High School Mathematics Test 2013

Year 9

Coordinate Geometry

Calculator Allowed

Name_____

Skills and Knowledge Assessed:
- Find the distance between two points located on a Cartesian plane using a range of strategies, including graphing software (ACMNA214)
- Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software (ACMNA294)

Section 1   Short Answer Section

Write all working and answers in the spaces provided on this test paper.

Question 1 – 3 refer to the number plane shown.
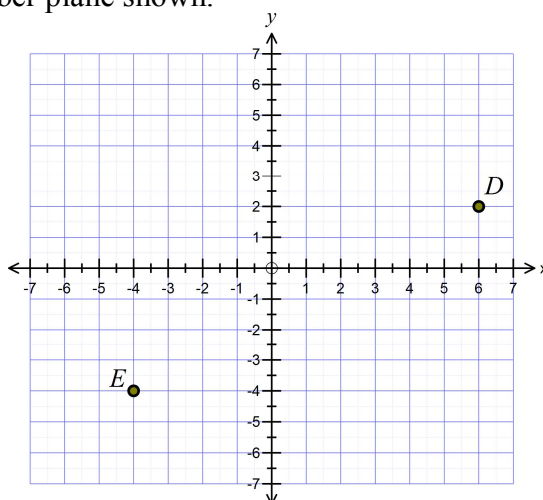
1.   Plot the points $G(2, 5)$, $H(-3, -5)$ and $I(3, -6)$ on the number plane above.

2.   What are the coordinates of the points D and E?

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3.   What is the midpoint of the interval joining D and E ?

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4.   What is the gradient of the line joining $S(8, -12)$ and $T(2, -18)$.

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5.   What is the length of the interval joining P (–7, 15) and Q (–2, 3).

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6.   What is the midpoint of the interval joining E (10, – 12) and F (–7, 6).

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7.   What is the gradient of the line shown?

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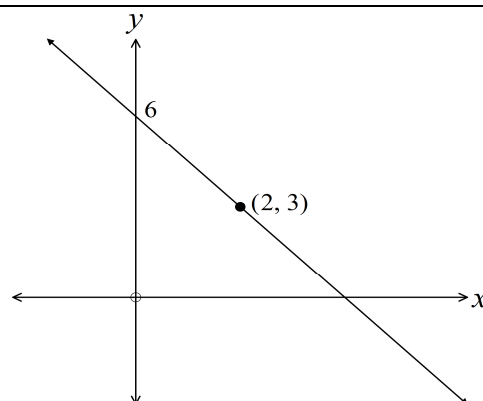
8.   The points A, B and C are three vertices of a parallelogram. What are the coordinates of the fourth vertex, D?

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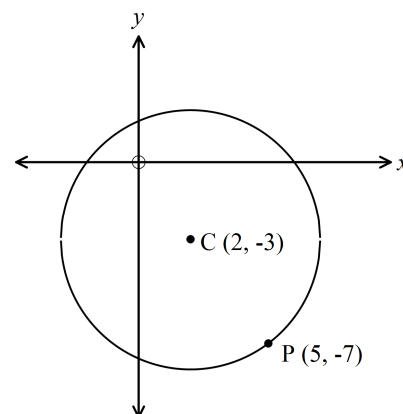…………………………………………………

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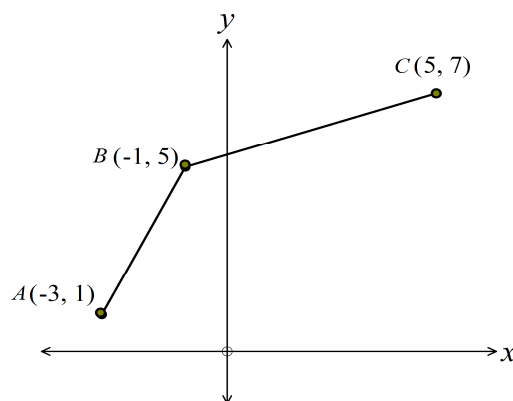
9.   A circle is drawn on the number plane with its centre at the point C (2, -3). The point P (5, -7) lies on the circle.
What is the radius of the circle?

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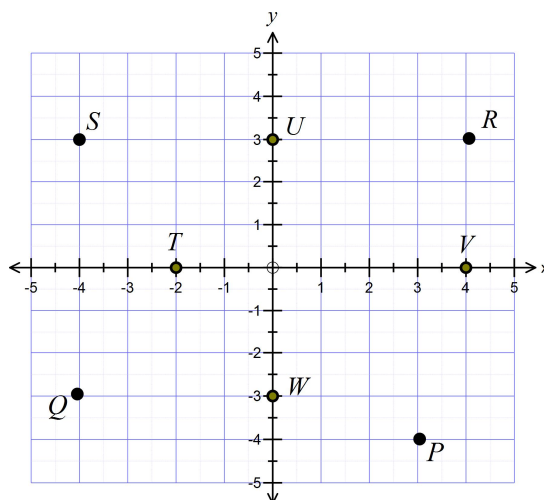## *Coordinate Geometry*

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Section 2   Multiple Choice Section

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

Questions 1 – 3 refer to the number plane shown.

