TULSA PUBLIC SCHOOLS

HS Math

(Algebra I-II & Geometry)

Distance Learning Activities

Dear families,

These learning packets are filled with grade level activities to keep students engaged in learning at home. We are following the learning routines with language of instruction that students would be engaged in within the classroom setting. We have an amazing diverse language community with over 65 different languages represented across our students and families.

If you need assistance in understanding the learning activities or instructions, we recommend using these phone and computer apps listed below.

Google Translate

- Free language translation app for Android and iPhone
- Supports text translations in 103 languages and speech translation (or conversation translations) in 32 languages
- Capable of doing camera translation in 38 languages and photo/image translations in 50 languages
- Performs translations across apps

Microsoft Translator

- Free language translation app for iPhone and Android
- Supports text translations in 64 languages and speech translation in 21 languages
- Supports camera and image translation
- Allows translation sharing between apps

Queridas familias:

Estos paquetes de aprendizaje tienen actividades a nivel de grado para mantener a los estudiantes comprometidos con la educación en casa. Estamos siguiendo las rutinas de aprendizaje con las palabras que se utilizan en el salón de clases. Tenemos una increíble y diversa comunidad de idiomas con más de 65 idiomas diferentes representados en nuestros estudiantes y familias.

Si necesita ayuda para entender las actividades o instrucciones de aprendizaje, le recomendamos que utilice estas aplicaciones de teléfono y computadora que se enlistan a continuación:

Google Translate

- Aplicación de traducción de idiomas para Android y iPhone (gratis)
- Traducciones de texto en 103 idiomas y traducción de voz (o traducciones de conversación) en 32 idiomas
- Traducción a través de cámara en 38 idiomas y traducciones de fotos / imágenes en 50 idiomas
- Realiza traducciones entre aplicaciones

Microsoft Translator

- Aplicación de traducción para iPhone y Android (gratis)
- Traducciones de texto en 64 idiomas y traducción de voz en 21 idiomas
- Traducción a través de la cámara y traducción de imágenes
- Permite compartir la traducción entre aplicaciones

Algebra I:

Introduction to Quadratics

Lesson for:
20 April 2020

Quadratics Introduction

Area Models

$4m^2 - 3m^6 + 5m^4$

What is the degree of the polynomial?

Which polynomials are in standard form?

Choose all answers that apply:

(A) $3z - 1$

(B) $2 + 4x - 5x^2$

(C) $-5p^5 + 2p^2 - 3p + 1$

(D) None of the above

Pick the expression that matches this description:

A polynomial of the 5^{th} degree with a leading coefficient of 7 and a constant term of 6

Choose 1 answer:

(A) $6x^7 - x^5 + 5$

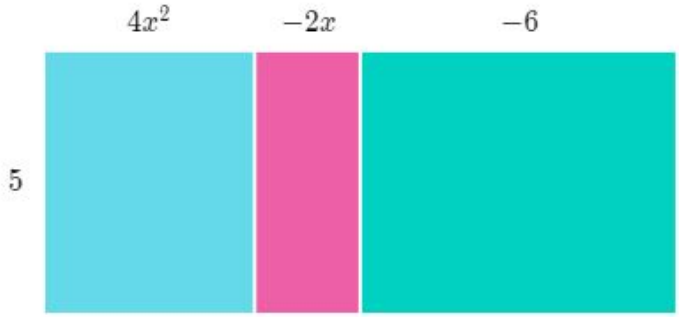
(B) $6x^5 + x^4 + 7$

(C) $7x^6 - 6x^4 + 5$

(D) $7x^5 + 2x^2 + 6$

A rectangle has a height of 5 and a width of $4x^2 - 2x - 6$.

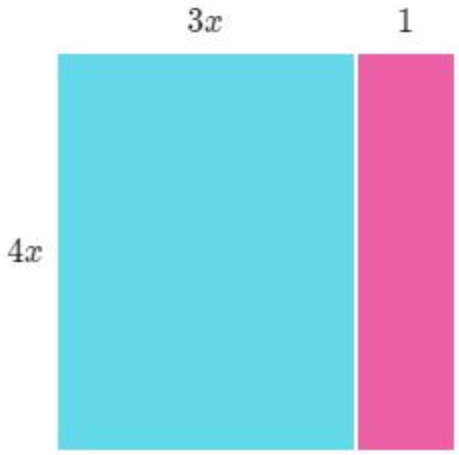
Express the area of the entire rectangle.
Expression should be expanded.



Area = ☐

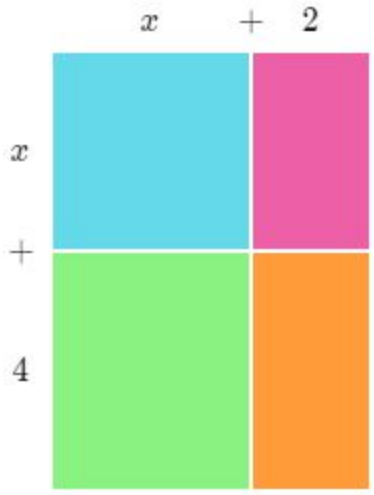
A rectangle has a height of $4x$ and a width of $3x + 1$.

Express the area of the entire rectangle.
Expression should be expanded.



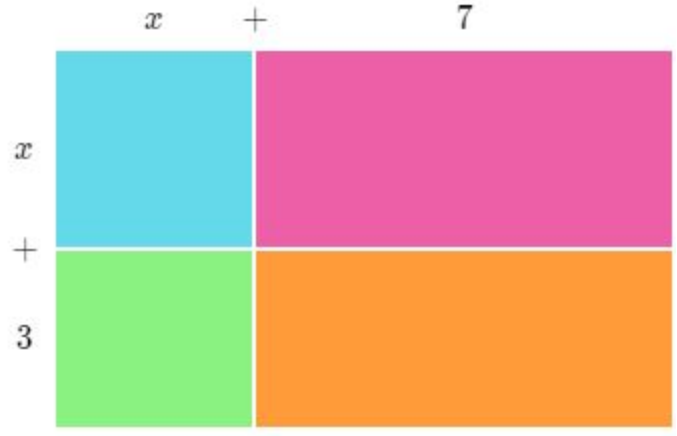
Area = ☐

Express the area of the entire rectangle.
Your answer should be a polynomial in standard form.



Area = ☐

Express the area of the entire rectangle.
Your answer should be a polynomial in standard form.



Area = ☐

Algebra I:
Multiplying Binomials

Lesson for:
21 April 2020

Binomial Introduction

Multiplying Binomials

Expand. *Your answer should be a polynomial in standard form.* $(x-3)(x-4) =$	**Expand.** *Your answer should be a polynomial in standard form.* $(x+2)(x+5) =$
Expand. *Your answer should be a polynomial in standard form.* $(x-7)(x-3) =$	**Expand.** *Your answer should be a polynomial in standard form.* $(x+1)(x+8) =$
Expand. *Your answer should be a polynomial in standard form.* $(-2h+9)(9h-2) =$	**Expand.** *Your answer should be a polynomial in standard form.* $(5+w)(w+4) =$
Expand. *Your answer should be a polynomial in standard form.* $(9+m)(-m+9) =$	**Expand.** *Your answer should be a polynomial in standard form.* $(3k+4)(9k+5) =$

Day 1 & 2 review:

A rectangle has a height of x and a width of $7x - 4$.

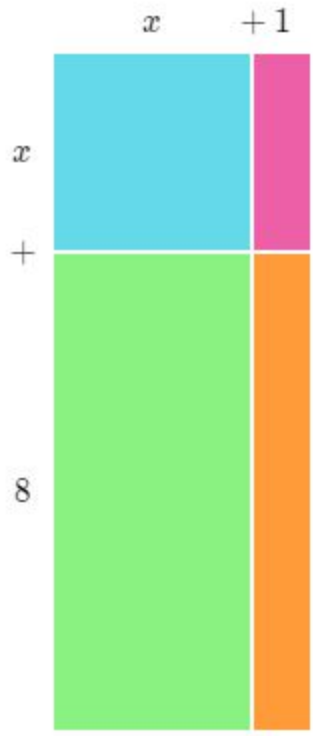
Express the area of the entire rectangle.
Expression should be expanded.

Area = ☐

Expand.
Your answer should be a polynomial in standard form.

$(x - 2)(x - 6) =$ ☐

Express the area of the entire rectangle.
Your answer should be a polynomial in standard form.



Area = ☐

Pick the expression that matches this description:

A 3^{rd} degree binomial with a constant term of 8

Choose 1 answer:

(A) $-5x^3 + 8$

(B) $2x^8 + 3$

(C) $x^3 - x^2 + 8$

(D) $8x^3 + 2x + 3$

Expand.
Your answer should be a polynomial in standard form.

$(-6d + 6)(2d - 2) =$ ☐

$t - 4t^2 + 2t^3$

What is the degree of the polynomial?

☐

Algebra I:

Introduction to Factoring

Lesson for:
22 April 2020

Factoring Intro Video

Multiply Binomials Video

1) Complete the sentence about the relationship expressed by $3x(x+2) = 3x^2 + 6x$.

$x + 2$ is *a factor of / divisible by* $3x^2 + 6x$, and

$3x^2 + 6x$ is *a factor of / divisible by* $x + 2$.

2) A teacher writes the following product on the board:

$$(3x^2)(4x) = 12x^3$$

Miles concludes that $3x^2$ is a factor of $12x^3$.

Jude concludes that $12x^3$ is divisible by $4x$.

Who is correct?

3) Is $30x^4$ divisible by $2x^2$?

4) Is $12x^2$ a factor of $6x$?

