

**Mathematics 1201
Common Mathematics Assessment**

Name: _____

Mathematics _____

Teacher: _____

Key

28 Selected Response
13 Constructed Response
FINAL

28 marks
42 marks

70 Marks

FORMULAE

Surface Area

Cylinder $2\pi r^2 + 2\pi rh$	Cone $\pi r^2 + \pi rs$	Sphere $4\pi r^2$
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Volume

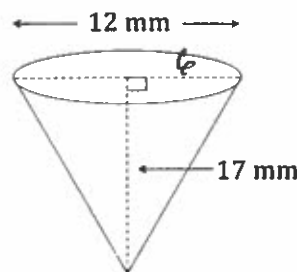
Pyramid $\frac{1}{3}Ah$	Cone $\frac{1}{3}\pi r^2 h$	Sphere $\frac{4}{3}\pi r^3$
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Selected Response:

Circle the appropriate response on the answer sheet or SCANTRON.

1. What is the slant height of a cone with diameter 12 mm and height 17 mm ?

- (A) 16 mm
- (B) 17 mm
- (C) 18 mm
- (D) 21 mm

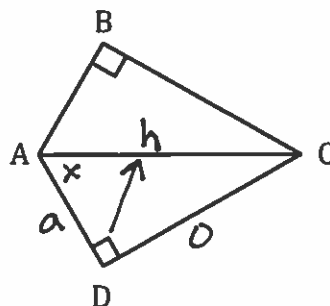


$$6^2 + 17^2 = S^2$$

$$S = 18.0$$

2. What is the *adjacent* side to $\angle DAC$?

- (A) AD
- (B) BA
- (C) CA
- (D) DC

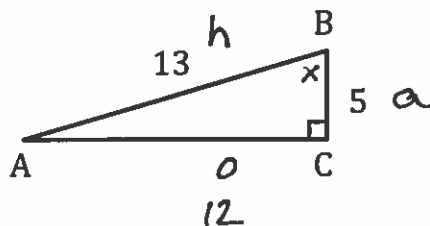


3. What is the measure of $\angle A$, to the nearest degree, if $\tan A = 0.8725$?

- (A) 34°
- (B) 41°
- (C) 49°
- (D) 61°

4. Which ratio represents $\sin B$?

- (A) $\frac{5}{13}$
- (B) $\frac{12}{13}$
- (C) $\frac{13}{12}$
- (D) $\frac{13}{5}$



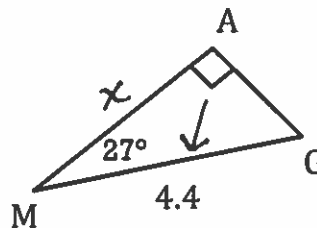
$$5^2 + x^2 = 13^2$$

$$x^2 = 144$$

$$x = 12$$

5. What is the length of side MA to the nearest tenth?

- (A) 2.0
- (B) 2.2
- (C) 3.9
- (D) 4.9



$$\cos 27^\circ = \frac{x}{4.4}$$

$$x = 3.9$$

6. Simplify: $\sqrt[3]{108}$

- (A) $3\sqrt[3]{4}$
- (B) $27\sqrt[3]{4}$
- (C) $6\sqrt[3]{3}$
- (D) $36\sqrt[3]{3}$

$$\sqrt[3]{27 \cdot 4}$$

$$3\sqrt[3]{4}$$

7. Which statement is true about 3600?

- (A) It is a perfect cube.
- (B) Its only factors are 360 and 10.
- (C) Its square root is an irrational number.
- (D) Its prime factorization is $2^4 \cdot 3^2 \cdot 5^2$.

8. What is $\sqrt[3]{5^2}$ expressed as a power?

- (A) $5^{-\frac{3}{2}}$
- (B) $5^{-\frac{2}{3}}$
- (C) $5^{\frac{2}{3}}$
- (D) $5^{\frac{3}{2}}$

9. A student did not receive full marks for her solution to the question below. In which step did she make the first error?

