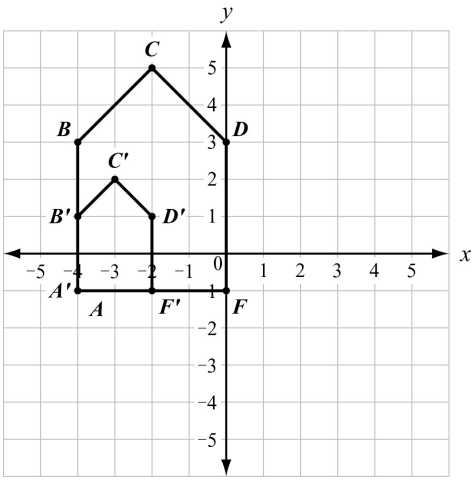
EOCT Practice Items

1) Figure $A'B'C'D'F'$ is a dilation of figure $ABCDF$ by a scale factor of $\frac{1}{2}$. The dilation is centered at (–4, –1).



Which statement is true?

A. $\frac{AB}{A'B'} = \frac{B'C'}{BC}$

B. $\frac{AB}{A'B'} = \frac{BC}{B'C'}$

C. $\frac{AB}{A'B'} = \frac{BC}{D'F'}$

D. $\frac{AB}{A'B'} = \frac{D'F'}{BC}$

[Key: B]

2) Which transformation results in a figure that is similar to the original figure but has a greater area?

A. a dilation of $\triangle QRS$ by a scale factor of 0.25

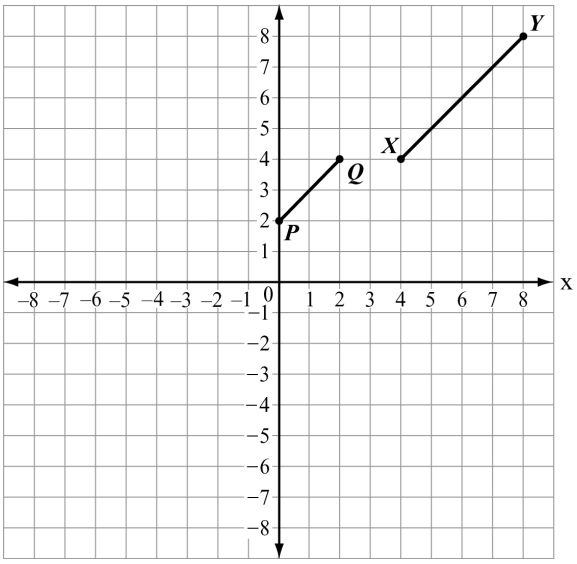
B. a dilation of $\triangle QRS$ by a scale factor of 0.5

C. a dilation of $\triangle QRS$ by a scale factor of 1

D. a dilation of $\triangle QRS$ by a scale factor of 2

[Key: D]

3) In the coordinate plane, segment $\overline{PQ}$ is the result of a dilation of segment $\overline{XY}$ by a scale factor of $\frac{1}{2}$.



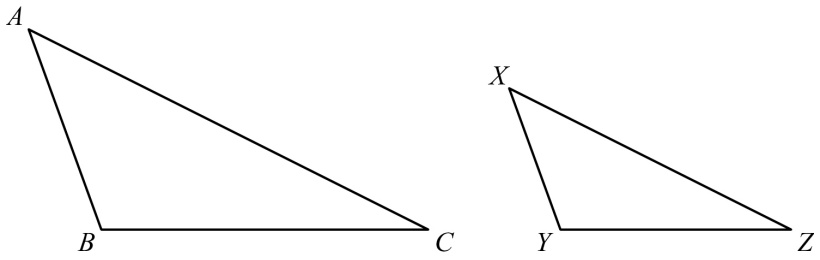
Which point is the center of dilation?

A. (–4, 0)
B. (0, –4)
C. (0, 4)
D. (4, 0)

[Key: A]

EOCT Practice Items

1) In the triangles shown, $\triangle ABC$ is dilated by a factor of $\frac{2}{3}$ to form $\triangle XYZ$.

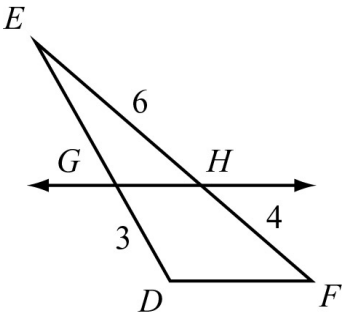


Given that $m\angle A = 50°$ and $m\angle B = 100°$, what is $m\angle Z$?

A. 15°
B. 25°
C. 30°
D. 50°

[Key: C]

2) In the triangle shown, $\overleftrightarrow{GH} \parallel \overline{DF}$.

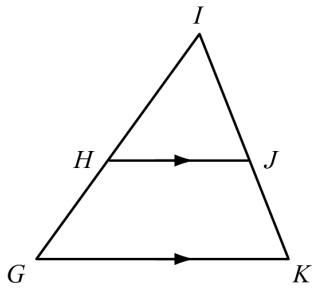


What is the length of $\overline{GE}$?

