Key

Eastern
School District

Grade 9 Mathematics
Common Mathematics Assessment

June 11, 2013

Name:
Mathematics
Teacher:

Selected Response   25 marks
Constructed Response   35 marks

FINAL   **60 Marks**

Calculator permitted.

Diagrams are NOT necessarily drawn to scale.

PART A - Selected Response:
Circle the appropriate response on the answer sheet or SCANTRON.

1. Which is a square number?

    (A)   0.09
    (B)   0.144
    (C) $\dfrac{6}{10}$
    (D) $\dfrac{16}{7}$

2. What is the square root of $\dfrac{32}{162}$?

    (A) $\dfrac{2}{3}$
    (B) $\dfrac{4}{9}$
    (C) $\dfrac{16}{81}$
    (D) $\dfrac{1024}{26\,244}$

    $\dfrac{32}{162} = \dfrac{16}{81}$

    $\sqrt{\dfrac{16}{81}} = \dfrac{4}{9}$

3. Which expression is equivalent to -5 ?

    (A) $-2^2 + (-2^0)$
    (B) $-2^2 - (-2^0)$
    (C) $(-2)^0 \times (-2)^2$
    (D) $(-2)^0 \div (-2)^2$

    $-4 + (-1) = -5$

4. An incorrect solution is shown for evaluating the expression below. In which step was the **first** mistake made?
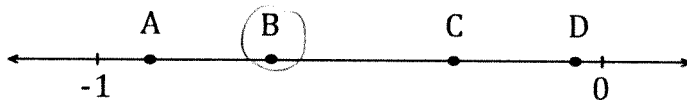 $$(-3)^2 + 2^2 \times 2^3 - 4^0$$

Step 1	$9 + 2^2 \times 2^3 - 4^0$
Step 2	$9 + 2^6 - 4^0$
Step 3	$9 + 64 - 1$
Step 4	74

    $\rightarrow 9 + 2^5 - 4^0$

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

5. Which number is between $-\dfrac{1}{4}$ and -0.3 ?

    (A) -0.08
    (B) -0.18
    (C) -0.28
    (D) -0.38

    $-0.25 , -0.30$
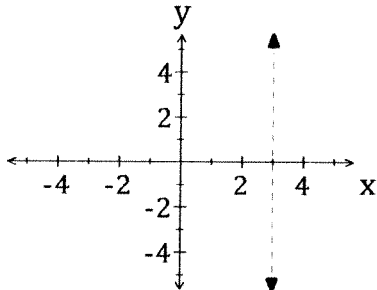
6. Which point is closest to $-\frac{2}{3}$?

(A)   A
(B)   B
(C)   C
(D)   D

7. Which point would lie on the line $2x - 3y = -7$?

(A) $(-2,1)$
(B) $(-1,2)$
(C) $(1,-2)$
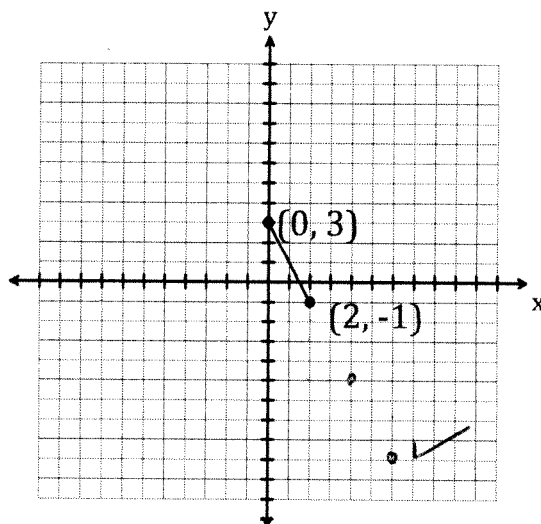(D) $(2,-1)$