Karen was trying to factor $6x^2 + 10$. She found that the greatest common factor of these terms was 2 and made an area model:

	Width	
2	$6x^2$	10

What is the width of Karen's area model?

Width = ____

Which expression is the result of factoring the expression below by taking out its greatest common factor?

$8x^2 - 24 = ?$

Choose 1 answer:

(A) $8x(x - 3)$

(B) $8(x^2 - 3)$

(C) $8(x - 3)$

(D) $8x(x^2 - 3)$

Which expression is the result of factoring the expression below by taking out its greatest common factor?

$12x^2 + 8 = ?$

Choose 1 answer:

(A) $4(3x^2 + 2)$

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

(C) $2(6x^2 + 4)$

(D) $2(6x + 4)$

Averi was trying to factor $4x^2 + 20x - 16$. She found that the greatest common factor of these terms was 4 and made an area model:

	Width		
4	$4x^2$	$20x$	-16

What is the width of Averi's area model?

Width = ☐

Algebra I:
Factoring Quadratics

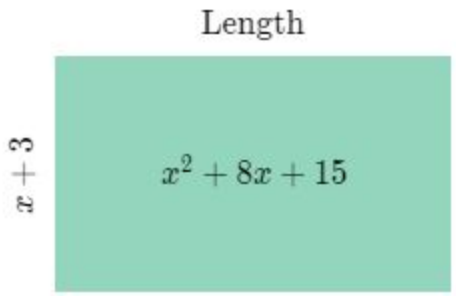
Lesson for:
23 April 2020

Factoring as (x+a)(x+b)

More examples of (x+a)(x+b)

The rectangle below has an area of $x^2 + 8x + 15$ square meters and a width of $x + 3$ meters.

What expression represents the length of the rectangle?



Length = ____ meters

Factor as the product of two binomials.

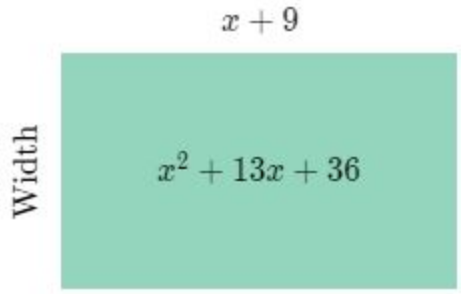
$x^2 - 3x + 2 =$ ____

Factor as the product of two binomials.

$x^2 - 9x + 20 =$ ____

The rectangle below has an area of $x^2 + 13x + 36$ square meters and a length of $x + 9$ meters.

What expression represents the width of the rectangle?



Width = ____ meters

Factor completely. $7x^2 + 28x - 35 =$	Factor completely. $-3x^2 + 6x + 9 =$
Factor completely. $5x^2 + 25x + 20 =$	Factor completely. $2x^2 - 18x + 36 =$

Algebra I:
Factoring by Grouping

Lesson for:
24 April 2020

Grouping Introduction

Common Factor + Grouping

Factor $9x^2 + 6x + 12x + 8$.

Choose 1 answer:

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

(B) $(3x + 1)(3x + 8)$

(C) $(9x + 6)(12x + 8)$

(D) $(3x + 2)(3x + 2)(3x + 4)$

Factor $2x^2 - 3x - 4x + 6$.

Choose 1 answer:

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

(B) $(2x - 3)(x - 2)$

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

Factor $5x^2 + 10x + 2x + 4$.

Factor $8x^2 + 6x + 4x + 3$.

Factor $3x^2 + 10x + 8$.

Choose 1 answer:

(A) $(3x + 1)(x + 8)$

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

(C) $(3x + 4)(6x + 8)$

(D) $(3x + 4)(3x + 4)(x + 2)$

Factor $2x^2 - 3x - 9$.

Choose 1 answer:

(A) $(2x - 1)(x + 9)$

(B) $(2x + 3)(6x - 9)$

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

(D) $(x - 3)(2x - 3)(2x - 3)$

Factor $4x^2 + 16x + 15$.

Factor $6x^2 - 13x + 6$.

Algebra I:
Solving Quadratics pt.1

Lesson for:
27 April 2020

Zero Product Property

Solving Square Roots

Solve for x. *Write the smaller solution first, and the larger solution second.* $(x+6)(-x+1)=0$ smaller $x=$ ☐ larger $x=$ ☐	**Find the zeros of the function.** *Write the smaller solution first, and the larger solution second.* $f(x)=(-x-2)(-2x-3)$ smaller $x=$ ☐ larger $x=$ ☐
Solve for x. *Write the smaller solution first, and the larger solution second.* $(x-7)(-4x-2)=0$ smaller $x=$ ☐ larger $x=$ ☐	**Find the zeros of the function.** *Write the smaller solution first, and the larger solution second.* $g(x)=(x-2)(3x+3)$ smaller $x=$ ☐ larger $x=$ ☐

Solve for x.
Write the smaller solution first, and the larger solution second.

$6x^2 + 1 = 487$

smaller $x =$ ☐

larger $x =$ ☐

Find the zeros of the function.
Write the smaller solution first, and the larger solution second.

$h(x) = -5x^2 + 180$

smaller $x =$ ☐

larger $x =$ ☐

Solve for x. Write the smaller solution first,

$(x + 5)^2 - 64 = 0$

smaller $x =$ ☐

larger $x =$ ☐

Find the zeros of the function.

$f(x) = (x - 2)^2 - 9$

smaller $x =$ ☐

larger $x =$ ☐

Algebra I:

Solving Quadratics pt.2

Lesson for:
28 April 2020

Solving by Factoring

Solving using Structure

Solve for x. Write the smaller solution first, $x^2 + 3x - 4 = 0$ smaller $x =$ ☐ larger $x =$ ☐	Solve for x. Write the smaller solution first, $x^2 - 3x - 40 = 0$ smaller $x =$ ☐ larger $x =$ ☐
Solve for x. Write the smaller solution first, $2x^2 - 16x + 14 = 0$ smaller $x =$ ☐ larger $x =$ ☐	Solve for x. Write the smaller solution first, $5x^2 + 15x - 140 = 0$ smaller $x =$ ☐ larger $x =$ ☐

Find one value of x that is a solution to the equation:

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

$x =$ ☐

Let $m = 2x+3$.

Which equation is equivalent to $(2x+3)^2 - 14x - 21 = -6$ in terms of m ?

Choose 1 answer:

(A) $m^2 + 7m + 6 = 0$

(B) $m^2 - 7m - 15 = 0$

(C) $m^2 - 7m + 6 = 0$

(D) $m^2 + 7m - 15 = 0$

Find one value of x that is a solution to the equation:

$(x-2)^2 - 6(x-2) + 5 = 0$

$x =$ ☐

Find one value of x that is a solution to the equation:

$(x^2+1)^2 - 5x^2 - 5 = 0$

$x =$ ☐

Algebra I:

The Quadratic Formula

Lesson for:
29 April 2020

Introduction to Formula

Negative Coefficients

Number of Solutions

Solve.

$10x^2 - 6 = 9x$

Choose 1 answer:

(A) $x = \frac{5 \pm \sqrt{65}}{-2}$

(B) $x = \frac{9 \pm \sqrt{321}}{20}$

(C) $x = \frac{4 \pm \sqrt{26}}{10}$

(D) $x = \frac{-1 \pm \sqrt{109}}{18}$

Solve.

$10 = -4x + 3x^2$

Choose 1 answer:

(A) $x = 1, -\frac{1}{2}$

(B) $x = \frac{-1 \pm \sqrt{10}}{2}$

(C) $x = \frac{-2 \pm \sqrt{34}}{-3}$

(D) $x = \frac{-3 \pm \sqrt{17}}{2}$

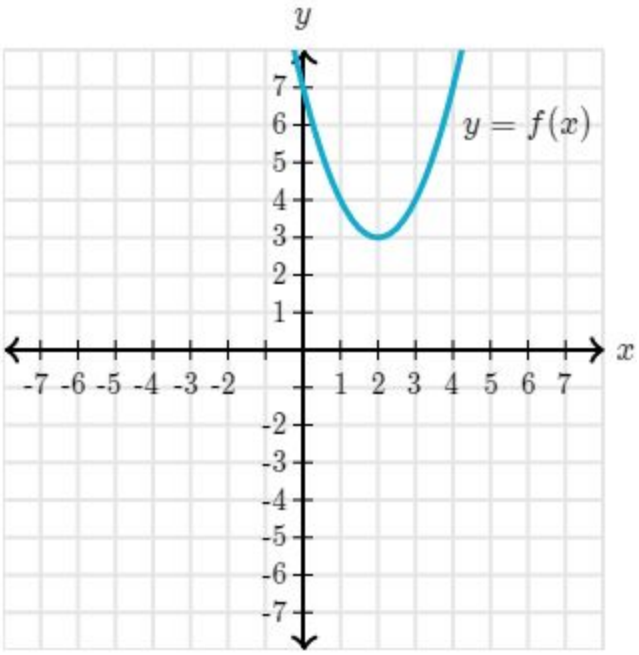
Solve.

$-5x^2 + 7x = -9$

Solve.

$10 - 9x^2 + 4x = -6x^2$

Is the discriminant of f positive, zero, or negative?



