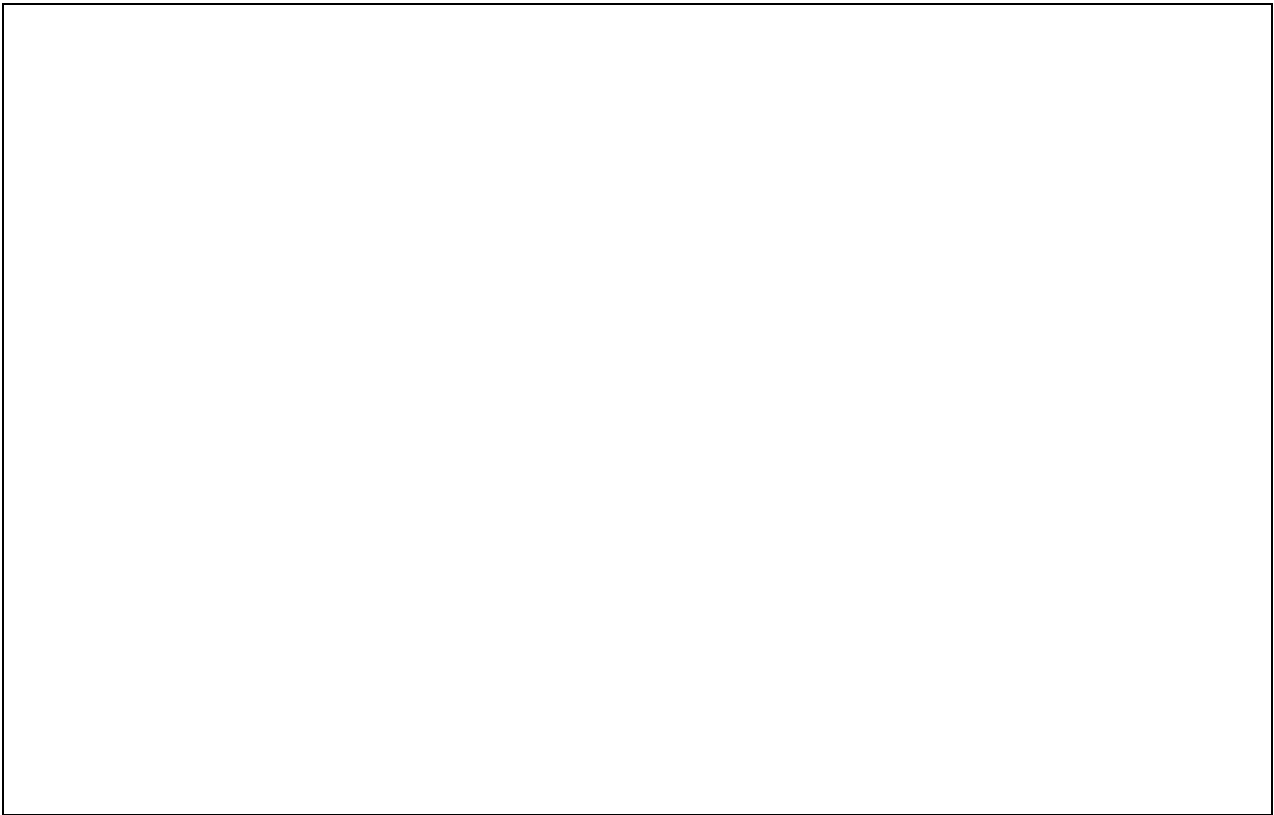
j. Find x if $f(x) = 23$

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 below.