$2(-2) - 3(1)$
$-4 - 3$
-7

8. What is the equation of the dashed line shown on the graph?

(A) $x + y = 3$
(B) $x - y = 3$
(C) $x = 3$
(D) $y = 3$

9. The graph represents a linear equation. Determine the value of y when $x = 6$.

(A) -9

(B) -7

(C) -5

(D) -1.5

$(0, 3)$

$(2, -1)$

10. Which equation would produce the given table of values?

(A) $y = -4.5x - 100$

(B) $y = -4.5x + 100$

(C) $y = 4.5x - 100$

(D) $y = 4.5x + 100$

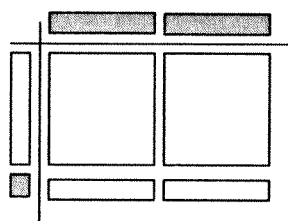| x	y
0	100
1	95.5
2	91
3	86.5
4	82
5	77.5

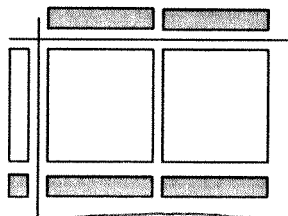$\rangle$ -4.5

11. What is a simplified expression for $(3x^2 - 5x + 2) + (1 - x + 6x^2)$?

(A) $3x^2 - 6x + 3$

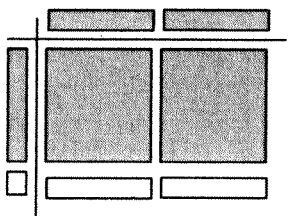(B) $4x^2 - 6x + 8$

(C) $4x^2 + 5x + 2$

(D) $9x^2 - 6x + 3$

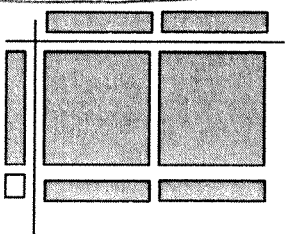12. Which model represents the product $2x(x - 1)$?

Note:

◼ = positive   ☐ = negative

(A)

(B)

(C)

(D)

13. What is the quotient of $\dfrac{16x^6 - 4x^2}{4x^2}$?

(A) $4x^3$

(B) $4x^4$

(C) $4x^3 - 1$

(D) $4x^4 - 1$

14. Solve: $\dfrac{10}{x} = 3$

    (A) $x = \dfrac{3}{10}$

    (B) $x = \dfrac{10}{3}$

    (C) $x = 7$

    (D) $x = 30$

15. Solve: $0.5(2x + 4) = 12$
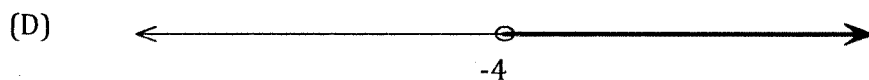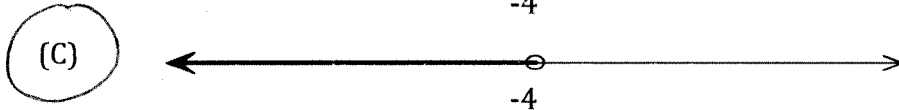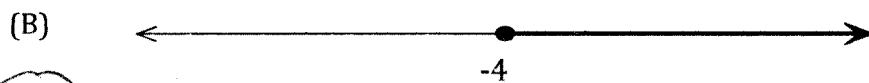
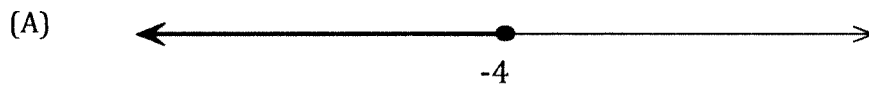   (A) $x = 8$

    (B) $x = 10$

    (C) $x = 14$

    (D) $x = 16$

(handwritten) $2x + 4 = 24$
$2x = 20$
$x = 10$

16. Which represents the solution set $x < -4$?

    (A)

    (B)

    (C)

    (D)

17. Which has solution $x \geq -3$?

    (A) $-3x + 2 \leq 11$

    (B) $-2x - 1 \geq 5$

    (C) $2x - 1 \geq 5$

    (D) $3x + 2 \leq 11$

(handwritten) $-3x + 2 \leq 11$
$-3x \leq 9$
$\dfrac{}{-3} \quad \dfrac{}{-3}$
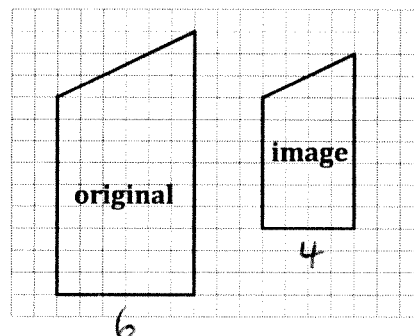$x \geq -3$