Simplify: $\frac{(a^{-2}b^7)^{-5}}{(a^2b^{-3})^3}$

Solution:

Step 1:

$$\frac{a^{-7}b^{12}}{a^5b^0}$$

Step 2:

$$a^{-7-5}b^{2-0}$$

Step 3:

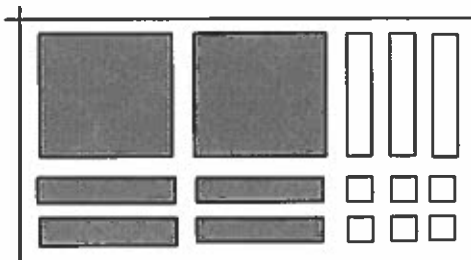
$$a^{-12}b^2$$

Step 4:

$$\frac{b^2}{-a^{12}}$$

- (A) 1
(B) 2
(C) 3
(D) 4

10. Which binomial product is modelled?



$$(2x-3)(x+2)$$

Note: = negative = positive

- (A) $(-2x + 3)(-x + 2)$
(B) $(-2x + 3)(x + 2)$
(C) $(2x - 3)(x + 2)$
(D) $(2x - 3)(x - 2)$

11. Expand and simplify: $(a - 3b)(2a - b)$

- (A) $2a^2 + 3b^2$
(B) $3a - 4b$
(C) $2a^2 - 7ab + 3b^2$
(D) $3a^2 - 6ab - 4b^2$

$$2a^2 - ab - 6ab + 3b^2$$

$$2a^2 - 7ab + 3b^2$$

12. What is the greatest common factor of $16x^2y^3$, $8x^3y^2$, and $-24x^3y^3$?

- (A) $4x^2y^2$
(B) $4x^3y^3$
(C) $8x^2y^2$
(D) $8x^3y^3$

$$8x^2y^2$$

13. Factor completely: $x^2 - 6x + 5$

- (A) $(x - 1)(x - 5)$
(B) $(x - 2)(x - 3)$
(C) $(x - 1)(x + 5)$
(D) $(x + 6)(x - 1)$

$$(x-5)(x-1)$$

14. Factor completely: $4x^2 - 36$

- (A) $2(2x^2 - 18)$
(B) $4(x^2 - 9)$
(C) $(2x - 6)(2x + 6)$
(D) $4(x - 3)(x + 3)$

$$4(x^2 - 9)$$

$$4(x-3)(x+3)$$

15. What is the missing value if the given polynomial is a perfect square trinomial?

- $25x^2 + [?] + 16$
- (A) $9x$
 - (B) $18x$
 - (C) $20x$
 - (D) $40x$

$$(5x + 4)(5x + 4)$$

$$25x^2 + 40x + 16$$

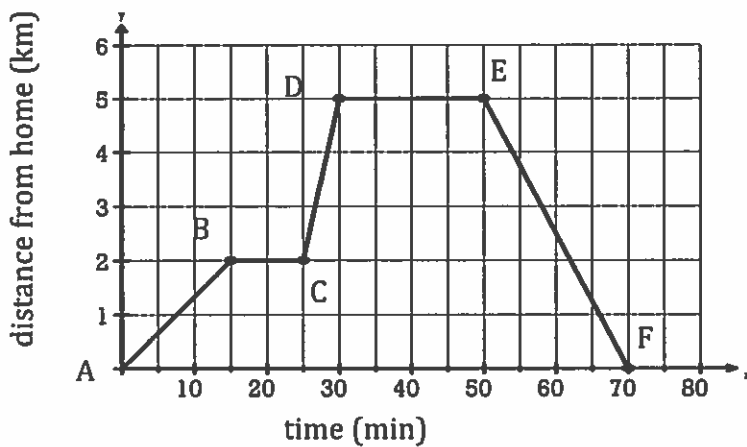
16. If the amount of gas remaining in your gas tank is affected by the distance travelled, what is the dependent variable?

- (A) the amount of gas in your tank
- (B) the amount of time
- (C) the cost of gas
- (D) the distance travelled

17. Which set of ordered pairs represents a function?

- (A) $\{(-3, -8), (-1, -7), (-2, -6), (-1, -5)\}$
- (B) $\{(-8, 0), (-6, 5), (4, -1), (7, 0)\}$
- (C) $\{(4, 1), (4, 2), (3, 4), (4, 4)\}$
- (D) $\{(2, 5), (3, 8), (4, 11), (2, 1)\}$

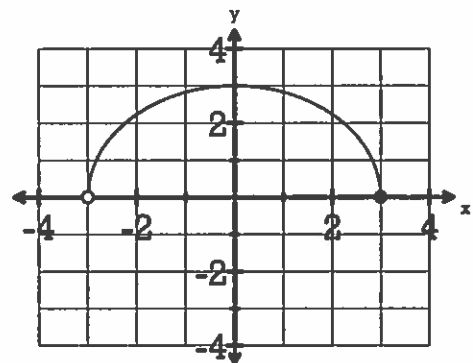
18. The graph describes Mackenzie's activity during a bike ride. What does segment EF represent?



- (A) Mackenzie stops at a friend's house.
- (B) Mackenzie rides downhill.
- (C) Mackenzie leaves home.
- (D) Mackenzie returns home.