A. 2.0
B. 4.5
C. 7.5
D. 8.0

[Key: B]

3) Use this triangle to answer the question.



This is a proof of the statement "If a line is parallel to one side of a triangle and intersects the other two sides at distinct points, then it separates these sides into segments of proportional lengths."

	Step	Justification
1	$\overline{GK}$ is parallel to $\overline{HJ}$	Given
2	$\angle HGK \cong \angle IHJ$ $\angle IKG \cong \angle IJH$	?
3	$\triangle GIK \sim \triangle HIJ$	AA similarity postulate
4	$\frac{IG}{IH} = \frac{IK}{IJ}$	Corresponding sides of similar triangles are proportional
5	$\frac{HG + IH}{IH} = \frac{JK + IJ}{IJ}$	Segment addition postulate
6	$\frac{HG}{IH} = \frac{JK}{IJ}$	Subtraction property

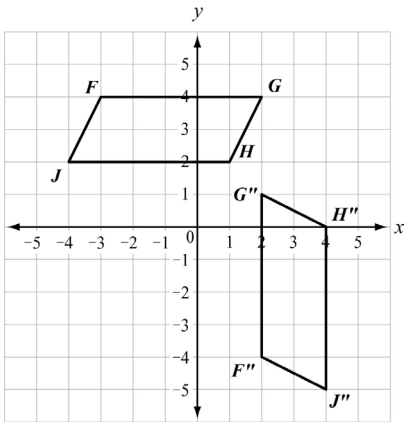
Which reason justifies Step 2?

A. Alternate interior angles are congruent.
B. Alternate exterior angles are congruent.
C. Corresponding angles are congruent.
D. Vertical angles are congruent.

[Key: C]

EOCT Practice Items

1) Parallelogram *FGHJ* was translated 3 units down to form parallelogram *F'G'H'J'*. Parallelogram *F'G'H'J'* was then rotated 90° counterclockwise about point *G'* to obtain parallelogram *F"G"H"J"*.

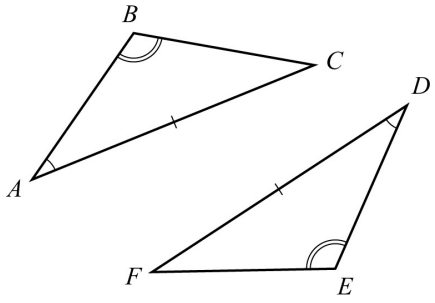


Which statement is true about parallelogram *FGHJ* and parallelogram *F"G"H"J"*?

A. The figures are both similar and congruent.
B. The figures are neither similar nor congruent.
C. The figures are similar but not congruent.
D. The figures are congruent but not similar.

[Key: A]

2) Consider the triangles shown.

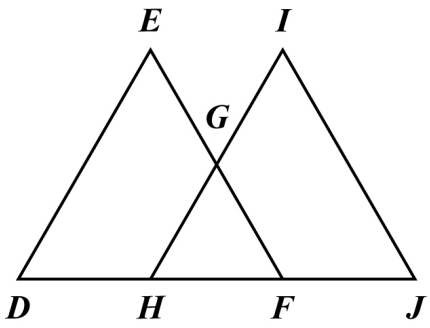


Which can be used to prove the triangles are congruent?

A. SSS
B. ASA
C. SAS
D. AAS

[Key: D]

3) In this diagram, $\overline{DE} \cong \overline{JI}$ and $\angle D \cong \angle J$.



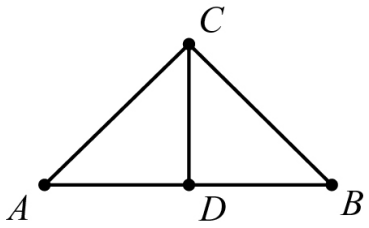
Which additional information is sufficient to prove that $\triangle DEF$ is congruent to $\triangle JIH$?

A. $\overline{EF} \cong \overline{IH}$
B. $\overline{DH} \cong \overline{JF}$
C. $\overline{HG} \cong \overline{GI}$
D. $\overline{HF} \cong \overline{JF}$

[Key: B]

EOCT Practice Items

1) In this diagram, $\overline{CD}$ is the perpendicular bisector of $\overline{AB}$. The two-column proof shows that $\overline{AC}$ is congruent to $\overline{BC}$.