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

$$16x^2 + 5 = 40x$$

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

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

$$x^2 + 13x = -42$$

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

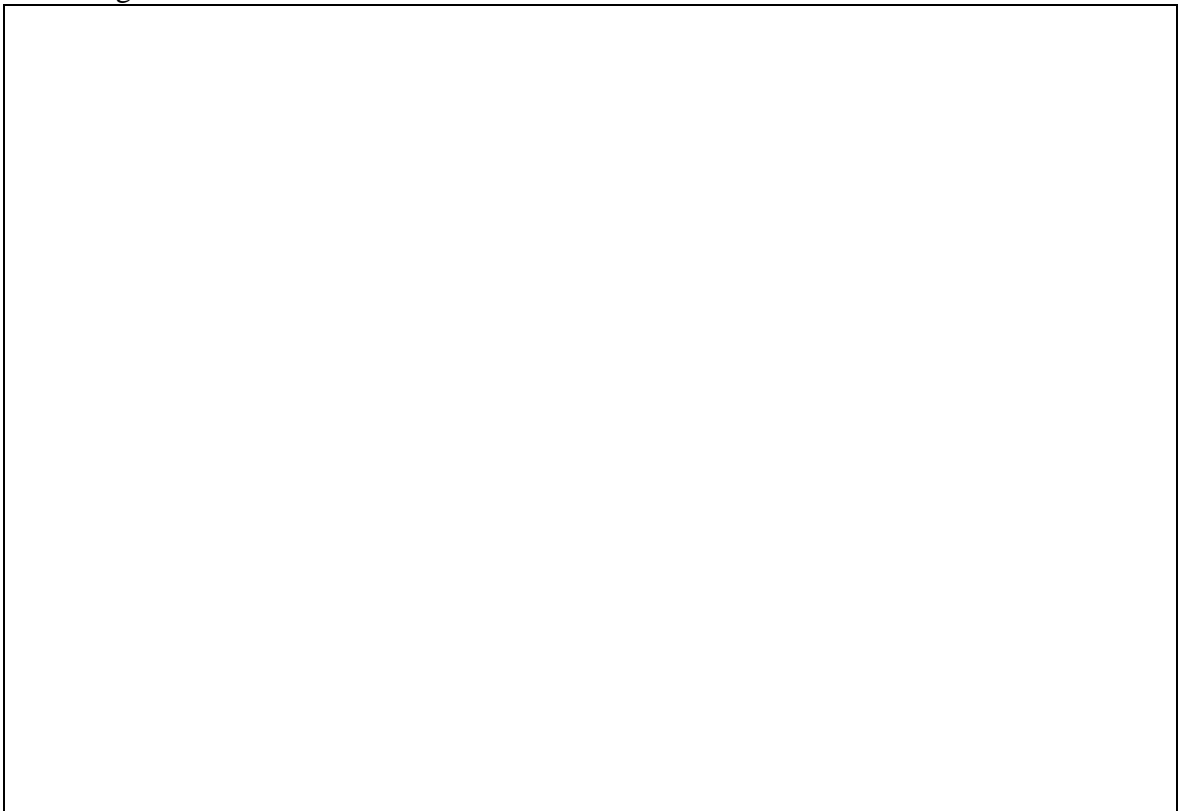
$$x^2 + 8x - 4 = 0$$

$$x^2 + x - 30 = 0$$

$$x^2 + 16 = 12x$$

$$5x^2 = 5x$$

Working Area:



8) Use the quadratic formula to solve for x .

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

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

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

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

$$x(x + 2) = 143$$

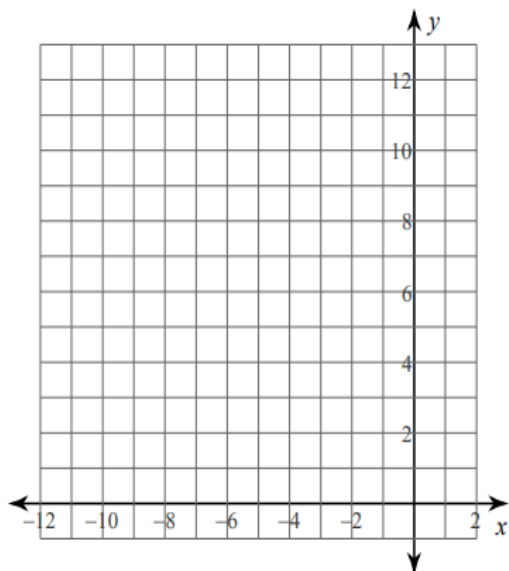
$$(x + 1)(x + 2) = 30$$

Working Area

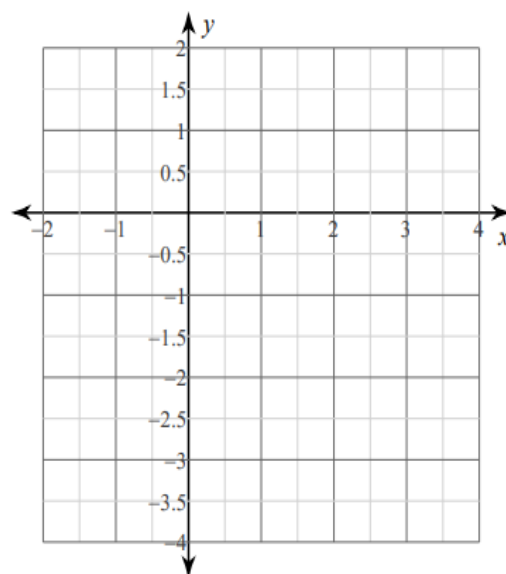


9) Graph the following Quadratic functions:

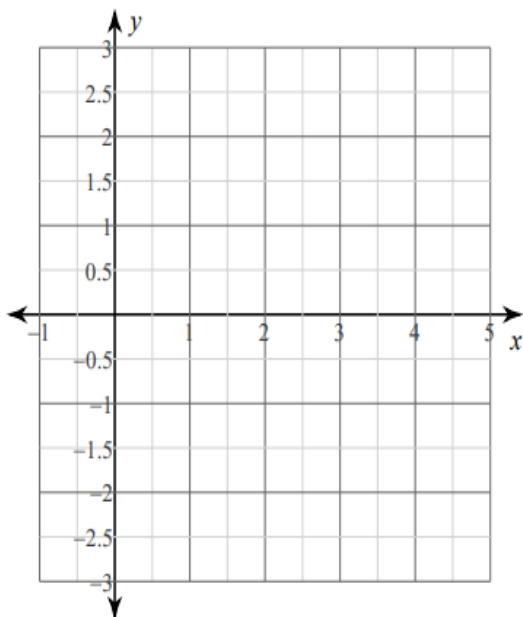
1) $y = 3x^2$



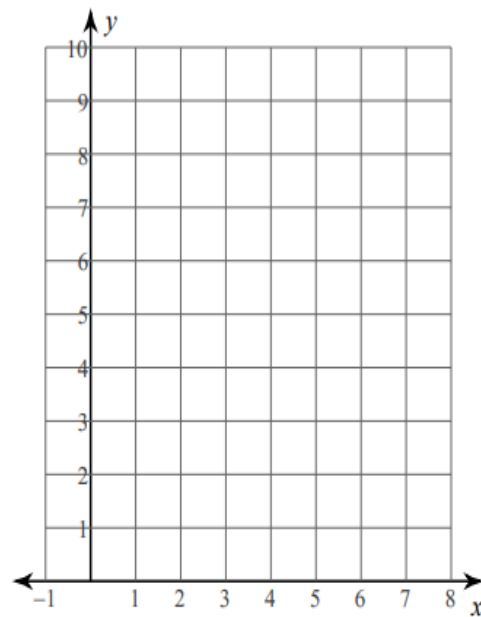
2) $y = -\frac{1}{2}x^2$



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:

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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) $\frac{5p - 15}{p^2 - 4}$

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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:

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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) $\frac{12p^3}{q^2} \times \frac{q^5}{4p^4}$

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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) $\frac{x}{2y} \div 4$

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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:

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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) $\sqrt{x} = y$

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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) $\log 0.3$

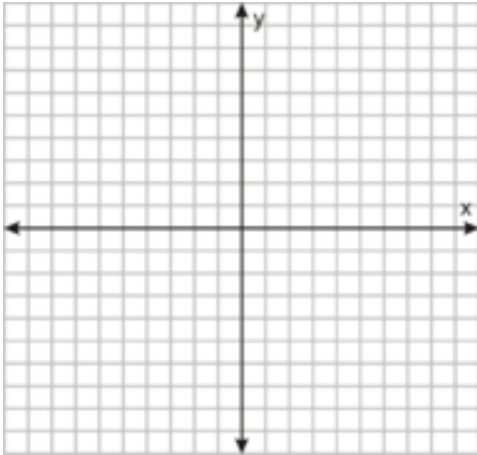
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4. Graph the following functions:

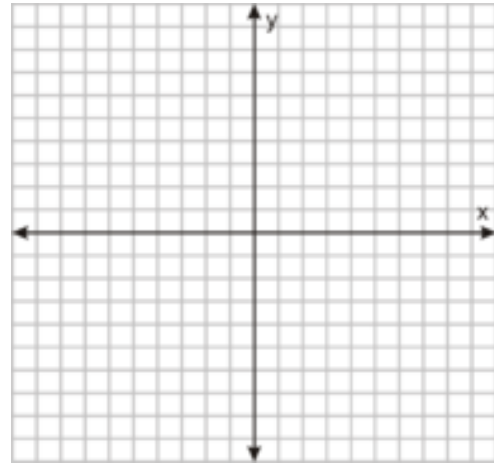
1. $f(x) = 3^x$

| | | | | | |
|---|--|--|--|--|--|
| x | | | | | |
| y | | | | | |



2. $f(x) = \text{Log}_3 x$

| | | | | | |
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| 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)

