PART A

Calculators are allowed.   Score: | /50 |

Fill-in-the-blanks Section (1 mark each)

1) The sequence **18, 12, 6, ...** is an example of a(n) _____ sequence with the common
(arithmetic/geometric)
_____ of _____ .
(difference/ratio)

2) If the general term of a sequence is $t_n = 5(-3)^{n-1}$, the sequence has the first term of _____, and the

common ratio of _____ .

3) Completely simplified form of the radical $\sqrt{44}$ is _____

4) The first step in rationalizing the denominator of the expression $\frac{5\sqrt{3}}{1+\sqrt{2}}$ should be to multiply the numerator

and the denominator by _____

5) The simplified form of $5\sqrt{x} - 3 + \sqrt{x} + 1$ is _____

6) Another angle smaller than 360° that has the same cosine ratio as the angle 187° is _____

7) In a non-right triangle where **all 3 sides are known**, we can use the _____ Law to solve for
any one of the angles.

8) The **sine is negative** and the **tangent is positive** in the _____ quadrant.

9) The greatest common factor in the expression $2x^2y + 4x^2y^3$ is _____

10) Factored form of $16x^2 - 9$ is _____ .

11) The roots of the equation $x(x - 1)(x + 4)$ are _____

12) The restrictions on the variable in the equation $6 - \sqrt{x - 5} = 2$ are _____

13) The parabola with the equation $y = -(x - 5)^2 + 8$ opens _____, and has the vertex at _____
(up/down)

14) Which value(s) of the discriminant mean that the quadratic equation has **no real roots?**_____

15) The quadratic function $f(x) = 4(x + 1)^2$ has a _____ of _____ at _____ . | /15 |
(max/min)

Short Response Questions (2 marks each)

Show work!! Put answers in the boxes provided.

16) A scientist starts an experiment with 6 bacteria in the first culture. The second culture contains 3 times more bacteria than the first. The third culture has 3 times more than the second, and so on.

a) How many bacteria are there in the 7th culture?

Answer: [   ]   /2

b) The scientist starts the experiment with 11 cultures. How many bacteria are there at the start of the experiment?

Answer: [   ]   /2

17) Simplify completely: $2\sqrt{8}(5\sqrt{2} - 3\sqrt{5})$

Answer: [   ]   /2

18) If the point $(-5, \sqrt{5})$ lies on the terminal arm of angle θ in standard position, what is the exact value of $\cos \theta$ in simplified (and rationalized) radical form?

[/8   ]

Answer: [   ]   /2

19) Solve the equation: $(x + 1)(x - 3) = 60$

Answer: [   ] /2

20) Use the quadratic formula to solve the equation: $x^2 + 5x + 3 = 0$ *(answer in simplified radical form)*

Answer: [   ] /2

21) What is the y-intercept of the parabola $y = -2(x + 3)^2 - 6$?

Answer: [   ] /2

/6

25) Solve: $x - 4 = \sqrt{x + 2}$. Remember to check your answers and reject extraneous solutions if they exist.

/5

26) Write the equation of a parabola that has the vertex $(3, -2)$ and passes through the point $(5, 0)$.

/3

27) Complete the square to change $y = 3x^2 - 18x + 2$ into the $y = a(x - p)^2 + q$ form.

Vertex: _____ Equation of the axis of symmetry: _____

/4

/12

Full Response Questions (marks are awarded for the clarity and accuracy of each step within solutions)

22) Determine the sum of the series: $-3.2 - 3 - 2.8 - \cdots + 16.4$

/3

23) Rationalize the denominator:

$$\frac{4\sqrt{2}}{\sqrt{3} - 1}$$

/3

24) Determine all angles in the shown triangle. Note that the angle B is obtuse. Round answers to the nearest degree (no decimals).

/3

/9

25) Solve: $x - 4 = \sqrt{x + 2}$. Remember to check your answers and reject extraneous solutions if they exist.

/5

26) Write the equation of a parabola that has the vertex $(3, -2)$ and passes through the point $(5, 0)$.

/3
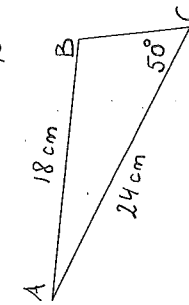
27) Complete the square to change $y = 3x^2 - 18x + 2$ into the $y = a(x - p)^2 + q$ form.

/4

Vertex: _____ Equation of the axis of symmetry: _____

/12

Full Response Questions (marks are awarded for the clarity and accuracy of each step within solutions)

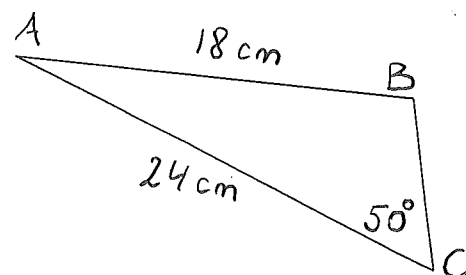22) Determine the sum of the series: $-3.2 - 3 - 2.8 - \cdots + 16.4$

/3

23) Rationalize the denominator: $\dfrac{4\sqrt{2}}{\sqrt{3}-1}$

/3

24) Determine all angles in the shown triangle. Note that the angle B is obtuse. Round answers to the nearest degree (no decimals.