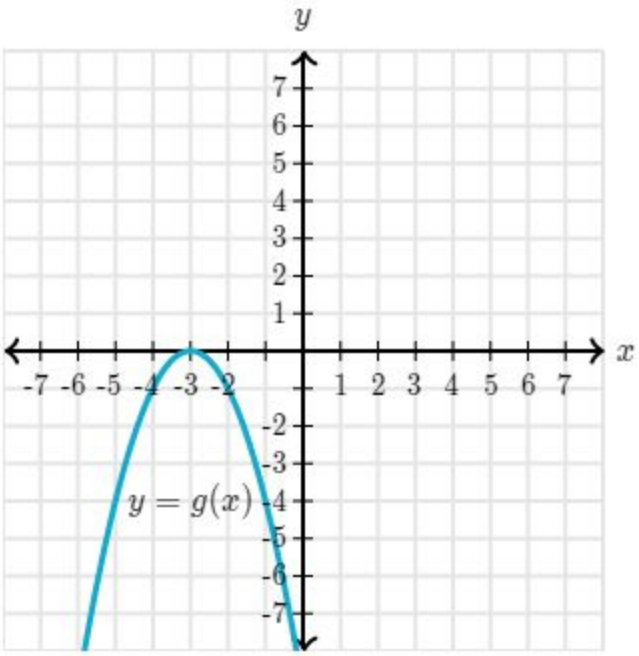
Answer:_____

$f(x) = 25x^2 - 10x + 1$

What is the value of the discriminant of f?

What is the number of x-intercepts does the graph of f have?

Is the discriminant of g positive, zero, or negative?



Answer:_____

$f(x) = 6x^2 + 10x - 1$

What is the value of the discriminant of f?

How many distinct real number zeros does f have?

Algebra I:

Completing the Square

Lesson for:
30 April 2020

Introduction

Re-writing the Square

Leading Coefficients

Rewrite the equation by completing the square. $x^2 + 14x + 49 = 0$ $(x + \square)^2 = \square$	Rewrite the function by completing the square. $f(x) = x^2 + 20x - 86$ $f(x) = (x + \square)^2 + \square$
Rewrite the function by completing the square. $f(x) = x^2 - 8x - 51$ $f(x) = (x + \square)^2 + \square$	Rewrite the equation by completing the square. $x^2 - 2x - 35 = 0$ $(x + \square)^2 = \square$

Rewrite the equation by completing the square.

$x^2 + 7x + 12 = 0$

$(x + \square)^2 = \square$

Rewrite the function by completing the square.

$f(x) = 2x^2 + 3x - 2$

$f(x) = \square(x+\square)^2+\square$

Rewrite the equation by completing the square.

$2x^2 - 9x + 7 = 0$

$(x + \square)^2 = \square$

Rewrite the function by completing the square.

$f(x) = 2x^2 + 13x + 20$

$f(x) = \square(x+\square)^2+\square$

Algebra I:
Quadratic Functions

Lesson for:
01 May 2020

Vertex/Axis | Comparing | Shifting | Scaling/Reflecting

$f(x) = x^2 + 6x + 8$

1) What are the zeros of the function?
Write the smaller x first, and the larger x second.

smaller $x =$ ____

larger $x =$ ____

2) What is the vertex of the parabola?

(____ , ____)

$f(t) = (t-5)^2 - 9$

1) What are the zeros of the function?
Write the smaller t first, and the larger t second.

smaller $t =$ ____

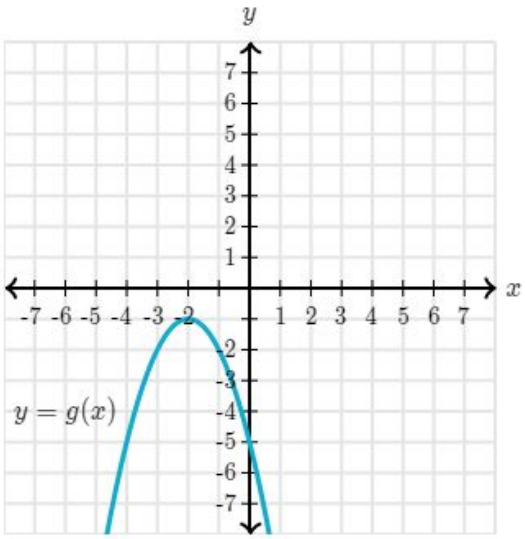
larger $t =$ ____

2) What is the vertex of the parabola?

(____ , ____)

Which function has a greater maximum?

$f(x) = -2(x+4)^2 + 1$



Choose 1 answer:

(A) f has a greater maximum than g.

(B) g has a greater maximum than f.

(C) f and g share the same maximum.

$f(x) = x^2$

$g(x) = (x+3)^2 + 5$

We can think of g as a translated (shifted) version of f.

Complete the description of the transformation.
Use nonnegative numbers.

To get the function *g*, shift *f* **up/down** by _____ units

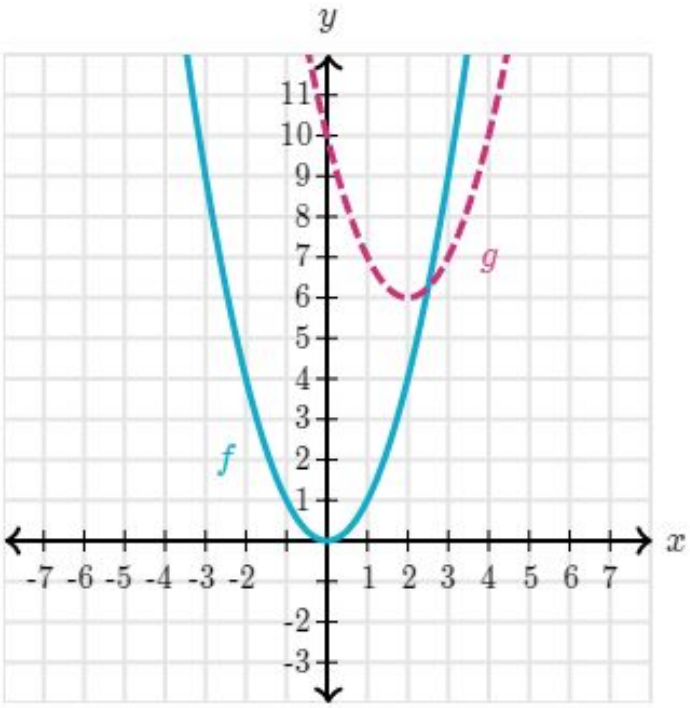
and to the **left/right** by _____ units.

$f(x) = x^2$

$g(x) = -3x^2$

Explain, in detail, how the two functions are different.

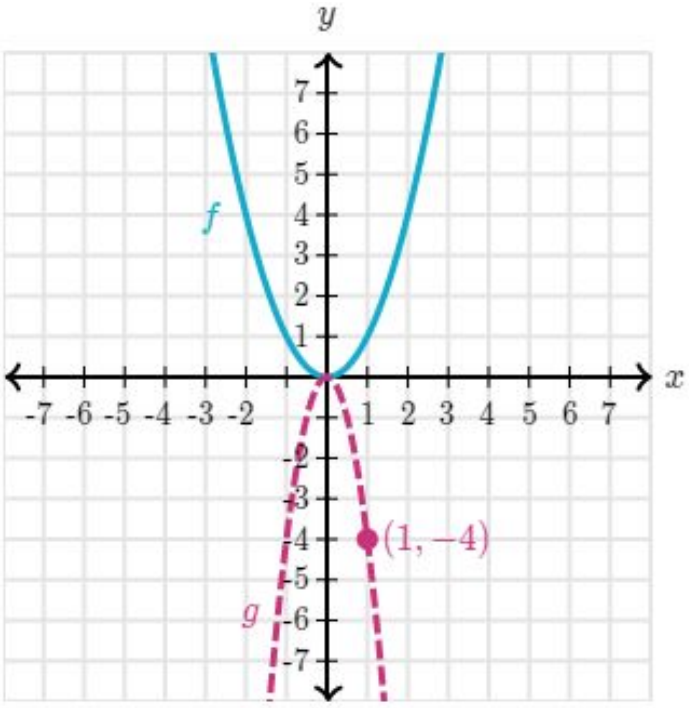
$f(x) = x^2$, find $g(x)$
Hint: this is a translation (shifted).



Write the equation for $g(x)$.

$g(x) =$ ☐

$f(x) = x^2$, find $g(x)$
Hint: this is scaled <u>and</u> reflected.



Write the equation for $g(x)$.

$g(x) =$ ☐

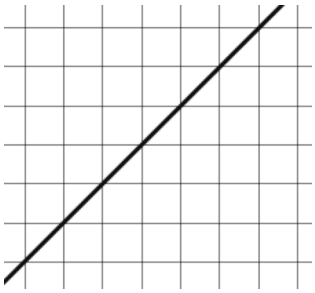
Algebra 2 // Review of the Trigonometric Ratios

Lesson for 20 Apr 2020

Topic: Slope as a ratio

Find the slope of each line and write it as a ratio of rise to run.

1.



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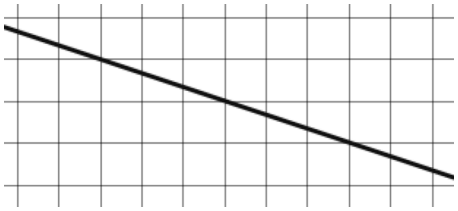

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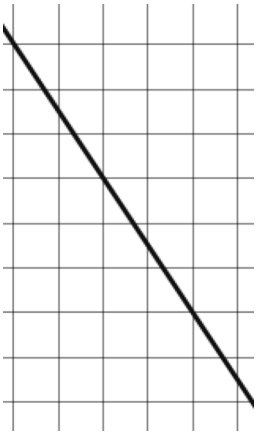
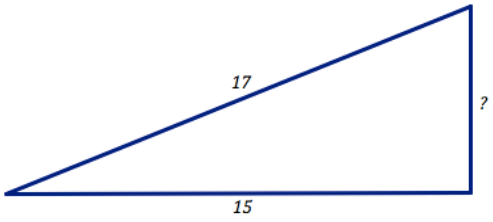


Find the missing length in each right triangle. Then determine the slope of the hypotenuse.

