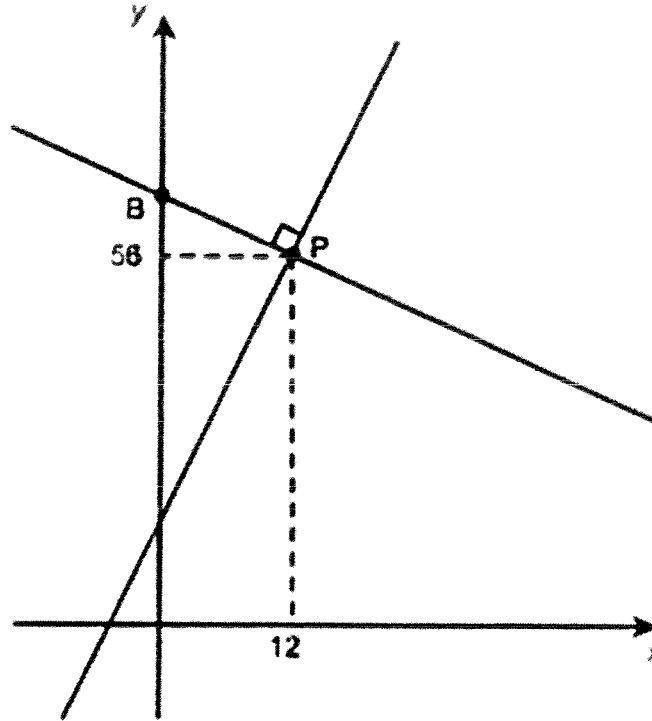


1

Two perpendicular lines intersect at point $P(12, 56)$ as shown on the Cartesian plane below. The equation of one of the lines is represented by $y = 4x + 8$.



What are the coordinates of point B?

2

Given that the divisor is not equal to zero, what binomial represents the result of the following division?

$$(24x^3 + 26x^2 - 111x + 40) \div (2x^2 + 3x - 8)$$

3

The equation of line ℓ in the Cartesian plane is $\frac{x}{n} + \frac{y}{s} = 1$ where $n \neq 0$, $s \neq 0$ and $n \neq s$. s are not equal

Which of the following equations represents a line perpendicular to line ℓ ?

A) $y = -\frac{n}{s}x + 1$ C) $y = \frac{n}{s}x + 1$

B) $y = -\frac{s}{n}x + 1$ D) $y = \frac{s}{n}x + 1$

Lines l_1 and l_2 in the Cartesian plane are parallel.

4

The equation of line l_1 is $\frac{x}{-80} + \frac{y}{120} = 1$.

Point $O(0, 0)$ is on line l_2 .

What is the equation of line l_2 ?

A) $y = -\frac{3}{2}x$

C) $y = \frac{2}{3}x$

B) $y = -\frac{2}{3}x$

D) $y = \frac{3}{2}x$

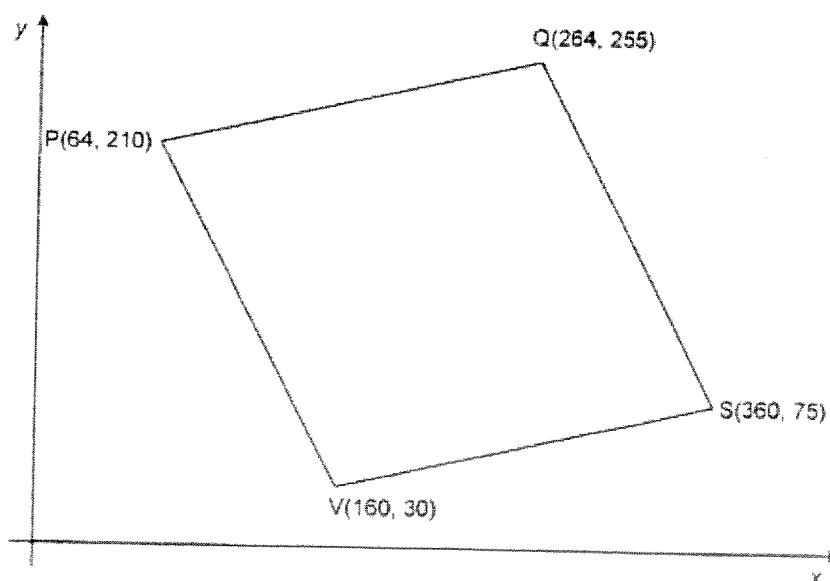
5

Given that the divisor is not equal to zero, what polynomial represents the result of the following division?