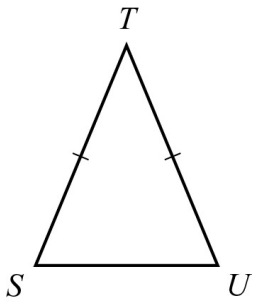
Step	Statement	Justification
1	$\overline{CD}$ is the perpendicular bisector of $\overline{AB}$	Given
2	$\overline{AD} \cong \overline{BD}$	Definition of bisector
3	$\overline{CD} \cong \overline{CD}$	Reflexive Property of Congruence
4	$\angle ADC$ and $\angle BDC$ are right angles	Definition of perpendicular lines
5	$\angle ADC \cong \angle BDC$	All right angles are congruent
6	$\triangle ADC \cong \triangle BDC$	**?**
7	$\overline{AC} \cong \overline{BC}$	CPCTC

Which theorem would justify Step 6?

A. AAS
B. ASA
C. SAS
D. SSS

[Key: C]

2) In this diagram, *STU* is an isosceles triangle where $\overline{ST}$ is congruent to $\overline{UT}$. The paragraph proof shows that $\angle S$ is congruent to $\angle U$.



It is given that $\overline{ST}$ is congruent to $\overline{UT}$. Draw $\overline{TV}$ that bisects $\angle T$. By the definition of an angle bisector, $\angle STV$ is congruent to $\angle UTV$. By the Reflexive Property, $\overline{TV}$ is congruent to $\overline{TV}$. Triangle *STV* is congruent to triangle *UTV* by SAS. $\angle S$ is congruent to $\angle U$ by _____?_____.

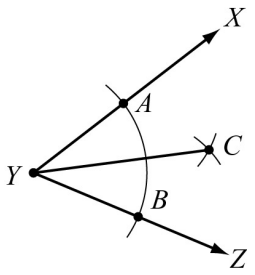
Which step is missing in the proof?

A. CPCTC
B. Reflexive Property of Congruence
C. Definition of right angles
D. Angle Congruence Postulate

[Key: A]

EOCT Practice Items

1) Consider the construction of the angle bisector shown.



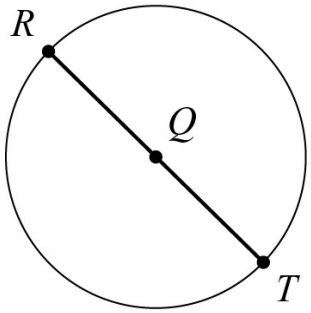
Which could have been the first step in creating this construction?

A. Place the compass point on point A and draw an arc inside $\angle Y$.
B. Place the compass point on point B and draw an arc inside $\angle Y$.
C. Place the compass point on vertex Y and draw an arc that intersects $\overline{YX}$ and $\overline{YZ}$.
D. Place the compass point on vertex Y and draw an arc that intersects point C.

[Key: C]

2) Consider the beginning of a construction of a square inscribed in circle *Q*.

Step 1: Label point *R* on circle *Q*.
Step 2: Draw a diameter through *R* and *Q*.
Step 3: Label the intersection on the circle point *T*.



What is the next step in this construction?

A. Draw radius $\overline{SQ}$.
B. Label point S on circle Q.
C. Construct a line segment parallel to $\overline{RT}$.
D. Construct the perpendicular bisector of $\overline{RT}$.

[Key: D]

EOCT Practice Items

1) In right triangle *ABC*, angle *A* and angle *B* are complementary angles. The value of cos *A* is $\frac{5}{13}$. What is the value of sin *B*?

A. $\frac{5}{13}$

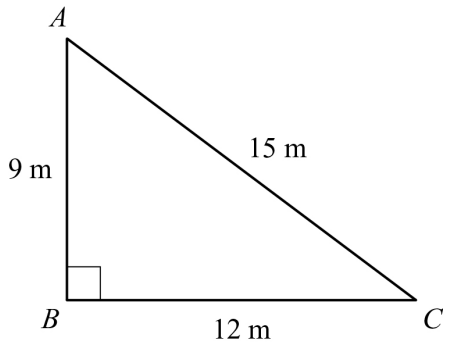
B. $\frac{12}{13}$

C. $\frac{13}{12}$

D. $\frac{13}{5}$

[Key: A]

2) Triangle *ABC* is given below.



What is the value of cos *A*?

A. $\frac{3}{5}$

B. $\frac{3}{4}$

C. $\frac{4}{5}$

D. $\frac{5}{3}$

[Key: A]

3) In right triangle *HJK*, $\angle J$ is a right angle and $\tan\angle H = 1$. Which statement about triangle *HJK* must be true?

A. $\sin\angle H = \frac{1}{2}$

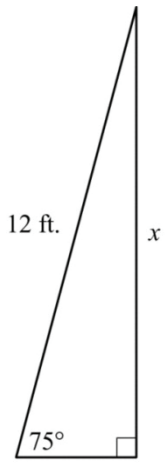
B. $\sin\angle H = 1$

C. $\sin\angle H = \cos\angle H$

D. $\sin\angle H = \frac{1}{\cos\angle H}$

[Key: C]

4) A 12-foot ladder is leaning against a building at a 75° angle with the ground.



Which can be used to find how high the ladder reaches up the side of the building?