19. What is the domain of the function shown?

- (A) $\{x \mid -3 < x \leq 3, x \in \mathbb{R}\}$
- (B) $\{x \mid -3 \leq x \leq 3, x \in \mathbb{R}\}$
- (C) $\{y \mid 0 \leq y \leq 3, y \in \mathbb{R}\}$
- (D) $\{y \mid -3 < y \leq 0, y \in \mathbb{R}\}$



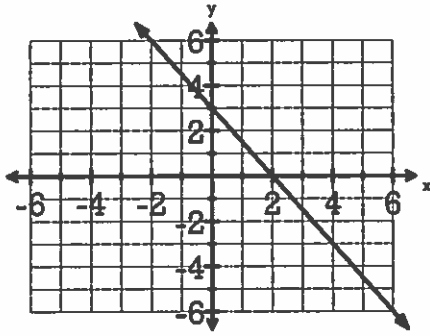
20. What is the rate of change in the given table?

- (A) $\frac{1}{5}$
- (B) $\frac{1}{2}$
- (C) 2
- (D) 5

d	C(d)
0	75
10	77
20	79
30	81
40	83

$$\frac{2}{10} = \frac{1}{5}$$

21. What is the equation of the line graphed?



- (A) $y = -\frac{3}{2}x + 2$
- (B) $y = -\frac{3}{2}x + 3$
- (C) $y = -\frac{2}{3}x + 2$
- (D) $y = -\frac{2}{3}x + 3$

22. What is the slope of a line **perpendicular** to $y = -\frac{1}{7}x + 5$?

- (A) -7
- (B) $-\frac{1}{7}$
- (C) $\frac{1}{7}$
- (D) 7

23. What is the equation of the line, in slope-point form, that has slope $\frac{4}{5}$, and passes through the point $(9, -1)$?

- (A) $y - 1 = \frac{4}{5}(x + 9)$
- (B) $y - 1 = \frac{5}{4}(x + 9)$
- (C) $y + 1 = \frac{4}{5}(x - 9)$
- (D) $y + 1 = \frac{5}{4}(x - 9)$

24. What is the expression for the slope between points (a, b) and (c, d) ?

- (A) $\frac{a - b}{c - d}$
- (B) $\frac{a - c}{b - d}$
- (C) $\frac{c - d}{a - b}$
- (D) $\frac{d - b}{c - a}$

25. Which system models the given situation?

A collection of nickels (n) and dimes (d) contains four times as many dimes as nickels. The total value of the collection is \$20.25.

(A) $\begin{cases} d = 4n \\ 0.05d + 0.10n = 20.25 \end{cases}$

(B) $\begin{cases} d = 4n \\ 0.10d + 0.05n = 20.25 \end{cases}$

(C) $\begin{cases} n = 4d \\ 0.05n + 0.10d = 20.25 \end{cases}$

(D) $\begin{cases} n = 4d \\ 0.10n + 0.05d = 20.25 \end{cases}$

26. How many solutions does the given system have?

$y = \frac{4}{6}x + 8$ $y = \frac{2}{3}x + 8$ // lines!
 $y = \frac{2}{3}x - 4$

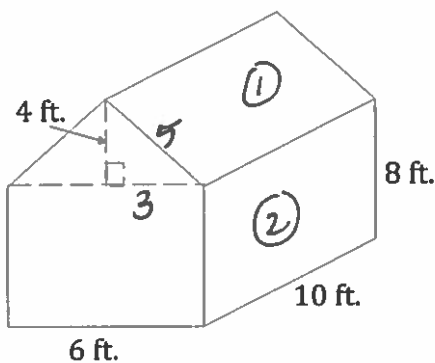
- (A) none
- (B) one
- (C) two
- (D) infinite

Constructed Response:

Answers to be written on this paper in the space provided. Show all workings.

27. A shed is constructed by using a rectangular prism for the walls with a triangular prism for the roof. Determine the surface area of the garage to the nearest square foot. (Do not include the shed floor.) [4 points]

$3^2 + 4^2 = h^2$
 $h = 5$
 $n = 5$



$A = \frac{1}{2}bh$
 $= \frac{1}{2}(6)(4)$
 $= 12 \text{ ft}^2$

$A = Lw$
 $= 10 \cdot 5$
 $= 50$

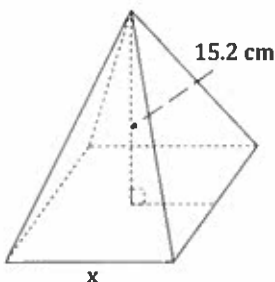
$SA_{\Delta} = 12 + 12 + 50 + 50$
 $= 124 \text{ ft}^2$