$$\div (15x^3 - 7x^2 - 66x + 54) \div (5x - 9)$$

6

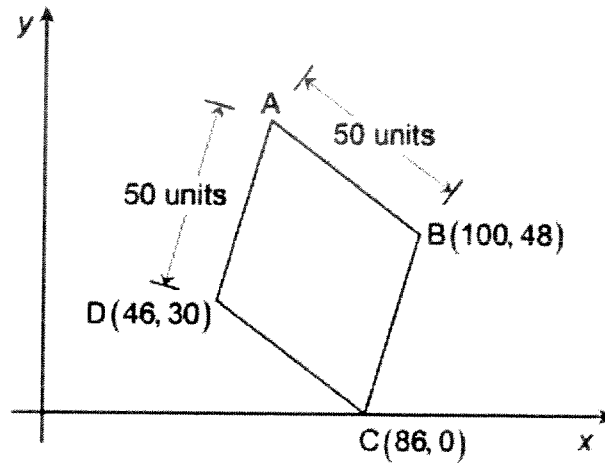
Consider quadrilateral PQSV represented below in the Cartesian plane.



Show that quadrilateral PQSV is a parallelogram, but that it is not a rhombus.

11

Consider quadrilateral ABCD represented in the Cartesian plane below.



Show that quadrilateral ABCD is a rhombus, but not a square.

13

Given that the divisor is not equal to zero, what is the result of the following division?

$$(8x^3 - 2x^2 - 13x - 3) \div (4x^2 + 5x + 1)$$

14

The equation of line ℓ is $\frac{x}{n} + \frac{y}{w} = 1$, where $n > 0$, $w > 0$ and $n \neq w$.

Which of the following equations represents a line parallel to line ℓ ?

A) $y = -\frac{n}{w}x$

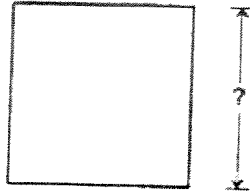
C) $y = \frac{n}{w}x$

B) $y = -\frac{w}{n}x$

D) $y = \frac{w}{n}x$

15

Polynomial $49x^2 - 56x + 16$ represents the area of a square.



What binomial represents the length of a side of this square?

16

The equation of line ℓ in the Cartesian plane is $25x + 40y - 604 = 0$.

What is the y -intercept of line ℓ ?

17

In the algebraic expression below, the numerators and denominators are not equal to zero.

$$\frac{x+4}{x^2-49} + \frac{3}{x-7}$$

Given that the numerator and the denominator of each of the following expressions are not equal to zero, which of these expressions is equivalent to the expression above?

A) $\frac{4x+25}{(x-7)(x+7)}$

C) $\frac{x+7}{x^2+x-56}$

B) $\frac{4x-17}{(x-7)(x-7)}$

D) $\frac{4x-3}{x^2-49}$

19

In the algebraic expression below, the denominator is not equal to zero.

$$x+2 - \frac{x^2+4x+3}{x^2-9}$$

If $x \neq -3$ and $x \neq 3$, which of the following expressions is equivalent to the expression above?

A) $\frac{1}{x-3}$

C) $\frac{x^2-2x-7}{x-3}$

B) $\frac{3}{x-3}$

D) $\frac{x^2-2x-5}{x-3}$

20

In the following algebraic expression, the numerators and denominators are not equal to zero.

$$\frac{9x^2-16}{x-4} \times \frac{2x^2-3x-20}{3x-4}$$

Given that the numerators and denominators of the following expressions are not equal to zero, which of these expressions is equivalent to the expression above?

A) $(3x-4)(2x+5)$

C) $\frac{(3x-4)(x+4)(2x-5)}{x-4}$

B) $(3x+4)(2x+5)$

D) $\frac{(3x+4)(x+4)(2x-5)}{x-4}$

21

In the following algebraic expression, the numerators and denominators are not equal to zero.

$$\cancel{\frac{4x^2-25}{x+4}} \times \frac{x^2+5x+4}{2x^2-3x-5}$$

This expression is equivalent to a binomial.

What is this binomial?

22

In the following algebraic expression, the denominators are not equal to zero.

$$\frac{a^2 - 16}{3a^2 + 8a - 16} \times \frac{15}{5a - 20}$$

Given that the denominator of each of the following expressions is not equal to zero, which of the following expressions is equivalent to the expression above?