18. What is the scale factor for the image?
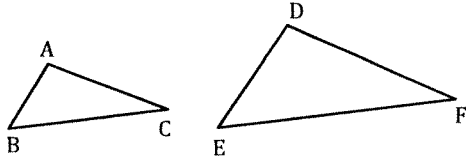
    (A) $\dfrac{1}{2}$

    (B) $\dfrac{2}{3}$

    (C) $\dfrac{3}{2}$

    (D) $\dfrac{2}{1}$

(handwritten) $\dfrac{4}{6} = \dfrac{2}{3}$

19. Given that $\triangle ABC \sim \triangle DEF$, which statement is true?

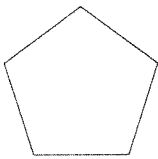$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

(A) $\dfrac{AB}{DE} = \dfrac{BC}{DF}$

(B) $\dfrac{BC}{EF} = \dfrac{AC}{FE}$

(C) $\dfrac{DE}{AC} = \dfrac{EF}{BC}$

(D) $\dfrac{DF}{AC} = \dfrac{EF}{BC}$

20. In the regular pentagon shown, what is the angle and order of rotational symmetry?

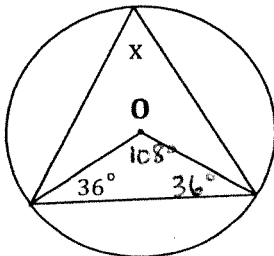(A) 60°, 6

(B) 72°, 5

(C) 90°, 4

(D) 120°, 3

21. Given the circle with center O, what is the value of x?
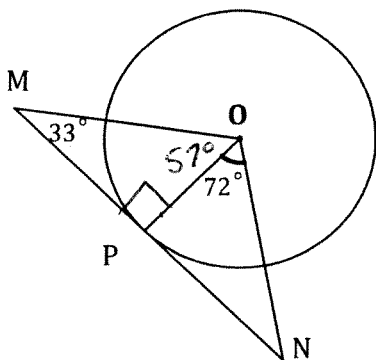
(A) 36°

(B) 54°

(C) 72°

(D) 108°

22. In the circle with center, O, and point of tangency, P, $\angle M = 33°$ and $\angle PON = 72°$. What is the measure of $\angle MON$?
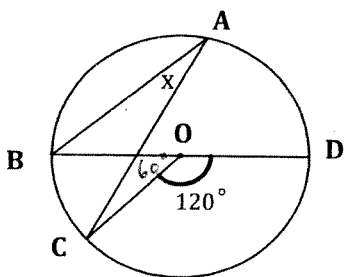
(A) 57°

(B) 105°

(C) 129°

(D) 147°

23. In the circle with center, O, $\angle COD = 120°$. Determine the value of x.
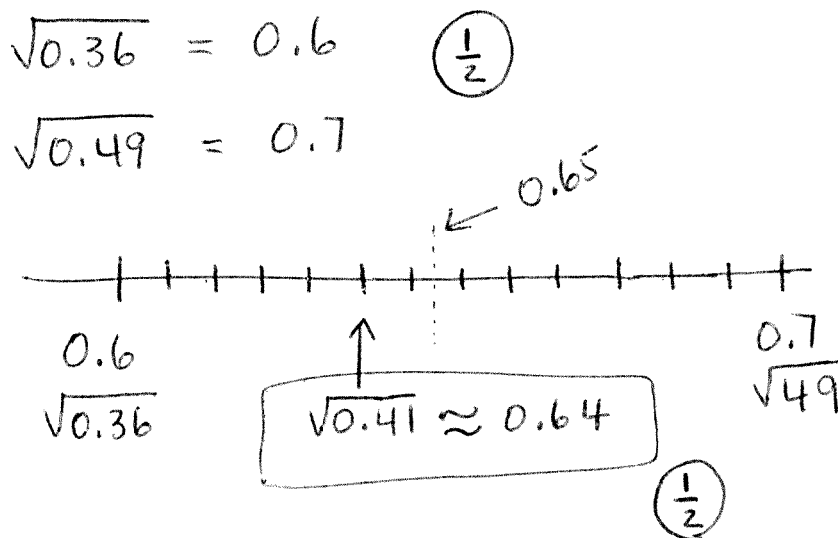

   (A)   30°
   (B)   40°
   (C)   50°
   (D)   60°

24. A teacher conducted a survey in her class by asking: *"Don't you think the school should provide paper and pencils for all students?"* What potential problem is present with the teacher's survey?