Review Pyth. Th. video

4



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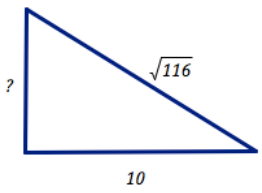

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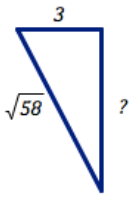
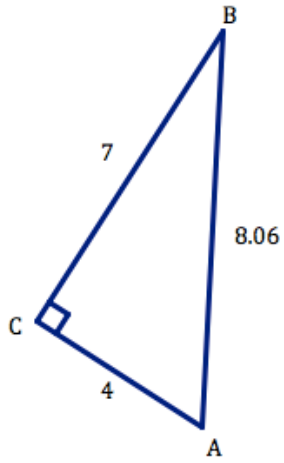


Review video

Topic: Creating trigonometric ratios for right triangles

For each right triangle and the identified angle of reference create the desired trigonometric ratios. If any sides of the triangle are missing, find them before determining the ratio.

7.

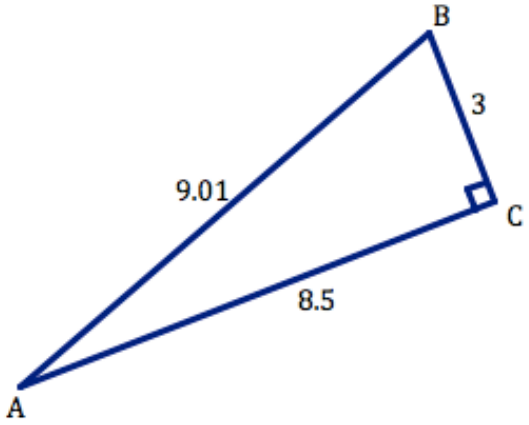


Cos (A)= Cos (B)=

Sin (A)= Sin (B)=

Tan (A)= Tan (B)=

8.

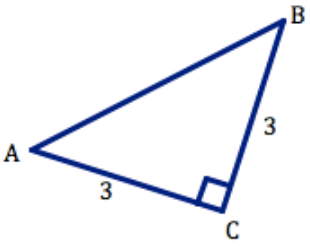


Cos (A)= Cos (B)=

Sin (A)= Sin (B)=

Tan (A)= Tan (B)=

9.

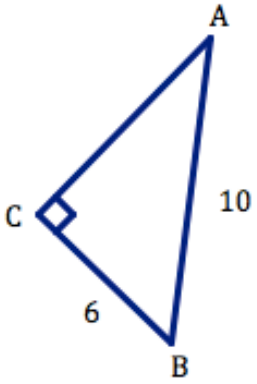


Cos (A)= Cos (B)=

Sin (A)= Sin (B)=

Tan (A)= Tan (B)=

10.



Cos (A)= Cos (B)=

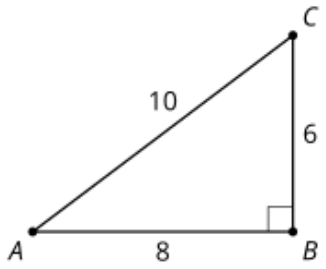
Sin (A)= Sin (B)=

Tan (A)= Tan (B)=

NOTE: all problems are extensions and applications of ideas of the lesson from 20 Apr 2020. Review the videos from lesson 1 for help.

Lesson 2 Cumulative Practice Problems

1. Which of the following is true?



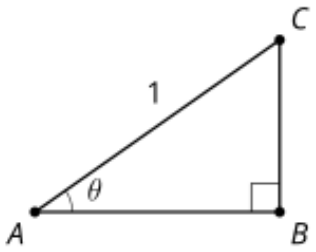
A. $\sin(A) = \frac{6}{10}$

B. $\cos(A) = \frac{6}{10}$

C. $\sin(B) = \frac{8}{10}$

D. $\cos(B) = \frac{6}{10}$

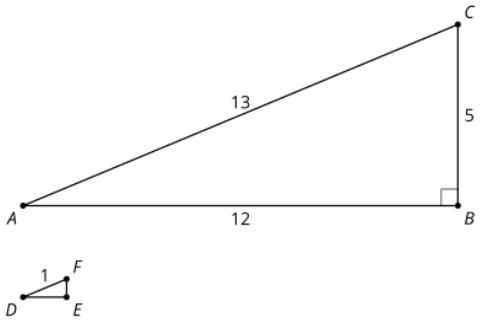
2. Here is triangle ABC:



a. Express the length of segment AB using sine or cosine.

b. Express the length of segment BC using sine or cosine.

3. Triangle DEF is similar to triangle ABC.



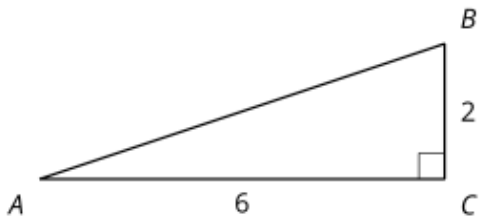
a. What is the length of segment DE? What is the length of segment EF? Explain how you know.

b. Explain why the length of segment DE is $\cos(D)$ and the length of segment EF is $\sin(D)$.

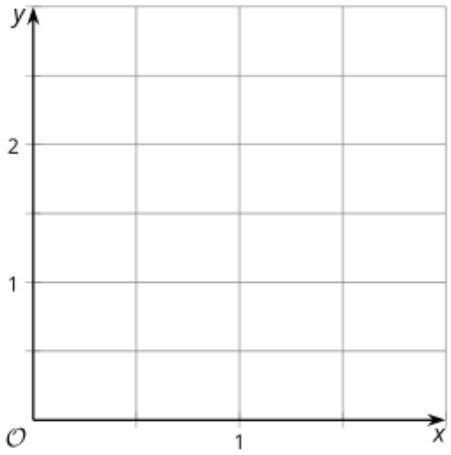
4. *From lesson 1*

Here is a triangle.

Find $\cos(A)$, $\sin(A)$, and $\tan(A)$.
Explain your reasoning.



5. Sketch and label a right triangle ABC with $\tan(A) = 2$.



6. The point (1,4) lies on a circle with center (0,0). Name at least one point in each quadrant that lies on the circle.

Lesson 3 Cumulative Practice Problems

What is a radian

Converting

Convert each degree measure into radians and each radian measure into degrees.

1) $-\frac{\pi}{6}$

2) $-\frac{23\pi}{6}$

3) -30°

4) -930°

5) -210°

6) $\frac{\pi}{4}$

7) -160°

8) $-\frac{\pi}{3}$

9) $\frac{11\pi}{6}$

10) $\frac{17\pi}{12}$

11) 915°

12) $\frac{\pi}{2}$

13) -105°

14) $\frac{4\pi}{9}$

15) $\frac{7\pi}{2}$

16) $\frac{31\pi}{9}$

17) 230°

18) $-\frac{13\pi}{6}$

19) -170°

20) 660°

Lesson 4 Cumulative Practice Problems

1. C is a circle with radius r. Which of the following is true? Select **all** that apply.

   A. The diameter of C is $2r$.

   B. The circumference of C is πr.

   C. The circumference of C is $2\pi r$.

   D. One quarter of the circle has length $\frac{\pi r}{4}$.

   E. One quarter of the circle has length $\frac{\pi r}{2}$.

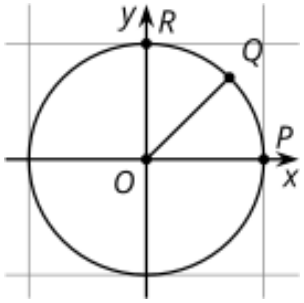
2. Extension of lesson 3
   The table shows an angle measure in radians and degrees with the amount of rotation about a circle corresponding to the angle. For example, 2π radians corresponds to 1 full rotation. Complete the table.

angle measure in radians	rotation	angle measure in degrees
0	0	
$\frac{\pi}{6}$		$30°$
	$\frac{1}{8}$	$45°$
	$\frac{1}{6}$	
$\frac{\pi}{2}$		
$\frac{2\pi}{3}$		$120°$
	$\frac{1}{2}$	
$\frac{3\pi}{2}$		
	$\frac{7}{8}$	$315°$
	1	


Angles in Quadrant (all 4)

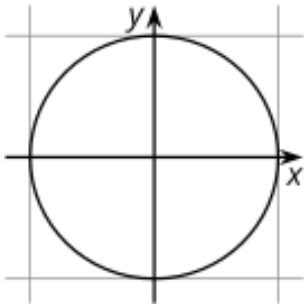
Plotting Points

3. Here are some points labeled on the unit circle:



a. What is the measure in radians of angle POR?
b. Angle POQ is halfway between 0 radians and angle POR. What is the measure in radians of angle POQ?
c. Label point U on the circle so that the measure of angle POU is $\frac{3\pi}{4}$.
d. Label point V on the circle so that the measure of angle POV is $\frac{3\pi}{2}$.

4. a. Mark the points on the unit circle with x-coordinate $\frac{4}{5}$.



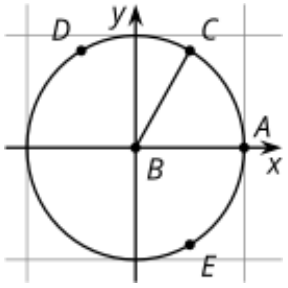
b. What are the y-coordinates of those points? Explain how you know.

5. The point (8,15) lies on a circle centered at (0,0). Where does the circle intersect the x-axis? Where does the circle intersect the y-axis? Explain how you know.