A) $\frac{3(a-4)}{(3a-4)(a-20)}$

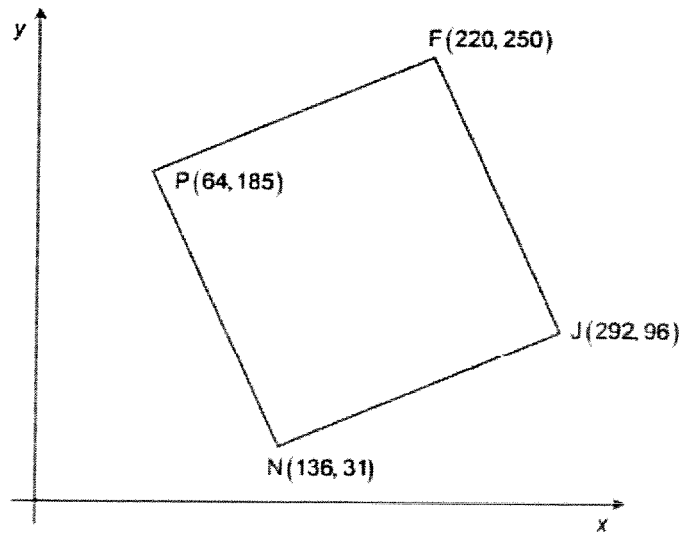
C) $\frac{3}{3a-4}$

B) $\frac{3(a-4)}{(3a-4)(a+4)}$

D) $\frac{1}{a-4}$

23

Consider quadrilateral FJNP represented below in the Cartesian plane.



Show that quadrilateral FJNP is neither a rectangle nor a rhombus.

The equation of line ℓ in the Cartesian plane is $\frac{x}{-8} + \frac{y}{10} = 1$.

24

Which of the following equations represents a line perpendicular to line ℓ ?

A) $y = -\frac{5}{4}x + 10$

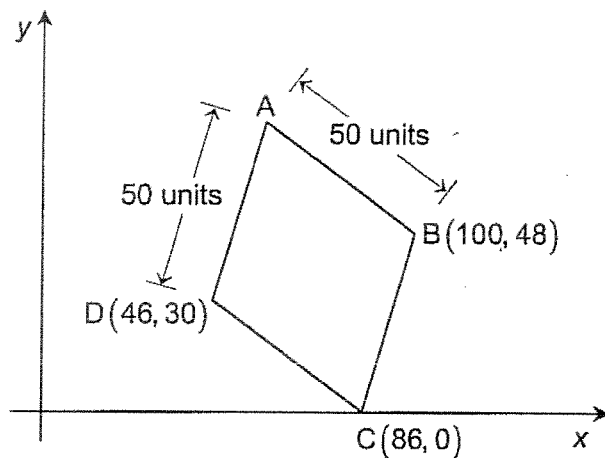
C) $y = \frac{4}{5}x - 10$

B) $y = -\frac{4}{5}x - 10$

D) $y = \frac{5}{4}x + 10$

13. A RHOMBUS, NOT A SQUARE

Consider quadrilateral ABCD represented in the Cartesian plane below.



Show that quadrilateral ABCD is a rhombus, but not a square.

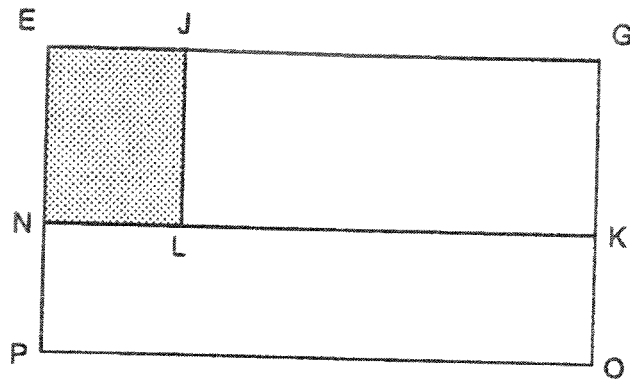
13. RECTANGLES

Rectangles JGKL and NKOP were drawn in rectangle EGOP shown below.

Rectangles JGKL and NKOP are equivalent.