A. $\sin 75^\circ = \frac{12}{x}$

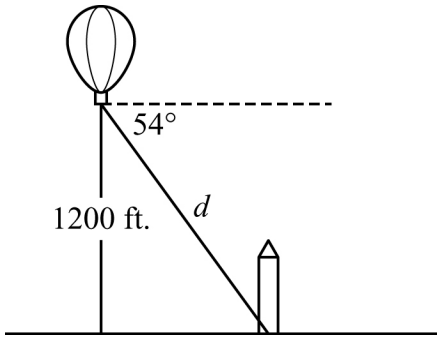
B. $\tan 75^\circ = \frac{12}{x}$

C. $\cos 75^\circ = \frac{x}{12}$

D. $\sin 75^\circ = \frac{x}{12}$

[Key: D]

5) A hot air balloon is 1200 feet above the ground. The angle of depression from the basket of the hot-air balloon to the base of a monument is 54°.



Which equation can be used to find the distance, *d*, in feet, from the basket of the hot-air balloon to the base of the monument?

A. $\sin 54° = \frac{d}{1200}$

B. $\sin 54° = \frac{1200}{d}$

C. $\cos 54° = \frac{d}{1200}$

D. $\cos 54° = \frac{1200}{d}$

[Key: B]

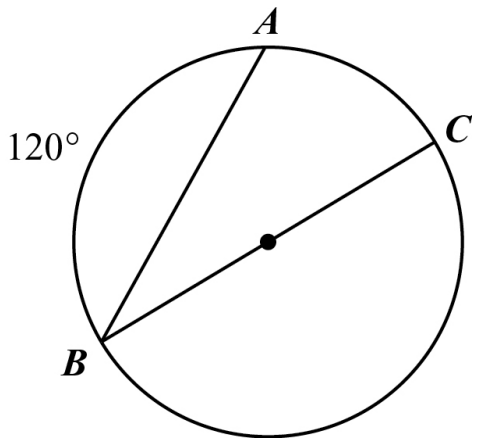
EOCT Practice Items

1) Circle *P* is dilated to form circle *P'*. Which statement is ALWAYS true?

A. The radius of circle *P* is equal to the radius of circle *P'*.
B. The length of any chord in circle *P* is greater than the length of any chord in circle *P'*.
C. The diameter of circle *P* is greater than the diameter of circle *P'*.
D. The ratio of the diameter to the circumference is the same for both circles.

[Key: D]

2) In the circle shown, $\overline{BC}$ is a diameter and $m\overset{\frown}{AB} = 120°$.



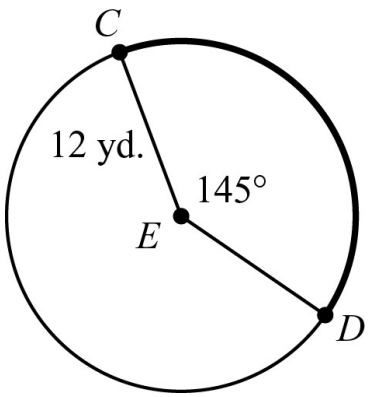
What is the measure of $\angle ABC$?

A. 15°
B. 30°
C. 60°
D. 120°

[Key: B]

EOCT Practice Items

1) Circle *E* is shown.



What is the length of $\overset{\frown}{CD}$?

A. $\frac{29}{72}\pi$ yd.

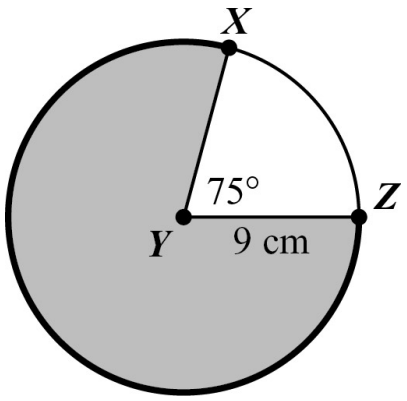
B. $\frac{29}{6}\pi$ yd.

C. $\frac{29}{3}\pi$ yd.

D. $\frac{29}{2}\pi$ yd.

[Key: C]

2) Circle *Y* is shown.



What is the area of the shaded part of the circle?

A. $\frac{57}{4}\pi$ cm^2

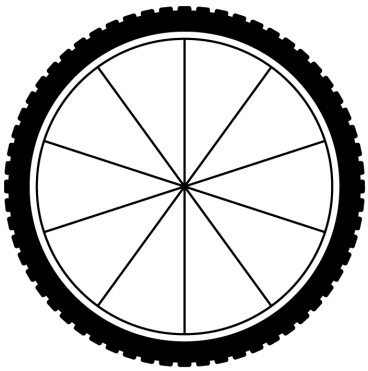
B. $\frac{135}{8}\pi$ cm^2

C. $\frac{405}{8}\pi$ cm^2

D. $\frac{513}{8}\pi$ cm^2

[Key: D]

3) The spokes of a bicycle wheel form 10 congruent central angles. The diameter of the circle formed by the outer edge of the wheel is 18 inches.