1.   Which point has coordinates $(3, -4)$.

      A. Point P B.   Point Q C.   Point R D.   Point S

2.   The point P lies in the:

      A.   first quadrant.   B.   second quadrant.

      C.   third quadrant   D.   fourth quadrant.

3.   Which point lies on the positive y axis?

      A. Point T B.   Point U C.   Point V D.   Point W

Questions 3 – 5 refer to the number plane shown.
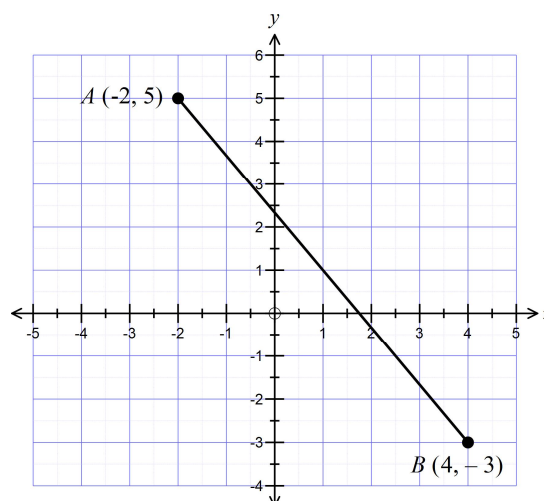
4. Find the midpoint of the interval AB.

    A.   (-1, -1)   B. (1, 1)   C.   (2, 0)   D.   (2, 0)

5. What is the gradient of the interval AB?

    A. $-\dfrac{4}{3}$ B. $-\dfrac{3}{4}$ C. $\dfrac{3}{4}$ D. $\dfrac{4}{3}$

6. What is the length of the interval AB?

    A. $\sqrt{14}$ units   B. 10 units   C. 14 units   D. 100 units

7. Find the midpoint of the interval joining the points the points $C(-5, 2)$ and $D(7, 9)$.

    A.   (-6, $5\frac{1}{2}$)   B. (-1, $5\frac{1}{2}$)   C. (1, $5\frac{1}{2}$)   D. (2, 11)

8. Find the gradient of the interval joining $E(-6, -7)$ and $F(-3, 2)$.
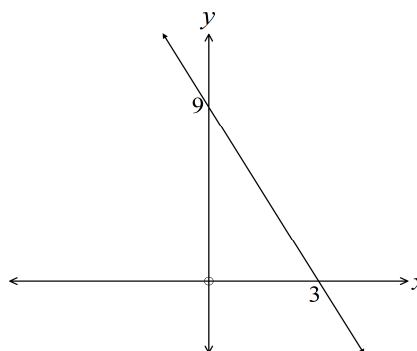
    A.   –3   B. $-\dfrac{1}{3}$ C. $\dfrac{1}{3}$ D.   3

9. Find the length of the interval joining $G(-7, 5)$ and $H(-3, -2)$.

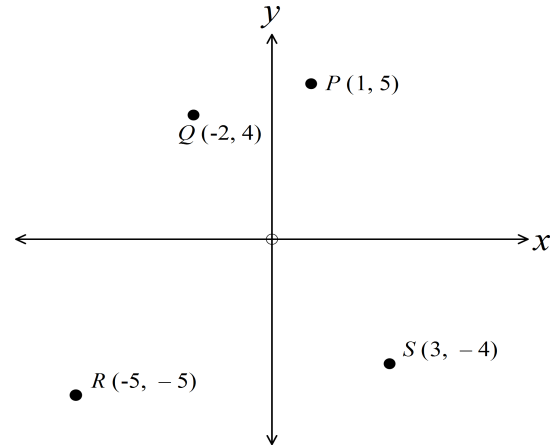   A. $\sqrt{11}$ units   B. $\sqrt{33}$ units   C. $\sqrt{65}$ units   D.   11 units

10. The gradient of the line shown is :

    A.   –3

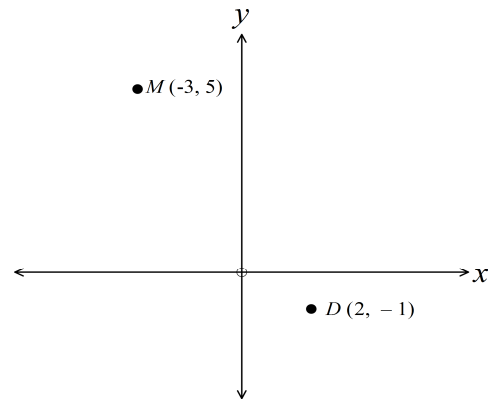   B. $-\dfrac{1}{3}$

    C. $\dfrac{1}{3}$

    D.   3

11.   Which point is 5 units from the origin?

   A.   Point P

   B.   Point Q

   C.   Point R

   D.   Point S

12. M (-3, 5) is the midpoint of the interval DE.
      D has coordinates (2, -1).
      What are the coordinates of E?

   A. $(-8, 11)$

   B. $\left(-\frac{1}{2}, 2\right)$

   C. $(7, -7)$

   D. $(8, -11)$

13.   The point G has coordinates (2, 5).

      The interval GH has a gradient of $-\frac{1}{2}$.