In addition:

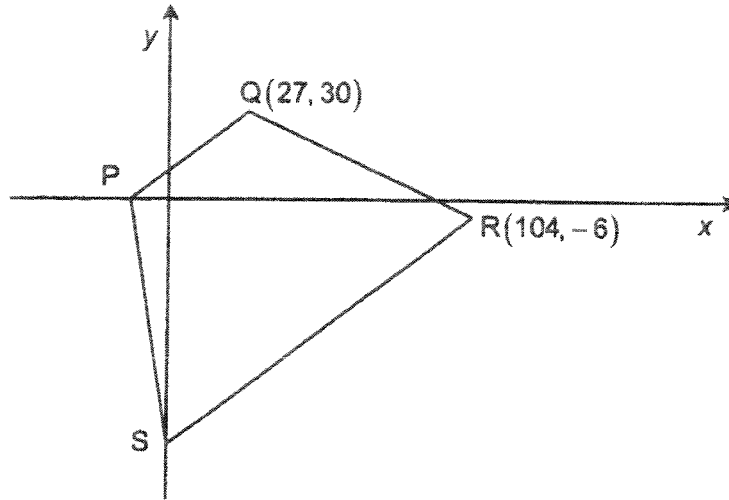
- ♦ $m\overline{NL} = (x - 1)$ units
- ♦ $m\overline{LK} = (2x + 4)$ units
- ♦ $m\overline{KO} = (x - 1)$ units
- ♦ $m\overline{JL} = (x + 1)$ units



What is the numerical area of rectangle EJLN?

14. ISOSCELES TRAPEZOID

Consider quadrilateral PQRS represented in the Cartesian plane below.

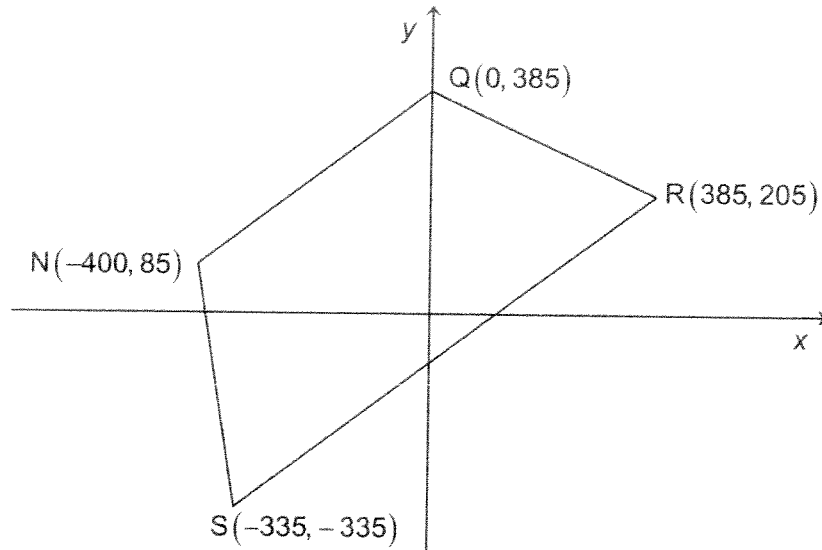


- Point P is on the x-axis.
- Point S is on the y-axis.
- The equation associated with line segment PS is $\frac{x}{-13} + \frac{y}{-84} = 1$.

Show that quadrilateral PQRS is an isosceles trapezoid.

14. QUADRILATERAL NQRS

Consider quadrilateral NQRS represented below in the Cartesian plan.



Show that quadrilateral NQRS is a trapezoid and that it is isosceles.

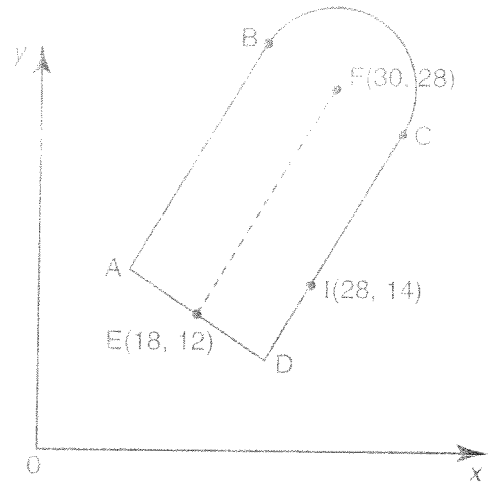
SECTION C

11. THE POOL

We graph on the right represents the aerial view of a pool formed by the rectangle ABCD and the semi-circle with diameter BC. The distances are expressed in metres.

Two posts, represented by points E and F, are placed at the midpoints of segments AD and BC respectively in order to install a net.

What is, to the nearest square metre, the area of the pool's floor given that it is a flat surface?



SECTION C

11. AN AREA OF A TRIANGLE

Consider the triangle ABC on the right.

Segment AH is the altitude drawn from vertex A.

The coordinates of point A are $A(42, 60)$.

The coordinates of point H are $H(12, 20)$.

What is, rounded to the nearest tenth, the area of triangle ABC?