   (A)   cultural sensitivity
   (B)   privacy
   (C)   timing
   (D)   use of language

25. Which would best be surveyed using an entire population?

   (A)   taste-testing muffins in a bakery
   (B)   testing the volume of air a helium balloon would hold before breaking
   (C)   testing the length of time a battery will last
   (D)   testing seat belt buckles in a new vehicle

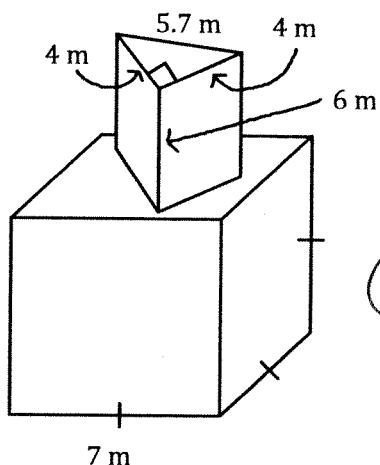**PART B - Constructed Response.**
Complete all questions on this paper. Show all workings for full credit.

26.   Use benchmarks to estimate $\sqrt{0.41}$ to two decimal places. Justify your answer.   [1 mark]

$$\sqrt{0.36} = 0.6 \quad \left(\tfrac{1}{2}\right)$$

$$\sqrt{0.49} = 0.7$$

0.65

0.6
$\sqrt{0.36}$

$\boxed{\sqrt{0.41} \approx 0.64}$

0.7
$\sqrt{49}$

$\left(\tfrac{1}{2}\right)$

27. Find the surface are of the composite figure shown. [3 marks]

① Cube: $SA = b \times h \times 6$
$= 7 \times 7 \times 6$
$= 294 \, m^2$

① Triangular Prism

Right $= 4 \times 6 = 24$
Left $= 4 \times 6 = 24$
Back $= 5.7 \times 6 = 34.\dot{2}$
Top $= \dfrac{b \times h}{2} = \dfrac{4 \times 4}{2} = 8$
Bottom $= 8$

$98.2 \, m^2$

Total SA $= 294 + 98.2 - \underbrace{16}_{overlap}$

① $= 376.2 \, m^2$

28. Write the given expression as a single power and evaluate. [2 marks]

$\dfrac{(3^9)(3^7)}{(3^6)^2}$ $\overset{\left(\frac{1}{2}\right)}{=} \dfrac{3^{16}}{3^{12}} \underset{\left(\frac{1}{2}\right)}{}$ $= 3^{16-12} = 3^4 = 81$

$\underbrace{\qquad\qquad}_{\left(\frac{1}{2}\right)}$ $\underset{\left(\frac{1}{2}\right)}{}$

29. Simplify the given expression. All calculations must be completed using fractional form. [3 marks]
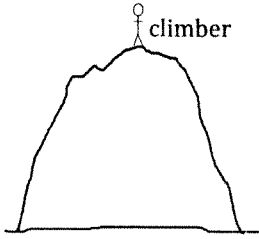
$$\tfrac{2}{3} \div \left(-\tfrac{1}{4}\right)^2 + \tfrac{1}{2} \times \tfrac{1}{3}$$

$= \tfrac{2}{3} \div \left(-\tfrac{1}{4}\right)\left(-\tfrac{1}{4}\right) + \tfrac{1}{2} \times \tfrac{1}{3}$

$= \tfrac{2}{3} \div \tfrac{1}{16} + \tfrac{1}{2} \times \tfrac{1}{3}$

$= \tfrac{2}{3} \times \tfrac{16}{1} + \tfrac{1}{2} \times \tfrac{1}{3}$

$= \tfrac{32}{3} + \tfrac{1}{6}$

$= \tfrac{64}{6} + \tfrac{1}{6}$

$= \tfrac{65}{6} = 10\tfrac{5}{6}$

① Order of Operations

② Calculations
4 @ $\left(\tfrac{1}{2}\right)$ each.