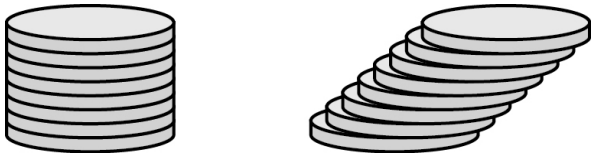
What is the length, to the nearest 0.1 inch, of the outer edge of the wheel between two consecutive spokes?

A. 1.8 inches
B. 5.7 inches
C. 11.3 inches
D. 25.4 inches

[Key: B]

EOCT Practice Items

1) Jason constructed two cylinders using solid metal washers. The cylinders have the same height, but one of the cylinders is slanted as shown.



Which statement is true about Jason's cylinders?

A. The cylinders have different volumes because they have different radii.
B. The cylinders have different volumes because they have different surface areas.
C. The cylinders have the same volume because each of the washers has the same height.
D. The cylinders have the same volume because they have the same cross-sectional area at every plane parallel to the bases.

[Key: D]

2) What is the volume of a cylinder with a radius of 3 in. and a height of $\frac{9}{2}$ in.?

A. $\frac{81}{2}\pi$ in.^{3}

B. $\frac{27}{4}\pi$ in.^{3}

C. $\frac{27}{8}\pi$ in.^{3}

D. $\frac{9}{4}\pi$ in.^{3}

[Key: A]

EOCT Practice Items

1) Which shows $\sqrt[4]{x^4}+\sqrt[4]{16x^2}+\sqrt[4]{x}$ using rational exponents for all positive values of x?

A. $x^{16}+16x^8+x^4$

B. $x+2x^{\frac{1}{2}}+x^{\frac{1}{4}}$

C. $x+4x^{\frac{1}{2}}+x^{\frac{1}{4}}$

D. $x^{\frac{1}{16}}+2x^{\frac{1}{8}}+x^{\frac{1}{4}}$

[Key: B]

2) Which expression is equivalent to $\frac{\sqrt{x}}{x^3}$?

A. $x^{\frac{5}{2}}$

B. $\sqrt{x^5}$

C. $\frac{1}{\sqrt{x^5}}$

D. $\frac{1}{x\sqrt{x}}$

[Key: C]

3) Which expression is equivalent to $\sqrt[3]{64x^{\frac{6}{7}}}$?

A. $4x^{\frac{2}{7}}$

B. $4x^{\frac{18}{7}}$

C. $64x^{\frac{2}{7}}$

D. $64x^{18}$

[Key: A]

4) Which expression is equivalent to $\sqrt{32} - \sqrt{8}$?

A. $2\sqrt{2}$
B. $6\sqrt{2}$
C. $2\sqrt{6}$
D. $2\sqrt{10}$

[Key: A]

5) Which expression is equivalent to $\sqrt{\frac{16}{27}}$?

A. $\frac{4\sqrt{3}}{3}$
B. $\frac{2\sqrt{3}}{3}$
C. $\frac{3\sqrt{3}}{4}$
D. $\frac{4\sqrt{3}}{9}$

[Key: D]

EOCT Practice Items

1) Which expression has a value that is a rational number?

A. $\sqrt{10}+16$

B. $2\left(\sqrt{5}+\sqrt{7}\right)$

C. $\sqrt{9}+\sqrt{4}$

D. $\sqrt{3}+0$

[Key: C]

2) Which statement is true about the value of $\left(\sqrt{8}+4\right)\bullet 4$?

A. It is rational, because the product of two rational numbers is rational.

B. It is rational, because the product of a rational number and an irrational number is rational.

C. It is irrational, because the product of two irrational numbers is irrational.

D. It is irrational, because the product of an irrational number and a rational number is irrational.

[Key: D]

3) Let *a* be a nonzero rational number and *b* be an irrational number. Which of these MUST be a rational number?

A. $b + 0$

B. $a + a$

C. $a + b$

D. $b + b$

[Key: B]

Solution:

Substitute $4x + 1$ for l and $2x - 3$ for w into the formula for the area of a rectangle:

$A = lw$

$A = (4x + 1)(2x - 3)$

$A = 8x^2 - 12x + 2x - 3$

$A = 8x^2 - 10x - 3$ square feet

EOCT Practice Items

1) What is the product of $7x - 4$ and $8x + 5$?

A. $15x + 1$

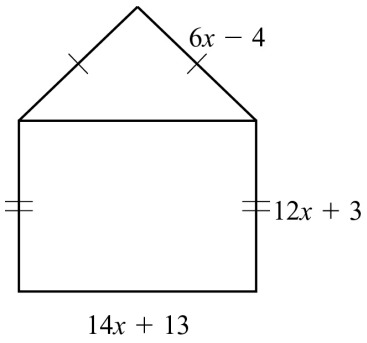
B. $30x + 2$

C. $56x^2 + 3x - 20$

D. $56x^2 - 3x + 20$

[Key: C]

2) A model of a house is shown.