$SA_{\square} = 2Lh + 2Lh$
 $= 2(6)(8) + 2(10)(8)$
 $= 2 \cdot 48 + 2 \cdot 80$
 $= 256 \text{ ft}^2$

380 ft²

$TSA = 124 + 256 = 380$

28. A right square pyramid has a volume of 182.4 cm^3 . Determine the side length of its base to the nearest cm. [2 points]



$V = \frac{1}{3}x^2(15.2)$

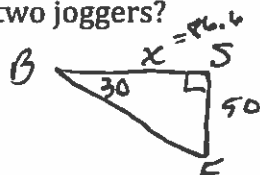
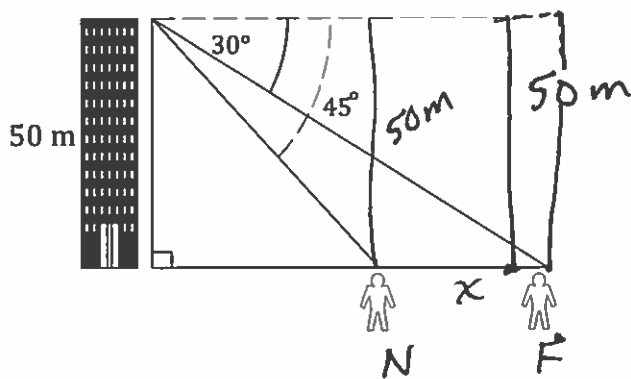
$182.4 = \frac{1}{3}x^2(15.2)$

$182.4 = 5.0\bar{6}x^2$

$x^2 = 36.00$

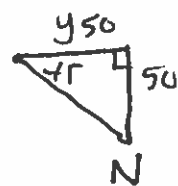
$x = 6 \text{ cm}$

29. From the top of a 50 m building, an observer spots two joggers. The first jogger is at an angle of depression of 45° and the second is at an angle of depression of 30° . How far apart (to the nearest tenth of a metre) are the two joggers? [4 points]



$$\tan 30 = \frac{50}{x}$$

$$x = 86.6 \text{ m}$$

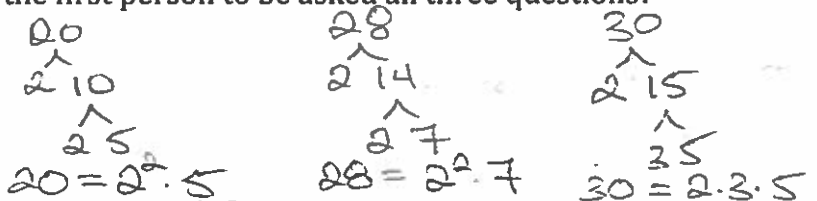


$$\tan 45 = \frac{50}{x}$$

$$x = 50 \text{ m}$$

$$86.6 - 50 = 36.6 \text{ m}$$

30. A polling organization uses the telephone book to randomly select people for a survey. They choose every 20th person to ask question #1, every 28th person to ask question #2, and every 30th person to ask question #3. In which position in the phone book is the first person to be asked all three questions? [3 points]



$$LCM = 2^2 \cdot 3 \cdot 5 \cdot 7 = 420$$

the 420th position

31. The area of a square is $121x^4y^2$. What is the expression for the perimeter of the square? [2 points]

$$s = \sqrt{121x^4y^2} = 11x^2y$$

$$P = 44x^2y$$

32. Simplify: $\left(\frac{-54x^6y}{2x^{-3}y^4}\right)^{\frac{4}{3}}$ [4 points]

$$= (-27x^9y^{-3})^{\frac{4}{3}} = (\sqrt[3]{-27})^4 x^{12} y^{-4}$$

$$= \frac{81x^{12}}{y^4}$$

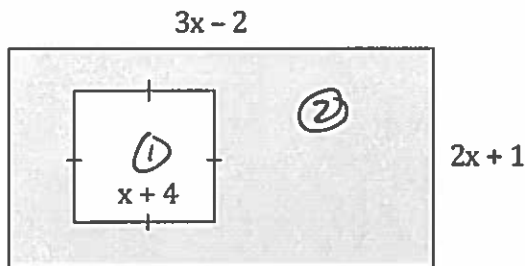
33. Expand and simplify: $(2x - 5)(x + 7)^2$ [3 points]