Intro to the Unit Circle

Lesson 5 Cumulative Practice Problems

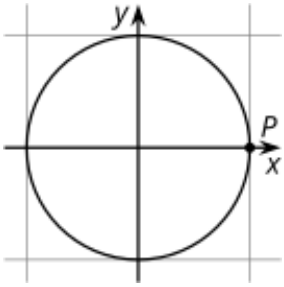
1. Angle ABC measures $\frac{\pi}{3}$ radians, and the coordinates of C are about $(0.5,0.87)$.



   a. The measure of angle ABD is $\frac{2\pi}{3}$ radians. What are the approximate coordinates of D? Explain how you know.

   b. The measure of angle ABE is $\frac{5\pi}{3}$ radians. What are the approximate coordinates of E? Explain how you know.

2. Give an angle of rotation centered at the origin that sends point P to a location whose (x, y) coordinates satisfy the given conditions.



   a. $x > 0$ and $y < 0$

   b. $x < 0$ and $y > 0$

   c. $y < 0$ and $x < 0$

3. Lin calculates $0.97^2 + 0.26^2$ and finds that it is 1.0085.

   a. Explain why (0.97,0.26) is not on the unit circle.

   b. Is (0.97,0.26) a good estimate for the coordinates of a point on the unit circle? Explain how you know.

4. The x-coordinate of a point P on the unit circle is 0. If point P is the result of rotating the point (1,0) by θ radians counterclockwise about the origin, what angle could θ represent? Select **all** that apply.

   A. 0

   B. $\frac{\pi}{2}$

   C. π

   D. $\frac{3\pi}{2}$

   E. 2π

Lesson 6 Cumulative Practice Problems

1. For which angles is the cosine positive? Select **all** that apply.

   A. 0 radians

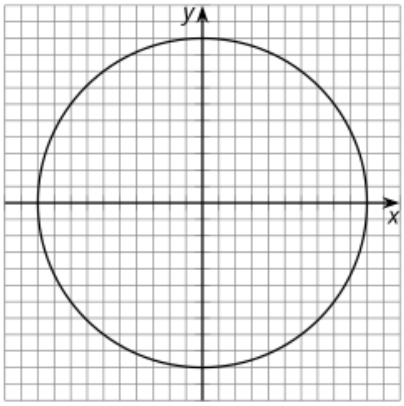
   B. $\frac{5\pi}{12}$ radians

   C. $\frac{5\pi}{6}$ radians

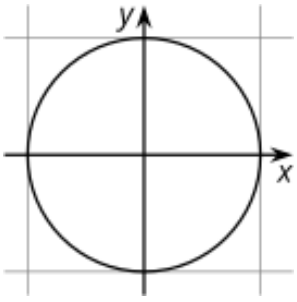
   D. $\frac{3\pi}{4}$ radians

   E. $\frac{5\pi}{3}$ radians

2. Mark two angles on the unit circle whose measure θ satisfies $\sin(\theta) = -0.4$. How do you know your angles are correct?

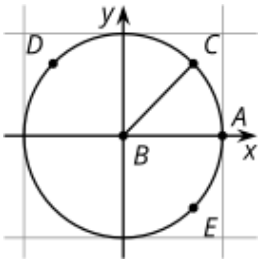


3. a. For which angle measures, θ, between 0 and 2π radians is $\cos(\theta) = 0$? Label the corresponding points on the unit circle.



   b. What are the values of $\sin(x)$ for these angle measures?

4. Angle ABC measures $\frac{\pi}{4}$ radians, and the coordinates of C are about (0.71,0.71).



a. The measure of angle ABD is $\frac{3\pi}{4}$ radians. What are the approximate coordinates of D? Explain how you know.

b. The measure of angle ABE is $\frac{7\pi}{4}$ radians. What are the approximate coordinates of E? Explain how you know.

5. a. In which quadrant is the value of the x-coordinate of a point on the unit circle always greater than the y-coordinate? Explain how you know.

b. Name 3 angles in this quadrant.

Building why the relationships

Side relationship in special right triangles.

Lesson 7 Cumulative Practice Problems

1. Which statements are true? Select **all** that apply.

   A. $\sin(\theta) > 0$ for an angle θ in quadrant 2

   B. $\cos(\theta) > 0$ for an angle θ in quadrant 2

   C. $\tan(\theta) > 0$ for an angle θ in quadrant 2

   D. $\sin(\theta) > 0$ for an angle θ in quadrant 3

   E. $\cos(\theta) > 0$ for an angle θ in quadrant 3

   F. $\tan(\theta) > 0$ for an angle θ in quadrant 3

2. The tangent of an angle satisfies $\tan(\theta) = 10$.

   a. Which quadrant could θ lie in? Explain how you know.

   b. Estimate the possible value(s) of θ. Explain your reasoning.

3. Evaluate each of the following:

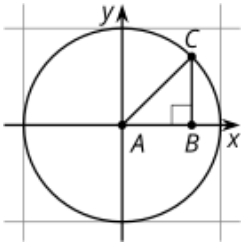
   a. $\tan\left(\frac{5\pi}{4}\right)$

   b. $\sin\left(\frac{3\pi}{2}\right)$

   c. $\cos\left(\frac{7\pi}{4}\right)$

Pythagorean Identity

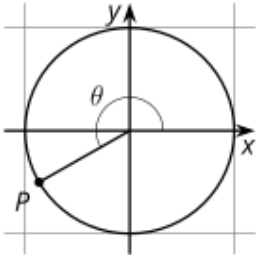
4. Triangle ABC is an isosceles right triangle in the unit circle.



a. Explain why $\sin(A) = \cos(A)$.

b. Use the Pythagorean Theorem to explain why $2(\sin(A))^2 = 1$.

5. Which of the following is true for angle θ? Select **all** that apply.



A. $\sin(\theta) < 0$

B. $\sin(\theta) > 0$

C. $\cos(\theta) < 0$

D. $\cos(\theta) > 0$

E. $\sin(\theta) > \cos(\theta)$

F. $\sin(\theta) < \cos(\theta)$

Application problems

Lesson 8 Cumulative Practice Problems

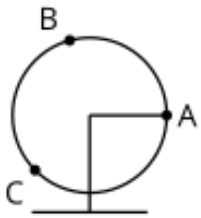
1. The center of a clock is at (0,0) in a coordinate system, and the minute hand is 10 inches long. Find the approximate coordinates of the tip of the minute hand at: (Hint: Use special right triangles)

   a. 12:05 p.m.

   b. 12:45 p.m.

   c. 12:55 p.m.

2. The center of a Ferris wheel is 100 feet off the ground and its radius is 85 feet. The point A is at the 0 radian position, B is rotated $\frac{7\pi}{12}$ radians from A, and C is rotated $\frac{5\pi}{4}$ radians from A.



   For each point A, B, and C, find how high the position on the Ferris wheel is off the ground. Write an expression using the sine or cosine function and estimate the value.

3. A Ferris wheel has a radius of 50 feet, and its center is 60 feet off the ground. How many points on the Ferris wheel are:

   a. 30 feet off the ground?

   b. 110 feet off the ground?

   c. 5 feet off the ground?

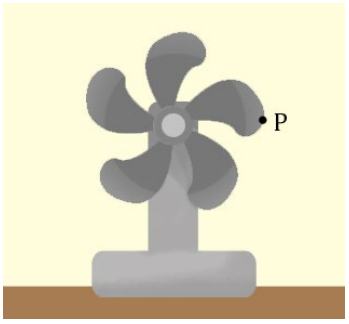
4. The minute hand on a clock tower is 6 feet long. At 10 minutes after the hour, the tip of the minute hand is 55 feet above the ground. How high above the ground is the center of the clock face? Explain how you know.

What makes something periodic

from circles to waves

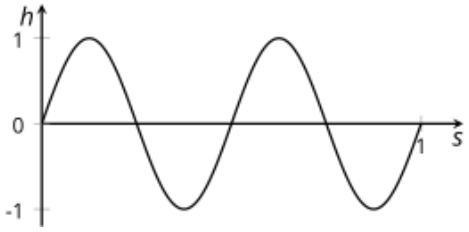
Lesson 09 Cumulative Practice Problems

1. A fan blade spins counterclockwise once per second.

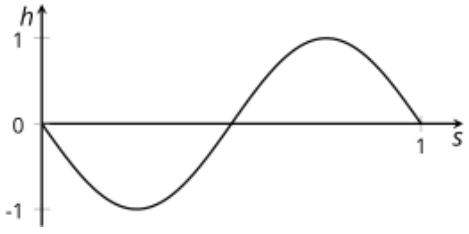


Which of these graphs best depicts the height, h, of P after s seconds? The fan blades are 1 foot long and the height is measured in feet from the center of the fan blades.

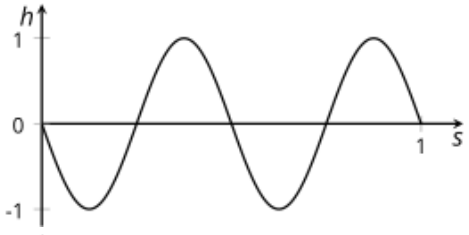
A.



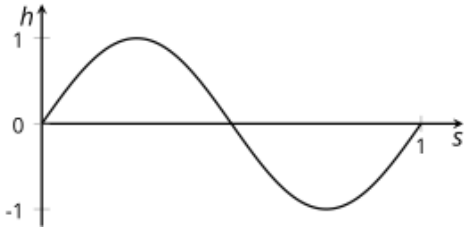
B.



C.



D.