30. A mountain climber has to descend a distance of 750 m to the base of a [2 marks] mountain. He descends at a rate of 85.2 m per hour. Write and evaluate an expression to determine how far he is from the base of the mountain after 5 hours.

climber

$$750 \overset{\left(\frac{1}{2}\right)}{+} (-85.2) \overset{\left(\frac{1}{2}\right)}{\times} \overset{\left(\frac{1}{2}\right)}{5} = \overset{\left(\frac{1}{2}\right)}{324}m$$

$$\underline{\underline{or}} \quad 750 - (85.2) \times 5 = 324m$$

He is 324m from the base.
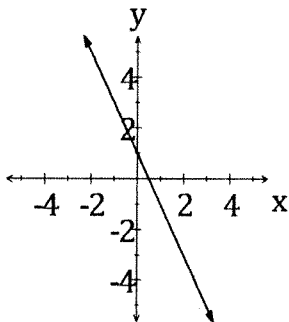
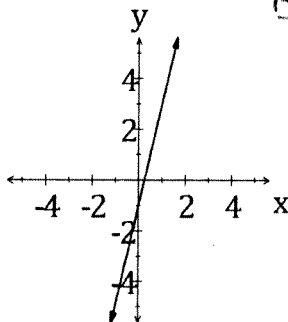31. Match the following equations with the appropriate graph. Justify your [2 marks] choice.

Equations

A: $4x - y = 1$

B: $4x + 2y = 2$

(Pick one point and sub. in.

$$(0,1) \quad \overset{or}{\underline{\underline{}}} \quad (0,-1)$$

A: 4(0)-1   A: 4(0)-(-1)
   0-1   0+1
   -1   ✗   1 ✓

B: 4(0)+2(1)
   0+2
   2 ✓

①)

Graph 1

Graph 2

EQUATION: __B__   EQUATION: __A__   ①

32. A line segment has a length represented by $6x^2 - 3x + 1$. If you remove a [2 marks] piece that has length $2x^2 - x + 4$, how long is the remaining piece?
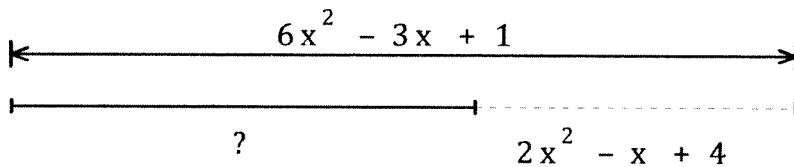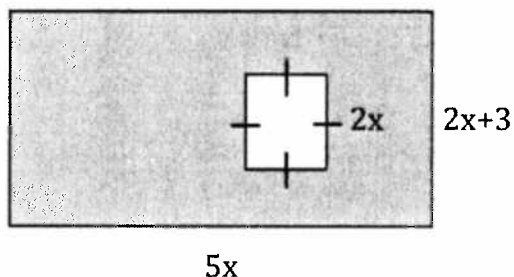

$$\left(6x^2 - 3x + 1\right) - \left(2x^2 - x + 4\right) \quad \left(\tfrac{1}{2}\right)$$

$$= 6x^2 - 3x + 1 - 2x^2 - (-x) - 4$$

$$= 6x^2 - 3x + 1 - 2x^2 + x - 4 \quad \left(\tfrac{1}{2}\right)$$

$$= 4x^2 - 2x - 3 \quad ①$$

33. Write a simplified polynomial for the shaded area: [2 marks]

$5x(2x+3) - 2x(2x)$

$= 10x^2 + 15x - 4x^2$ ①/2 ①/2

$= 6x^2 + 15x$ ①/2

$A = l \times w$ ①/2

34. Solve. All calculations must be completed using fractional form. [2 marks]

$\frac{4x}{7} + \frac{2}{3} = 2$

$\frac{4x}{7} = 2 - \frac{2}{3}$ ①/2

$\frac{4x}{7} = \frac{6}{3} - \frac{2}{3}$

$\frac{7}{4} \cdot \frac{4x}{7} = \frac{4}{3}$ ①/2 $\cdot \frac{7}{4}$ ①/2

$x = \frac{7}{3}$ ①/2

OR: $21\left(\frac{4x}{7}\right) + 21\left(\frac{2}{3}\right) = 21(2)$ ①/2

$3(4x) + 7(2) = 42$

$12x + 14 = 42$ ①/2

$12x = 42 - 14$

$12x = 28$

$x = \frac{28}{12} = \frac{7}{3}$ ①

OR ...