/3

/9

/3

Name: _____   _____

Calculators are allowed.   Score: | /26 |

Short Response Questions (2 marks each)

Show work. Place answers in the box

1) Determine the nonpermissible value(s) of the variable in the expression: $\dfrac{(x+4)(x-5)}{x(x-5)(x+2)}$

Answer: | | /2

2) Reduce the expression $\dfrac{x^2-3x-10}{x^2-4}$ to lowest terms, provided that $x \neq \pm 2$

Answer: | | /2

3) Simplify completely: $\dfrac{5}{2y} - \dfrac{3}{4y} + \dfrac{4}{y}$, provided that $y \neq 0$

Answer: | | /2

| /6 |

4) Simplify $\dfrac{m^2-m-12}{m+3} \div \dfrac{3m-12}{m^2-9}$ and state the restrictions.

Answer: [ ]   /2

5) What are the solutions of the equation $|x-4| = 5$?

Answer: [ ]   /2

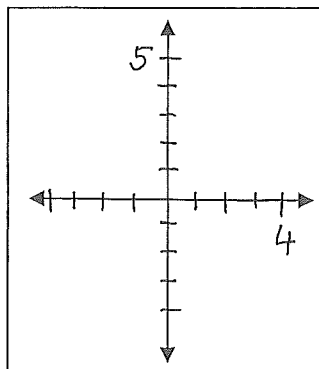**6)** Solve the system of equations by substitution:

$y = 2x$

$y = x^2 + 2x - 9$

Answer: [ ]   /2

7) Sketch and shade the part of the plane that

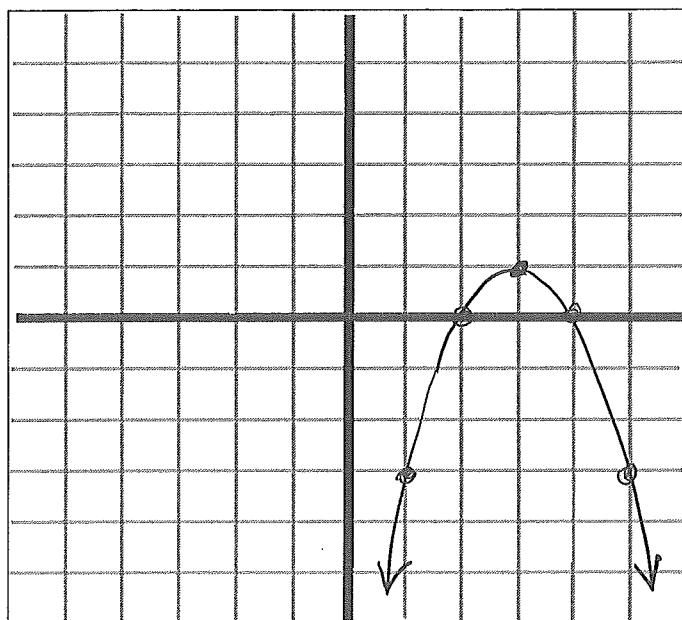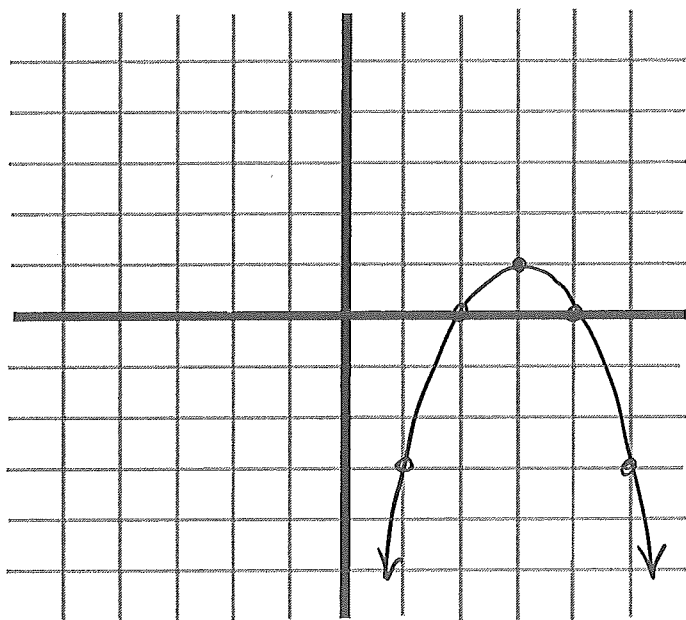represents the solution of the inequality $x - 2 < 0$

Answer:

/2

[/8]

10) Diagrams below show the graph of the function $f(x) = -(x-3)^2 + 1$

a) Graph the function $y = |f(x)|$ (1 mark)

b) Graph the function $y = \dfrac{1}{f(x)}$ (3 marks)

/4

/4

Full Response Questions (marks are awarded for the clarity and accuracy of each step within solutions)

8) State the nonpermissible value(s) and solve algebraically.

$$\frac{4x + 10}{x^2 - 1} = \frac{x}{x + 1} + 2$$

/4

9) Solve the inequality: $(x - 4)(x + 5) \geq 0$

/4

/8