2. Which situations are modeled accurately by a periodic function? Select **all** that apply.

   A. the distance from the earth to the sun as a function of time

   B. the vertical height of a point on a rotating wheel as a function of time

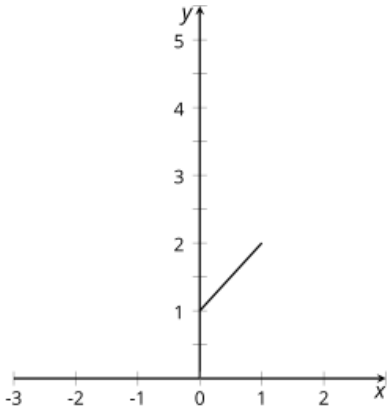
   C. the area of a sheet of paper as a function of the number of times it is folded in half

   D. the number of centimeters in x inches

   E. the height of a swinging pendulum as a function of time

   F. the height of a ball tossed in the air as a function of time

3. Here is the graph of a function for some values of x.



   a. Can you extend the graph to the whole plane so that the function f is periodic? Explain your reasoning.

   b. Can you extend the graph to the whole plane so that the function f is not periodic? Explain your reasoning.

4. a. Can a non-constant linear function be periodic? Explain your reasoning.

   b. Can a quadratic function be periodic? Explain your reasoning.

The sine wave

Connecting sine and cosine

Lesson 10 Cumulative Practice Problems

1. Which statement is *not* true for the function f given by $f(\theta) = \sin(\theta)$, for values of θ between 0 and 2π?

   A. The outputs of the function range from -1 to 1.

   B. $\sin\theta = 1$ only when $\theta = \frac{\pi}{2}$

   C. $\sin\theta = 0$ only when $\theta = 0$

   D. $\sin\theta > 0$ for $0 < \theta < \pi$

2. Angle θ, measured in radians, satisfies $\cos(\theta) = 0$. What could the value of θ be? Select **all** that apply.

   A. 0

   B. $\frac{\pi}{4}$

   C. $\frac{\pi}{2}$

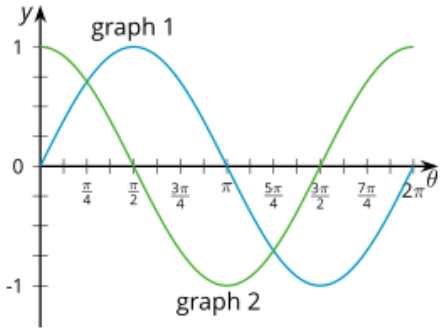
   D. π

   E. $\frac{3\pi}{2}$

3. Here are the graphs of two functions.

   a. Which is the graph of $y = \cos(\theta)$? Explain how you know.

   b. Which is the graph of $y = \sin(\theta)$? Explain how you know.



4. Which statements are true for *both* functions $y = \cos(\theta)$ and $y = \sin(\theta)$? Select **all** that apply.

   A. The function is periodic.

   B. The maximum value is 1.

   C. The maximum value occurs at $\theta = 0$.

   D. The period of the function is 2π.

   E. The function has a value of about 0.71 when $\theta = \frac{\pi}{4}$.

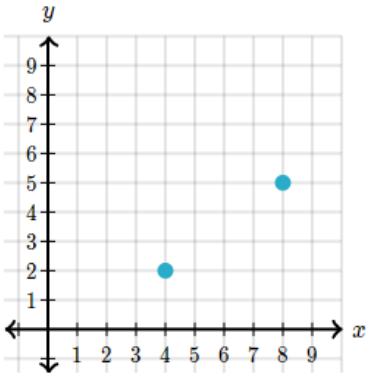
   F. The function has a value of about 0.71 when $\theta = \frac{3\pi}{4}$.

Geometry For the lesson on 20 Apr 2020

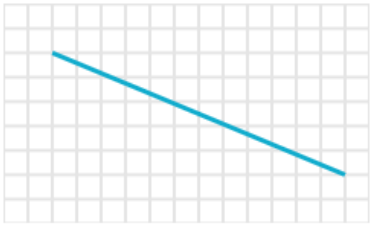
1. What is the distance between (8,−3) and (4,−7)?

Video Help

2. What is the distance between the following points?

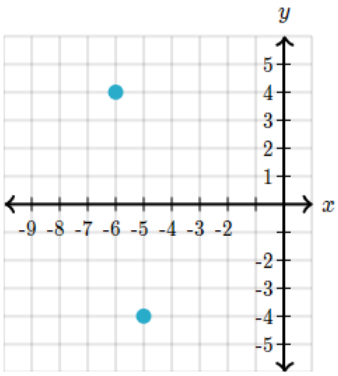


3. What is the length of the line segment?

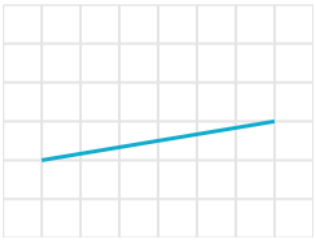


4. What is the distance between (−5,−6) and (−3,−8)?

5. What is the distance between the following points?



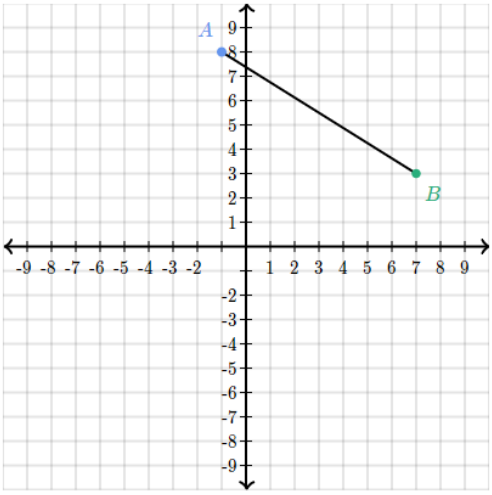
6. What is the length of the line segment?



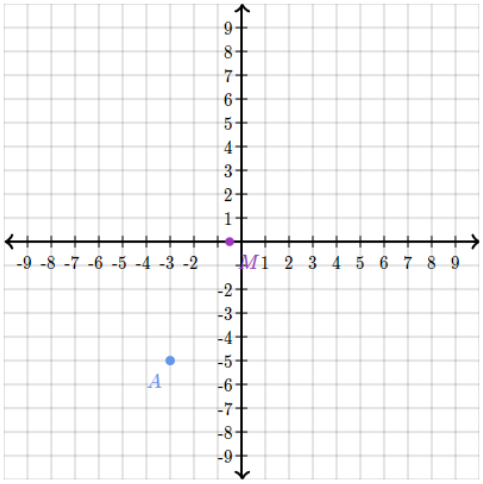
7. What is the distance between $(-9,-6)$ and $(-2,-2)$?

Geometry Lesson for 21 Apr 2020

1. Point A is at (−1,8) and point B is at (7,3). What is the midpoint of line segment $\overline{AB}$?



2. Point A is at (−3,−5) and point M is at (−0.5,0). Point M is the midpoint of point A and point B. What are the coordinates of point B?



3. Point A (-7, 5) and point B is at (7,3). What is the midpoint of line segment $\overline{AB}$?

4. Point A is at (−3,−5) and point Mis at (−1,−7). Point M is the midpoint of point A and point B. What are the coordinates of point B?

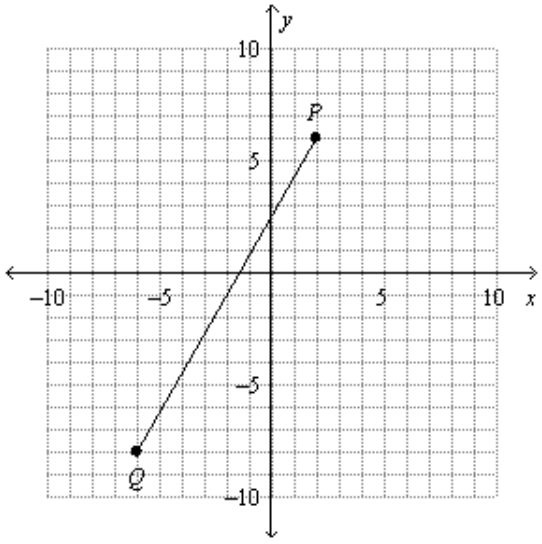
1 A high school soccer team is going to Columbus, Ohio to see a professional soccer game. A coordinate grid is superimposed on a highway map of Ohio. The high school is at point (3, 4) and the stadium in Columbus is at point (7, 1). The map shows a highway rest stop halfway between the high school and the stadium. What are the coordinates of the rest stop? What is the approximate distance between the high school and the stadium? (One unit is approximately equal to 6.4 miles.)

A $\left(5, \frac{5}{2}\right)$, 5 miles
B $\left(\frac{3}{2}, \frac{5}{2}\right)$, 160 miles
C $\left(5, \frac{5}{2}\right)$, 32 miles
D $\left(\frac{3}{2}, \frac{5}{2}\right)$, 16 miles

2 Noam walks home from school by walking 8 blocks north and then 6 blocks east. How much shorter would his walk be if there were a direct path from the school to his house? Assume that the blocks are square.

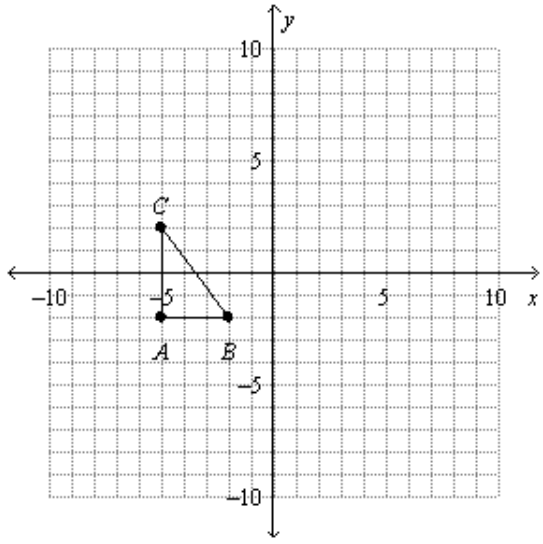
A 14 blocks
B 10 blocks
C 4 blocks
D The distance would be the same.