35. Without solving, verify that the solution to the given equation is $a = -10$. [1 mark]

$3.4(a - 5) = 5a - 1$

$LS = 3.4(-10-5)$ ①/2 $RS = 5(-10) - 1$

$= 3.4(-15)$ $= -50 - 1$

$= -51$ $= -51$

①/2 $LS = RS$, ∴ $a = -10$.

36. Two bus companies charge as follows for a trip:

Company A: $200 plus $2 per person

Company B: $100 plus $4 per person

Write an equation to determine the number of people (p) for which both [2 marks]
companies charge the same amount. **Solve** the equation algebraically.

$200 + 2p = 100 + 4p$ ①

$200 - 100 = 4p - 2p$ ①/2

$100 = 2p$

$\frac{100}{2} = \frac{2p}{2}$

$50 = p$ ①/2

Both companies charge the same amount for 50 people.

37. The cost to buy a pizza is $7 plus $1.50 for each topping added. Robyn has $20 to spend on a pizza.

a) Write an inequality and use it to determine the number of toppings, [2 marks] (t), that she could have on the pizza.

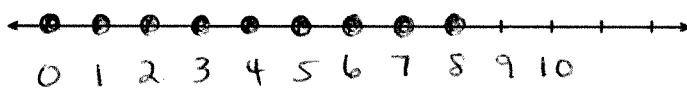$$1.50t + 7 \leq 20 \quad ①$$

$$1.50t \leq 20 - 7$$

$$1.50t \leq 13$$

$$t \leq \frac{13}{1.50}$$

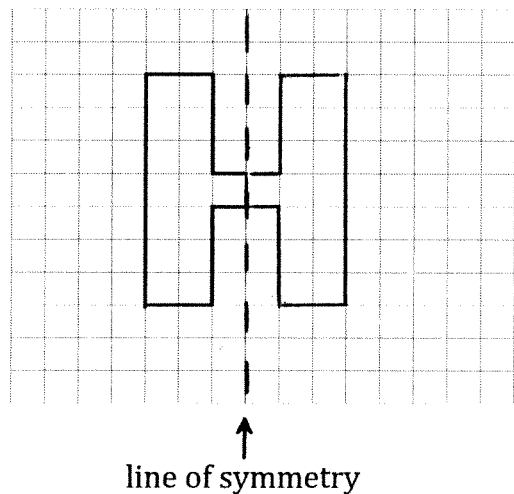$$t \leq 8.\overline{6} \quad or \quad 8\frac{2}{3}$$

Robyn can have up to 8 toppings.

① [1 mark]

b) Graph the solution to the inequality on the number line below.

$$0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9 \quad 10$$

$$(\tfrac{1}{2}) \quad 0 \leq t \leq 8$$

$$(\tfrac{1}{2}) \quad discrete$$

38. The partial figure shown represents half of a total figure. Use the line of [1 mark] symmetry to complete the entire figure.
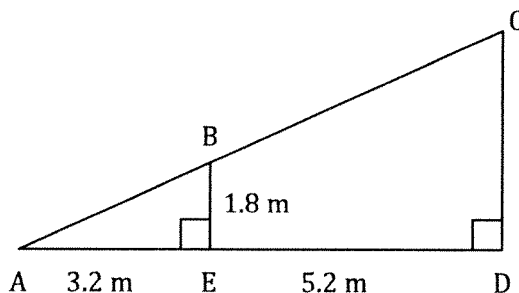