What is the perimeter, in units, of the model?

A. $32x + 12$

B. $46x + 25$

C. $50x + 11$

D. $64x + 24$

[Key: C]

3) Which has the same value as the expression $(8x^2 + 2x - 6) - (5x^2 - 3x + 2)$?

A. $3x^2 - x - 4$

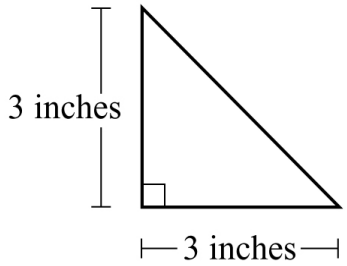
B. $3x^2 + 5x - 8$

C. $13x^2 - x - 8$

D. $13x^2 - 5x - 4$

[Key: B]

4) Kelly makes two different-sized ceramic tiles in the shape of right isosceles triangles. This diagram shows the leg lengths of the small tile.



Kelly makes a larger tile by increasing the length of each leg of the small tile by x inches. Which expression represents the length, in inches, of the hypotenuse of the large tile?

A. $18 + x$

B. $(x + 3)^2$

C. $(x + 3)\sqrt{2}$

D. $3\sqrt{2} + x$

[Key: C]

EOCT Practice Items

1) Which has the same value as $-i^5 + i^3$?

A. $-2i$
B. -2
C. 2
D. $2i$

[Key: A]

2) Let $r = 4 + i$ and $s = 1 - i$. What is the value of $r^2 - s$?

A. $14 + i$
B. $15 + i$
C. $14 + 7i$
D. $14 + 9i$

[Key: D]

3) Which has the same value as $(5 - 3i)(-4 + 2i)$?

A. $-26 - 2i$
B. $-26 + 22i$
C. $-14 - 2i$
D. $-14 + 22i$

[Key: D]

EOCT Practice Items

1) What are the solutions to the equation $12x^2 = -300$?

A. $x = \pm 5$

B. $x = \pm 5i$

C. $x = 5 \pm i$

D. $x = -5 \pm i$

[Key: B]

2) What are the solutions to the equation $2x^2 + 3x + 9 = 0$?

A. $x = \frac{3}{4} \pm \frac{21}{4}i$

B. $x = -\frac{3}{4} \pm \frac{21}{4}i$

C. $x = \frac{3}{4} \pm \frac{3i\sqrt{7}}{4}$

D. $x = -\frac{3}{4} \pm \frac{3i\sqrt{7}}{4}$

[Key: D]

EOCT Practice Items

1) In which expression is the coefficient of the *n* term –1?

A. $3n^2 + 4n - 1$

B. $-n^2 + 5n + 4$

C. $-2n^2 - n + 5$

D. $4n^2 + n - 5$

[Key: C]

2) Which expression is equivalent to $121x^4 - 64y^6$?

A. $(11x^2 - 16y^2)(11x^2 + 16y^2)$

B. $(11x^2 - 16y^3)(11x^2 - 16y^3)$

C. $(11x^2 + 8y^2)(11x^2 + 8y^2)$

D. $(11x^2 + 8y^3)(11x^2 - 8y^3)$

[Key: D]

3) The expression s^2 is used to calculate the area of a square, where *s* is the side length of the square. What does the expression $(8x)^2$ represent?

A. the area of a square with a side length of 8

B. the area of a square with a side length of 16

C. the area of a square with a side length of $4x$

D. the area of a square with a side length of $8x$

[Key: D]

EOCT Practice Items

1) What are the zeros of the function represented by the quadratic expression $2x^2 + x - 3$?

A. $x = -\frac{3}{2}$ and $x = 1$

B. $x = -\frac{2}{3}$ and $x = 1$

C. $x = -1$ and $x = \frac{2}{3}$

D. $x = -1$ and $x = -\frac{3}{2}$

[Key: A]

2) What is the vertex of the graph of $f(x) = x^2 + 10x - 9$?

A. (5, 66)

B. (5, –9)

C. (–5, –9)

D. (–5, –34)

[Key: D]

3) Which of the following is the result of completing the square for the expression $x^2 + 8x - 30$?

A. $(x + 4)^2 - 30$

B. $(x + 4)^2 - 46$

C. $(x + 8)^2 - 30$

D. $(x + 8)^2 - 94$

[Key: B]

4) The expression $-x^2 + 70x - 600$ represents a company's profit for selling x items. For which number(s) of items sold is the company's profit equal to \$0?

A. 0 items

B. 35 items

C. 10 items and 60 items

D. 20 items and 30 items

[Key: C]

EOCT Practice Items

1) A garden measuring 8 feet by 12 feet will have a walkway around it. The walkway has a uniform width, and the area covered by the garden and the walkway is 192 square feet. What is the width of the walkway?