3 Find the midpoint of the segment.



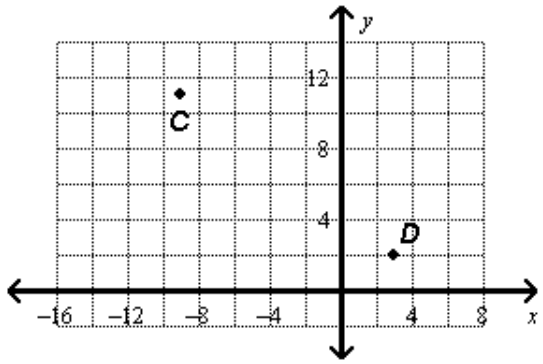
A (–3, –1)
B (–2, 0)
C (–2, –1)
D (–3, 0)

4 Find the perimeter of the triangle with vertices $A(-5, -2)$, $B(-2, -2)$, and $C(-5, 2)$.



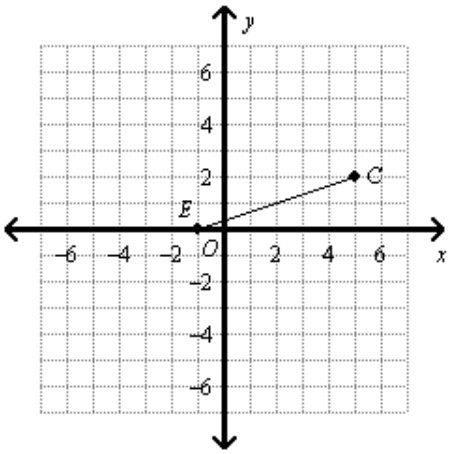
A 12 units
B 7 units
C 32 units
D 14 units

5 On the coordinate plane below, what is the midpoint of $\overline{CD}$?



A (6, 4.5)
B (–4, 6.5)
C (–6, 4.5)
D (–3, 6.5)

6 The midpoint of $\overline{CD}$ is $E(-1, 0)$. One endpoint is $C(5, 2)$. What are the coordinates of the other endpoint?



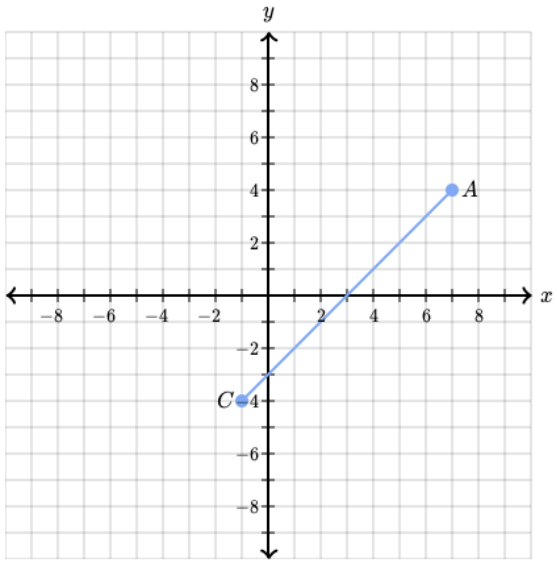
A $D(-7, -2)$
B $D(-2, -7)$
C $D(-5, -2)$
D $D(2, 5)$

Geometry Lesson for 23 Apr 2020

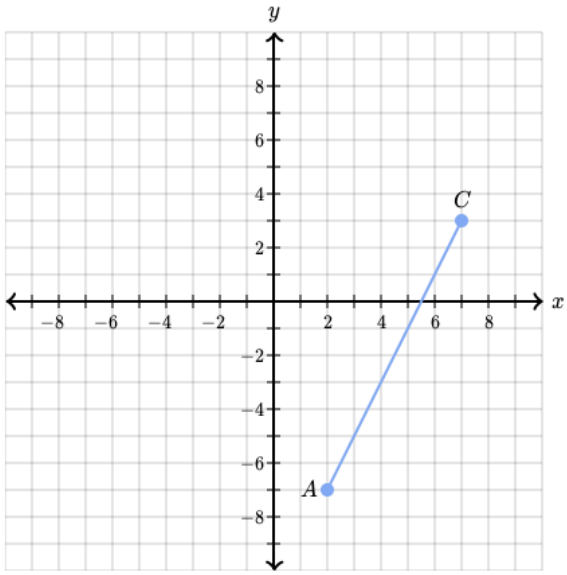
Dividing Line Segments Graphically

Video 2

1. Find the coordinates of point B on $\overline{AC}$ such that AB is $\frac{1}{4}$ of AC.



2. Find the point B on $\overline{AC}$ such that the ratio of AB:BC is 2:3.



3. A, B, and C are collinear, and B is between A and C. The ratio of AB to AC is 2:5. If A is at (−6,9) and B is at (−2,3), what are the coordinates of point C?

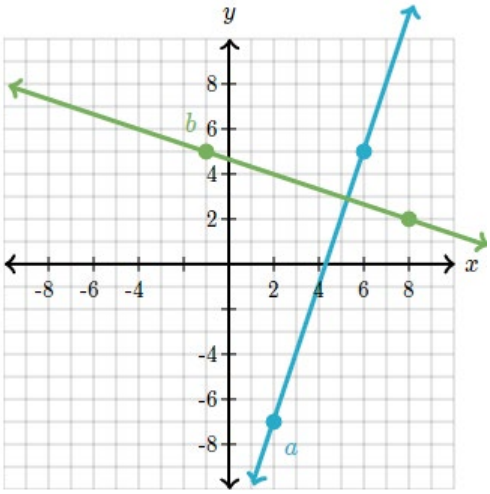
4. A, B, and C are collinear, and B is between A and C. The ratio of AB to BC is 2:1. If A is at (7,−2) and B is at (1,−6), what are the coordinates of point C?

Geometry Lesson for 24 Apr 2020

Introduction Video

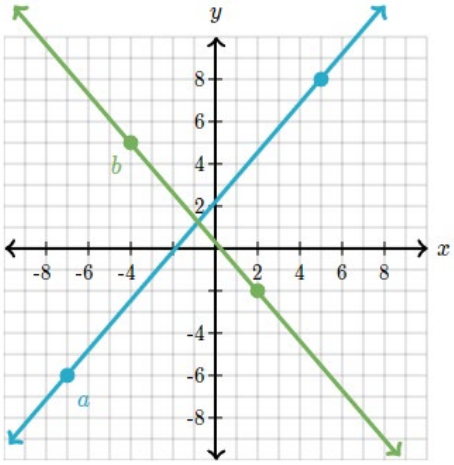
From a Graph

1. Are the lines in the figure parallel, perpendicular, or neither?



2. One line passes through the points (−6,0) and (−4,6). Another line passes through points (5,−2) and (8,7). Are the lines parallel, perpendicular, or neither?

3. Are the lines in the figure parallel, perpendicular, or neither?



4. One line passes through the points (−3,−1) and (1,−9). Another line passes through points (1,4) and (5,6). Are the lines parallel, perpendicular, or neither?


Parallel Lines from Equations


Example #2


Video 3

5. What do the following two equations represent?

$$-2x + 4y = 5$$

$$-4x + 8y = 10$$

6. Find the slope and y-intercept of the line that is parallel to $y=-2x-5$ and passes through the point $(-3,-3)$.

7. What do the following two equations represent?

$$3x - 2y = 5$$
$$-9x + 6y = 3$$

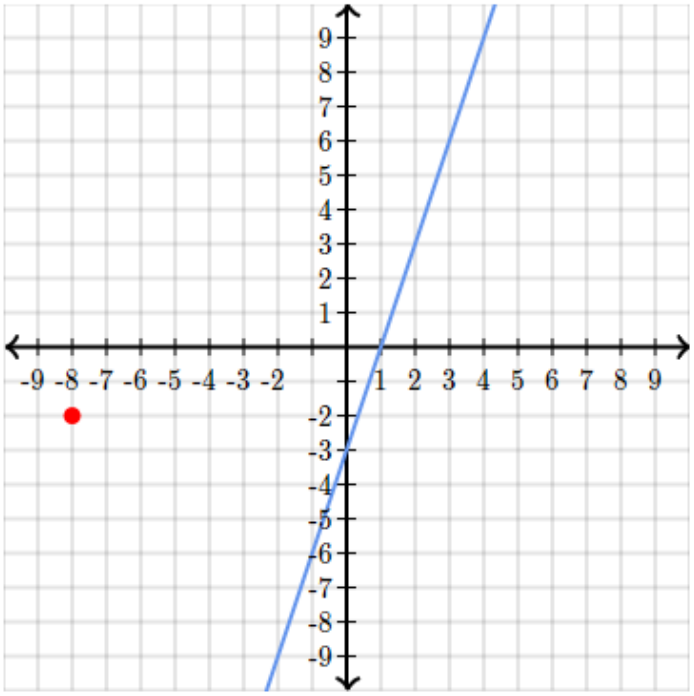
Geometry Lesson for 27 Apr 2020

ID perpendicular lines

Writing equations

Example 2

1. **Find the slope and y-intercept of the line that is perpendicular to $y = 3x - 3$ and passes through the point $(-8, -2)$.**



2. Write the equation of a line that is *parallel* to y = 0.6x + 3and that passes through the point (−3,−5).

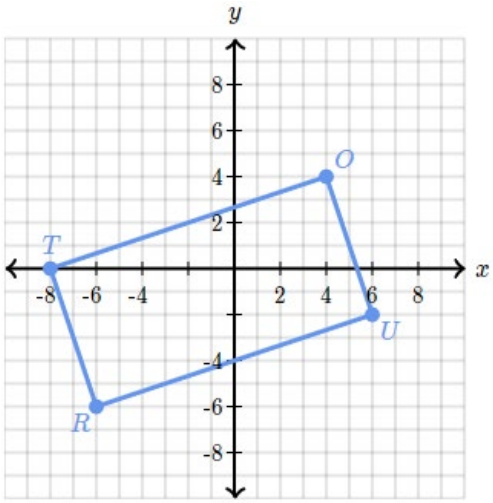
3. Write the equation of a line that is *perpendicular* to y = −0.3x + 6 and that passes through the point (3,−8).