①

line of symmetry

39. Find the length of CD in the diagram below. Do not round. [2 marks] Justify your answer.

$$\frac{CD}{BE} = \frac{AD}{AE}$$

$$(\tfrac{1}{2}) \quad \frac{x}{1.8} = \frac{8.4}{3.2} \quad (\tfrac{1}{2})$$

A   3.2 m   E   5.2 m   D

B   1.8 m

C

$$\frac{3.2x}{3.2} = \frac{15.12}{3.2} \quad (\tfrac{1}{2})$$
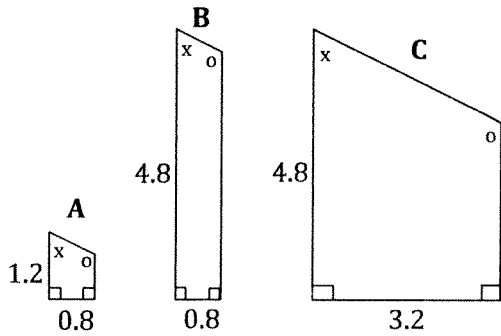
$$x = 4.725 m \quad (\tfrac{1}{2})$$

or Scale factor:

$$\frac{8.4}{3.2} = 2.625 \quad ①$$

$$2.625 \times 1.8 = 4.725$$

①

40. Which two polygons are similar? Justify your answer. [2 marks] ①

Polygon A is similar to
Polygon C because sides
are proportional.

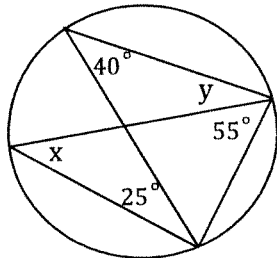$$\frac{4.8}{1.2} = 4 \qquad \frac{3.2}{0.8} = 4 \quad ①$$

OR: Sides within:

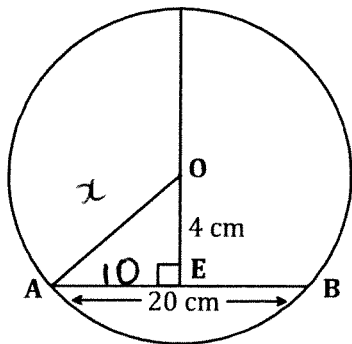A: $\frac{1.2}{0.8} = \boxed{1.5}$ B: $\frac{4.8}{0.8} = 6$ C: $\frac{4.8}{3.2} = \boxed{1.5}$

41. Determine the measures of angles x and y. [1 mark]

$x = \underline{40°}$ ⓵ $y = \underline{25°}$ ⓵

42. In the circle with center, O, $\overline{OE} = 4\,cm$ and $\overline{AB} = 20\,cm$. What is the [2 marks]
length of the diameter to the nearest tenth?

$$4^2 + 10^2 = x^2 \quad ⓵$$
$$16 + 100 = x^2$$
$$116 = x^2$$
$$\sqrt{116} = x$$
$$10.77 = x \quad ⓵$$

∴ diameter $= 2(10.77) = 21.5$ ⓵ cm

43. There are 10 green marbles and 6 red marbles in a container. Mary knows [2 marks]
there is a greater probability of choosing a green marble. Is this based on
experimental probability, theoretical probability, or subjective judgement?
Justify your answer. ①

This is theoretical probability since there
are more green than red marbles. ①

$\left(? \text{ OR}: P(G) = \frac{10}{16} = 62.5\% \right)$

Grade 9 Common Mathematics Assessment - June 2013
Answer Sheet

Student's Name_____

Math Teacher_____

1. (A)   B   C   D
2.   A   (B)   C   D
3. (A)   B   C   D
4.   A   (B)   C   D
5.   A   B   (C)   D
6.   A   (B)   C   D
7. (A)   B   C   D
8.   A   B   (C)   D
9. (A)   B   C   D
10. A   (B)   C   D
11. A   B   C   (D)
12. A   B   (C)   D
13. A   B   C   (D)
14. A   (B)   C   D
15. A   (B)   C   D
16. A   B   (C)   D
17. (A)   B   C   D
18. A   (B)   C   D
19. A   B   C   (D)
20. A   (B)   C   D
21. A   (B)   C   D
22. A   B   (C)   D
23. (A)   B   C   D
24. A   B   C   (D)
25. A   B   C   (D)