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3. Find the first four terms of the sequence with n th term:

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

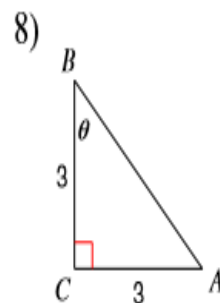
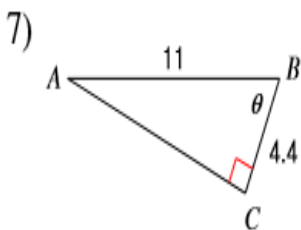
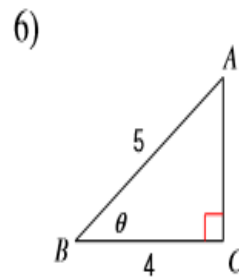
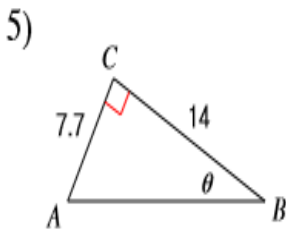
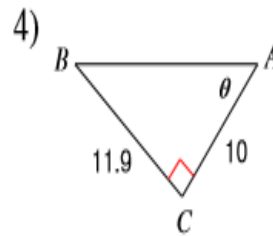
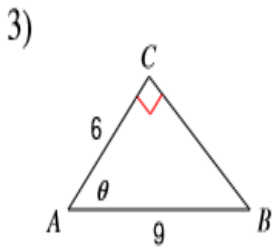
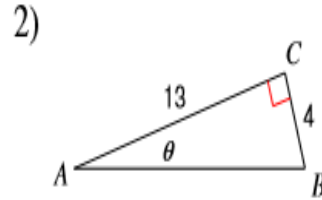
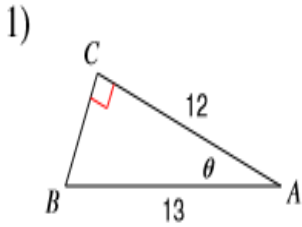
4. Find a formula for the general term u_n of the arithmetic sequence: 3, 6, 9, 12,
5. Find a formula for the general term u_n of the geometric sequence: 2, 4, 8, 16,

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Trigonometry in Right Triangles

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



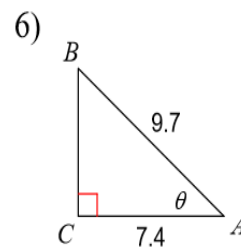
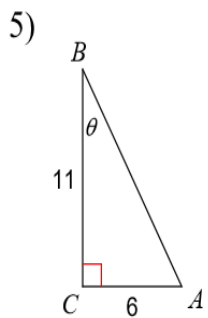
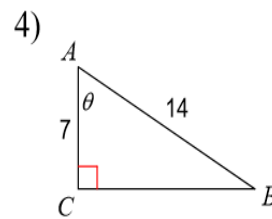
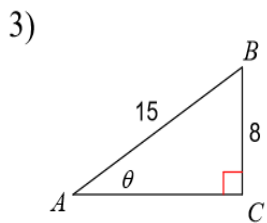
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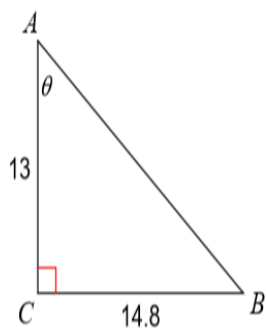
2- Find the values of the three trigonometric functions for each triangle. Give exact answers.



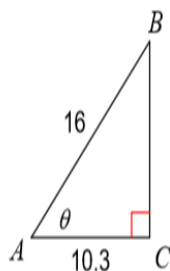
3- Find the measure of each angle indicated. Round to the nearest tenth.



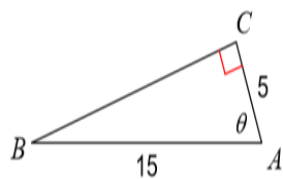
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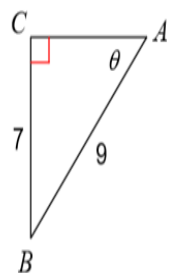
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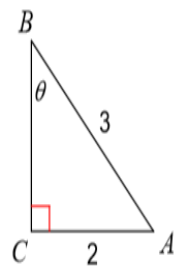
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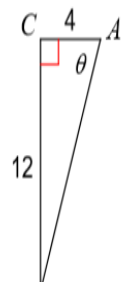
12)



13)



14)



Working Area:

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- 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° . Find the height of the building



Trigonometry in Non- Right Triangles

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

| | |
|-----------------|-----------------|
| <p>1</p> | <p>2</p> |
| <p>3</p> | <p>4</p> |

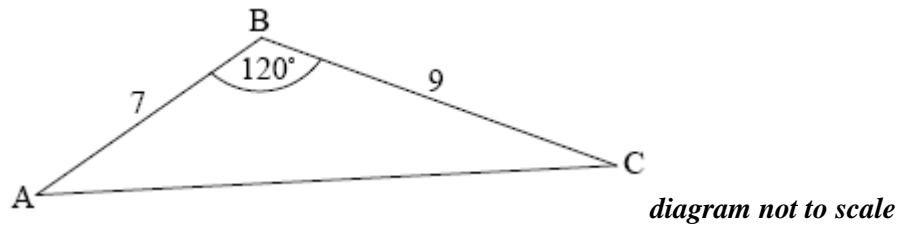
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- 2- Triangle ABC has $m\angle ABC = 48^\circ$, $AB = 10\text{cm}$, and $AC = 8\text{cm}$. Show that $m\angle ACB$ has two possible sizes. Give each answer correct to 3 significant figures

- 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 \hat{PQR} .

4- The following diagram shows triangle ABC.



$AB = 7$ cm, $BC = 9$ cm and $\hat{A}BC = 120^\circ$.

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.

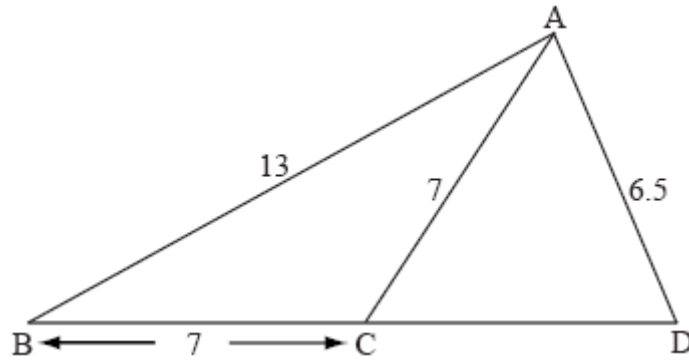
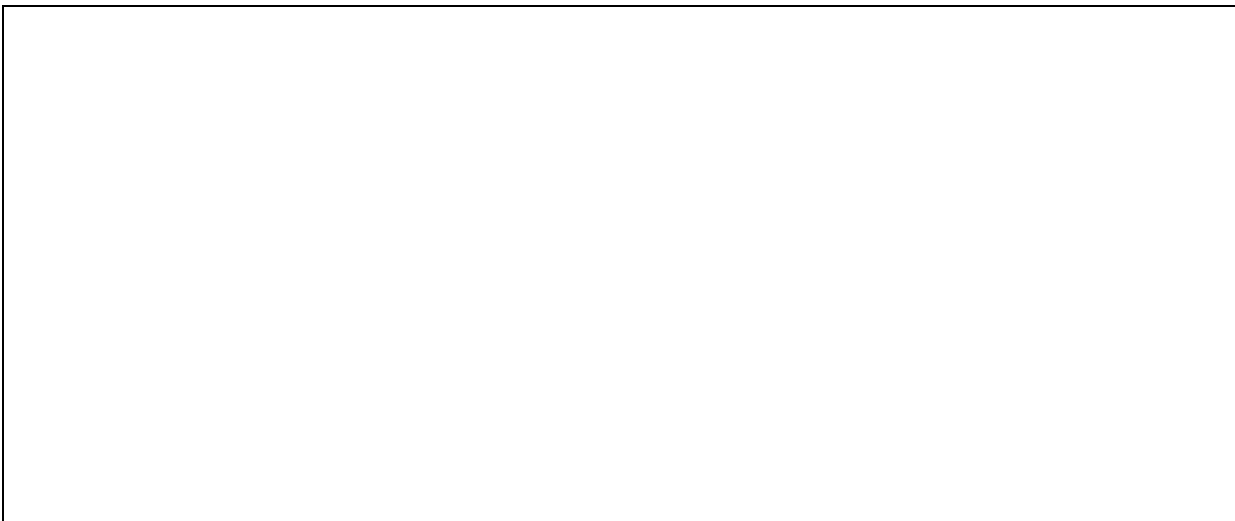


diagram not to scale

- (a) Find the size of angle ACB.
- (b) Find the size of angle CAD.



End of Summer Pack