4. Write the equation of a line that is *parallel* to x=−5 and that passes through the point (1,4).

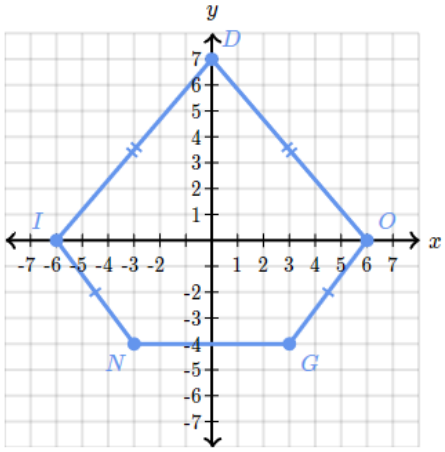
5. Write the equation of a line that is *perpendicular* to y=−1and that passes through the point (8,−4).

Area on the Coordinate Plane

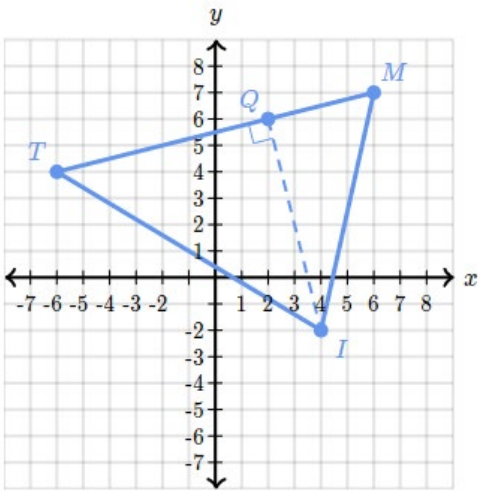
1. Find the area of the rectangle TOUR plotted below.



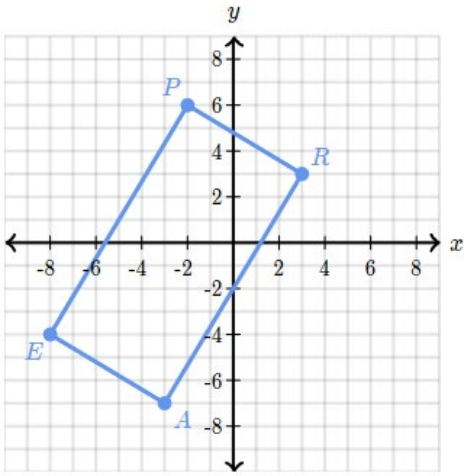
2. Find the approximate perimeter of polygon DINGO plotted below.



3. Find the area of $\triangle MIT$ plotted below.



4. Find the approximate perimeter of rectangle PEAR plotted below.



link for video access

1. A circle is centered at $O(0, 0)$ and has a radius of $\sqrt{38}$.

   Where does the point $K(6, 1)$ lie?

   Choose 1 answer:

   - (A) Inside the circle
   - (B) On the circle
   - (C) Outside the circle

2. A circle is centered at $Q(1, -5)$ and has a radius of 5.

   Where does the point $Y(4, -1)$ lie?

3. A circle is centered at $K(0, 0)$. The point $U(6, -4)$ is on the circle.

   Where does the point $V(\sqrt{2}, -7)$ lie?

4. A circle is centered at $K(0, 0)$. The point $U(6, -4)$ is on the circle.

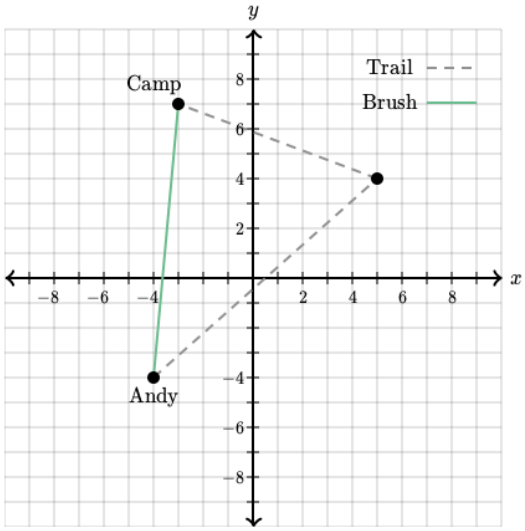
   Where does the point $V(\sqrt{2}, -7)$ lie?

Geometry Lesson for 30 Apr 2020

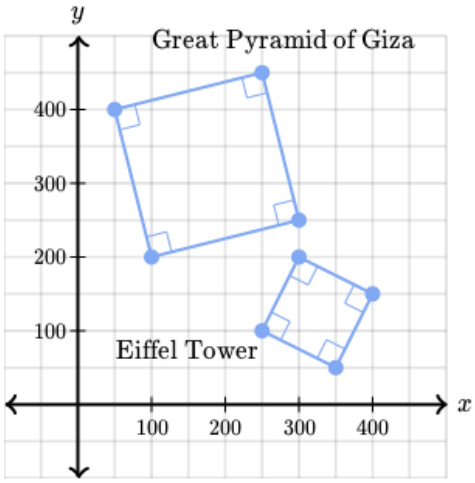
Video

1. Alice the alien is visiting planet Earth to acquire a cow specimen for her terrestrial research. She has landed her ship in a pasture. The ship's sensors are giving the coordinates of the surrounding cows in meters (detailed below). The ship is located at the origin of the coordinate system.
   Cow A is at point (6,8)
   Cow B is at point (−4,9)
   Cow C is at point (7,7)
   If Alice wants to acquire the cow that is closest to her ship, which cow should she take?

2. Andy is alone in the wilderness and eager to get back to camp. Looking at his map (shown below), Andy sees that he might be able to cut through the brush instead of hiking the trail.
   How much shorter would it be for Andy to cut through the brush than hike the trail?



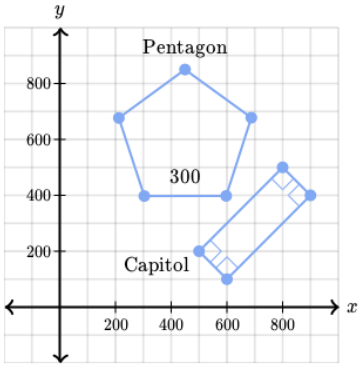
3. Greg and Elizabeth are having a debate. Greg contends that the square base of the Great Pyramid of Giza is at least 4 times as large as the square base of the Eiffel Tower in terms of area. Elizabeth thinks Greg is wrong. To settle their debate, they find satellite images of both structures online and juxtapose them on a single coordinate grid (shown below).



The area of the base of the Great Pyramid of Giza is
The area of the base of the Eiffel Tower is
Who should win the debate?

4. Percy and Caren are having a debate. Percy contends that the headquarters of the United States Department of Defense (also known as the Pentagon) has a longer perimeter than the United States Capitol. Caren contends the opposite.

To settle their debate, they find satellite images of both buildings online and juxtapose them on a single coordinate grid (shown below). Assume the Pentagon is a regular pentagon with side length 300m.

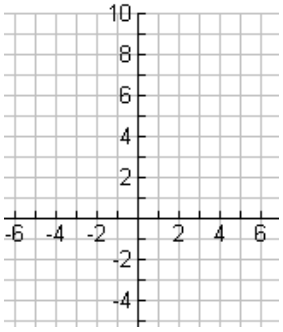


The perimeter of the Pentagon is
The perimeter of the Capitol is
Who should win the debate?

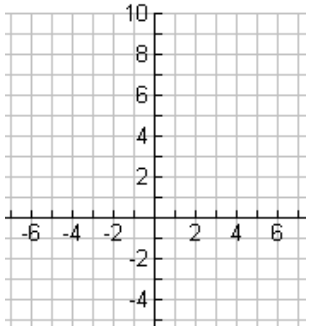
Quadrilaterals in the Coordinate Plane part 1

1 – 2: Show that the quadrilateral with the given vertices is a parallelogram.

1. $A(-3, 2)$, $B(-2, 7)$, $C(2, 4)$, and $D(1, -1)$

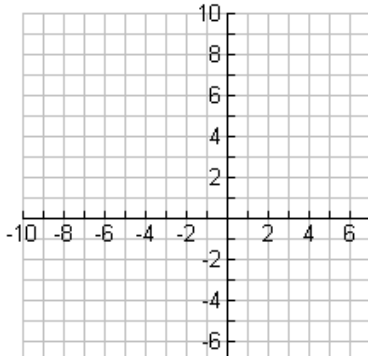


2. $J(-1, 0)$, $K(-3, 7)$, $L(2, 6)$, and $M(4, -1)$



3– 4: Use the diagonals to determine whether a parallelogram with the given vertices is a rectangle, rhombus, or square. Give all names that apply.

3. $A(-10, 4)$, $B(-2, 10)$, $C(4, 2)$, and $D(-4, -4)$



4. $J(-9, -7)$, $K(-4, -2)$, $L(3, -3)$, and $M(-2, -8)$