$$(2x - 5)(x^2 + 14x + 49)$$

$$2x^3 + 28x^2 + 98x - 5x^2 - 70x - 245$$

$$2x^3 + 23x^2 + 28x - 245$$

34. Determine the expression, in simplest form, for the area of the shaded region: [3 points]



$$A_1 = (x+4)(x+4)$$

$$= x^2 + 4x + 4x + 16$$

$$= x^2 + 8x + 16$$

$$A_2 = (3x-2)(2x+1)$$

$$= 6x^2 + 3x - 4x - 2$$

$$= 6x^2 - x - 2$$

$$TA = (6x^2 - x - 2) - (x^2 + 8x + 16)$$

$$= 6x^2 - x - 2 - x^2 - 8x - 16$$

$$= 5x^2 - 9x - 18$$

35. Factor completely: $5x^2 - 9x - 18$ [3 points]

$$P = -90$$

$$S = -9$$

$$6, -15$$

$$5x^2 - 15x + 6x - 18$$

$$5x(x-3) + 6(x-3)$$

$$(5x+6)(x-3)$$

36. The cost of printing advertising flyers for a school play is represented by the function $C(f) = 0.80f + 10.00$, where C is total cost in dollars and f is the number of flyers. [4 points]

a) If $C(f) = 86.00$, determine the value of f . Explain what this situation means.

$$\begin{array}{r} 86 = 0.8f + 10 \\ -10 \quad \quad -10 \\ \hline 76 = 0.8f \end{array}$$

$$\frac{76}{0.8} = \frac{0.8f}{0.8} \quad \text{It costs } \$86 \text{ to print } 95 \text{ flyers.}$$

$$f = 95$$

b) Does this function represent discrete or continuous data? Explain.

discrete, can't have $\frac{1}{2}$ a flyer!

39. Write the equation, in the form $Ax + By + C = 0$, of the line that passes through the points $(4, 5)$ and $(-6, 10)$. [3 points]

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 5}{-6 - 4} = \frac{5}{-10} = -\frac{1}{2}$$

$$y - y_1 = m(x - x_1)$$

$$y - 10 = -\frac{1}{2}(x + 6)$$

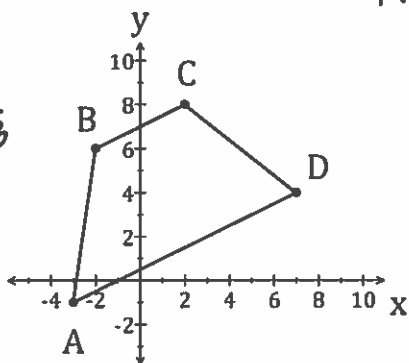
$$2y - 20 = -(x + 6)$$

$$2y - 20 = -x - 6$$

$$x + 2y - 14 = 0$$

40. A trapezoid is defined as a quadrilateral with exactly one pair of parallel sides. Show that the points $A(-3, -1)$, $B(-2, 6)$, $C(2, 8)$, and $D(7, 4)$ can be joined to form a trapezoid. [3 points]

Prove $\overline{BC} \parallel \overline{AD}$



$$m_{BA} = \frac{6 + 1}{-2 + 3} = \frac{7}{1} = 7$$

$$m_{CD} = \frac{4 - 8}{7 - 2} = \frac{-4}{5}$$

$\overline{BA} \not\parallel \overline{CD}$

$$m_{BC} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 6}{2 - (-2)} = \frac{2}{4} = \frac{1}{2}$$

$$m_{AD} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 + 1}{7 + 3} = \frac{5}{10} = \frac{1}{2}$$

Since $\overline{AD} \parallel \overline{BC}$ it is a trapezoid.

So ABCD has exactly one pair of parallel lines!

41. Solve: $\begin{cases} \frac{3}{2}x - 2y = -8 \\ 4x + 3y = -13 \end{cases} \quad \times 2 \rightarrow \begin{cases} 3x - 4y = -16 \\ 4x - 3y = -13 \end{cases} \quad \times 4$ [4 points]

$$\begin{array}{r} 12x - 16y = -64 \\ -12x + 9y = 39 \\ \hline -7y = -25 \\ y = \frac{25}{7} \end{array}$$

$$\begin{array}{r} 4x + 3y = -13 \\ 4x + \frac{3}{1}(\frac{25}{7}) = \frac{-13}{1} \\ 4x = \frac{-13}{1} - \frac{75}{7} \\ 4x = \frac{-91}{7} - \frac{75}{7} \end{array}$$

$$\frac{1}{4} \times 4x = \frac{-166}{7} \times \frac{1}{4}$$

$$x = \frac{-166}{28} = \frac{-83}{14}$$

$$\left(-\frac{83}{14}, \frac{25}{7} \right)$$