A. 2 feet

B. 3.5 feet

C. 4 feet

D. 6 feet

[Key: A]

2) The formula for the surface area of a cone is $SA = \pi r^2 + \pi rs$. Which equation shows the formula in terms of s?

A. $s = \frac{SA}{\pi r} - \pi r^2$

B. $s = \frac{SA}{\pi r} + \pi r^2$

C. $s = \frac{SA - \pi r^2}{\pi r}$

D. $s = \frac{SA + \pi r^2}{\pi r}$

[Key: C]

3) Solve the equation $x^2 - 100 = 0$ by using square roots.

Solution:

Solve the equation using square roots.

$x^2 = 100$	Add 100 to both sides of the equation.
$x = \pm\sqrt{100}$	Take the square root of both sides of the equation.
$x = \pm 10$	Evaluate.

EOCT Practice Items

1) What are the solutions to the equation $2x^2 - 2x - 12 = 0$?

A. $x = -4, x = 3$

B. $x = -3, x = 4$

C. $x = -2, x = 3$

D. $x = -6, x = 2$

[Key: C]

2) What are the solutions to the equation $4x^2 + 8x + 20 = 0$?

A. $x = 1 \pm 2i$

B. $x = -1 \pm 2i$

C. $x = 1 \pm i$

D. $x = -1 \pm i$

[Key: B]

3) What are the solutions to the equation $6x^2 - x - 40 = 0$?

A. $x = -\frac{8}{3}, x = -\frac{5}{2}$

B. $x = -\frac{8}{3}, x = \frac{5}{2}$

C. $x = \frac{5}{2}, x = \frac{8}{3}$

D. $x = -\frac{5}{2}, x = \frac{8}{3}$

[Key: D]

4) What are the solutions to the equation $x^2 - 5x = 14$?

A. $x = -7, x = -2$

B. $x = -14, x = -1$

C. $x = -2, x = 7$

D. $x = -1, x = 14$

[Key: C]

5) An object is thrown in the air with an initial velocity of 5 m/s from a height of 9 m. The equation $h(t) = -4.9t^2 + 5t + 9$ models the height of the object in meters after t seconds.

How many seconds does it take for the object to hit the ground?

A. 0.94 seconds

B. 1.77 seconds

C. 1.96 seconds

D. 9.0 seconds

[Key: C]

EOCT Practice Items

1) What are the solutions of this system of equations?

$$y = 5x^2 + 7x - 6$$
$$y = 12x - 6$$

A. (0, 6) and (1, –6)

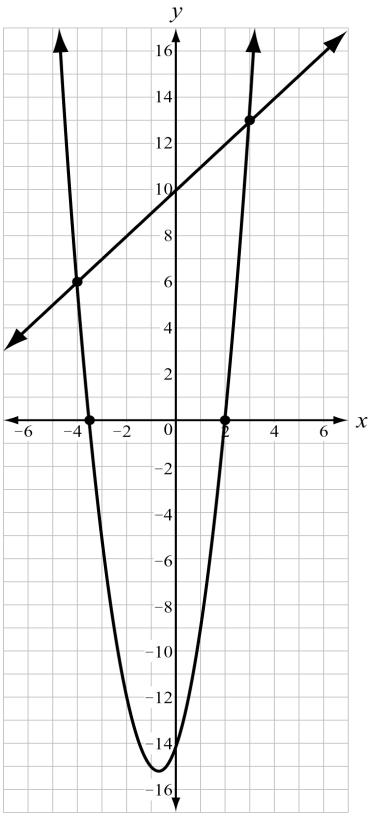
B. (0, –6) and (1, –6)

C. (0, –6) and (1, 6)

D. (–6, 0) and (6, 1)

[Key: C]

2) What appear to be the solutions of the system of equations shown in the graph?



A. (4, 6) and (3, 13)

B. (–4, 6) and (3, 13)

C. (–4, 13) and (3, 6)

D. (–3, 13) and (4, 6)

[Key: B]

$$\frac{f(b)-f(a)}{b-a}=\frac{627-18}{24-3}=\frac{609}{21}=29$$

The average rate of change between 3 and 24 months is 29 thousand dollars ($29,000) per month.

EOCT Practice Items

1) A flying disk is thrown into the air from a height of 25 feet at time $t = 0$. The function that models this situation is $h(t) = -16t^2 + 75t + 25$, where t is measured in seconds and h is the height in feet. What values of t best describe the times when the disk is flying in the air?

A. $0 < t < 5$

B. $0 < t < 25$

C. all real numbers

D. all positive integers

[Key: A]

2) Use this table to answer the question.

x	$f(x)$
–2	15
–1	9
0	5
1	3
2	3

What is the average rate of change of $f(x)$ over the interval $-2 \le f(x) \le 0$?

A. –10

B. –5

C. 5

D. 10

[Key: B]

3) What is the end behavior of the graph of $f(x) = -0.25x^2 - 2x + 1$?