      Which of the following could be the coordinates of H?

   A. $(-2, -1)$ B. $(-2, 3)$ C. $(-2, 7)$ D. $(-2, 15)$

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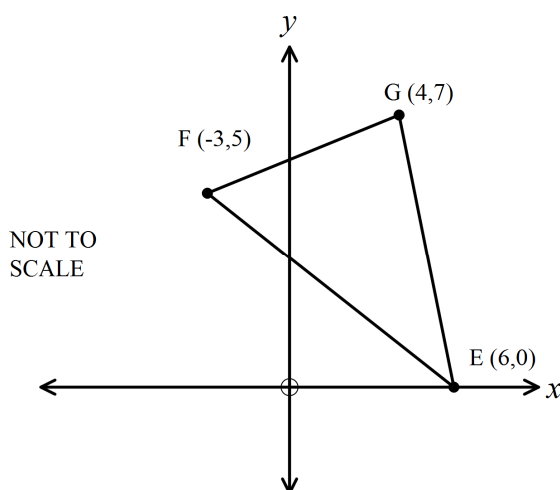
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Section 3   Longer Answer Section

Write all working and answers in the spaces provided on this test paper.

Marks

1.   The points E (6, 0), F (-3, 5) and G (4, 7)
     are the vertices of a triangle.

NOT TO
SCALE

a)   Find the midpoint of the side EF.   **1**

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b)   Find the gradient of the side EF.   **1**

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c)   Show that the triangle EFG is isosceles.   **3**

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Multiple Choice Answer Sheet

Name _____

Completely fill the response oval representing the most correct answer.

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 ◯

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ANSWERS

Section 1	
1.	
2.	D $D(6, 2)$ $E(-4, -4)$
3.	$\left(\dfrac{6-4}{2}, \dfrac{2-4}{2}\right) = (1, -1)$
4.	$m = \dfrac{-18+12}{2-8} = \dfrac{-6}{-6} = 1$
5.	$d = \sqrt{(-2+7)^2 - (3-15)^2}$ $\quad = \sqrt{(5)^2 - (-12)^2}$ $\quad = \sqrt{169}$ $\quad = 13$ units
6.	$\left(\dfrac{10-7}{2}, \dfrac{-12+6}{2}\right) = \left(\dfrac{3}{2}, -\dfrac{6}{2}\right) = \left(1\dfrac{1}{2}, -3\right)$
7.	Gradient $= \dfrac{6-3}{0-2} = \dfrac{3}{-2} = -\dfrac{3}{2}$
8.	

9.	$r = \sqrt{(5-2)^2 + (-7+3)^2}$
	$= \sqrt{(3)^2 + (-4)^2}$
	$= \sqrt{9 + 16}$
	$= \sqrt{25}$
	$= 5$ units

Section 2	
1.	A
2.	D
3.	B
4.	B
5.	A
6.	B
7.	C
8.	D
9.	C
10.	A
11.	D
12.	A
13.	C

Section 3	
1.	a) Midpoint $= \left(\dfrac{-3+6}{2}, \dfrac{5+0}{2}\right)$
	$= \left(\dfrac{3}{2}, \dfrac{5}{2}\right)$
	$= \left(1\dfrac{1}{2}, 2\dfrac{1}{2}\right)$
	b) Gradient EF $= \dfrac{5-0}{-3-6}$
	$= \dfrac{5}{-9}$
	c) $FG = \sqrt{(4+3)^2 + (7-5)^2}$ $\qquad EG = \sqrt{(4-6)^2 + (7-0)^2}$
	$\quad = \sqrt{(7)^2 + (2)^2}$ $\qquad\qquad = \sqrt{(-2)^2 + (7)^2}$
	$\quad = \sqrt{49 + 4}$ $\qquad\qquad\quad = \sqrt{4 + 49}$
	$\quad = \sqrt{53}$ $\qquad\qquad\qquad = \sqrt{53}$
	Since FG = EG, triangle EFG is isosceles.

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Multiple Choice Answer Sheet

Name_____ <u>Marking Sheet</u>

Completely fill the response oval representing the most correct answer.

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 ○