A. As x increases, $f(x)$ increases.
As x decreases, $f(x)$ decreases.

B. As x increases, $f(x)$ decreases.
As x decreases, $f(x)$ decreases.

C. As x increases, $f(x)$ increases.
As x decreases, $f(x)$ increases.

D. As x increases, $f(x)$ decreases.
As x decreases, $f(x)$ increases. [Key: B]

Solution:

The minimum value of a quadratic function is the *y*-value of the vertex.
The vertex of the graph of $f(x)$ appears to be (2, –18). So, the minimum value is –18.

Find the vertex of the function $g(x) = 4x^2 + 6x - 18$.

To find the vertex of $g(x)$, use $\left(\frac{-b}{2a}, g\left(\frac{-b}{2a}\right)\right)$ with $a = 4$ and $b = 6$.

$$x = \frac{-b}{2a} = \frac{-(6)}{2(4)} = \frac{-6}{8} = -0.75$$

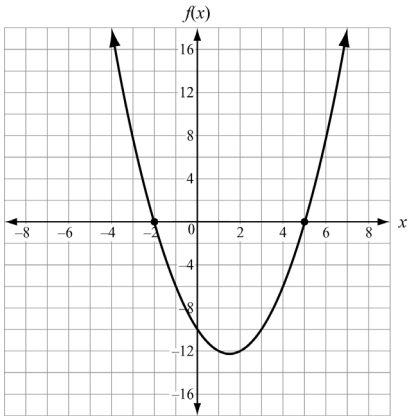
Substitute –0.75 for x in the original function $g(x)$ to find $g(-0.75)$:

$$g(x) = 4x^2 + 6x - 18$$
$$g(-0.75) = 4(-0.75)^2 + 6(-0.75) - 18$$
$$= 2.25 - 4.5 - 18$$
$$= -20.25$$

The minimum value of $g(x)$ is –20.25.
$-20.25 < -18$, so the function $g(x)$ has the lesser minimum value.

EOCT Practice Items

1) Use this graph to answer the question.



Which function is shown in the graph?

A. $f(x) = x^2 - 3x - 10$

B. $f(x) = x^2 + 3x - 10$

C. $f(x) = x^2 + x - 12$

D. $f(x) = x^2 - 5x - 8$

[Key: A]

2) The function $f(t) = -16t^2 + 64t + 5$ models the height of a ball that was hit into the air, where t is measured in seconds and h is the height in feet.

This table represents the height, $g(t)$, of a second ball that was thrown into the air.

Time, t (in seconds)	Height, $g(t)$ (in feet)
0	4
1	36
2	36
3	4

Which statement BEST compares the length of time each ball is in the air?

A. The ball represented by $f(t)$ is in the air for about 5 seconds, and the ball represented by $g(t)$ is in the air for about 3 seconds.

B. The ball represented by $f(t)$ is in the air for about 3 seconds, and the ball represented by $g(t)$ is in the air for about 5 seconds.

C. The ball represented by $f(t)$ is in the air for about 3 seconds, and the ball represented by $g(t)$ is in the air for about 4 seconds.

D. The ball represented by $f(t)$ is in the air for about 4 seconds, and the ball represented by $g(t)$ is in the air for about 3 seconds.

[Key: D]

EOCT Practice Items

1) What explicit expression can be used to find the next term in this sequence?

2, 8, 18, 32, 50, …

A. $2n$

B. $2n + 6$

C. $2n^2$

D. $2n^2 + 1$

[Key: C]

2) The function $s(t) = vt + h - 0.5at^2$ represents the height of an object, s, from the ground after time, t, when the object is thrown with an initial velocity of v, at an initial height of h, and where a is the acceleration due to gravity (32 feet per second squared).

A baseball player hits a baseball 4 feet above the ground with an initial velocity of 80 feet per second. About how long will it take the baseball to hit the ground?

A. 2 seconds

B. 3 seconds

C. 4 seconds

D. 5 seconds

[Key: D]

3) A café's annual income depends on x, the number of customers. The function $I(x) = 4x^2 - 20x$ describes the café's total annual income. The function $C(x) = 2x^2 + 5$ describes the total amount the café spends in a year. The café's annual profit, $P(x)$, is the difference between the annual income and the amount spent in a year.

Which function describes $P(x)$?

A. $P(x) = 2x^2 - 20x - 5$

B. $P(x) = 4x^3 - 20x^2$

C. $P(x) = 6x^2 - 20x + 5$

D. $P(x) = 8x^4 - 40x^3 - 20x^2 - 100x$

[Key: A]

EOCT Practice Items

1) Which statement BEST describes the graph of $f(x + 6)$?

A. The graph of $f(x)$ is shifted up 6 units.

B. The graph of $f(x)$ is shifted left 6 units.

C. The graph of $f(x)$ is shifted right 6 units.

D. The graph of $f(x)$ is shifted down 6 units.

[Key: B]

2) Which of these is an even function?

A. $f(x) = 5x^2 - x$

B. $f(x) = 3x^3 + x$

C. $f(x) = 6x^2 - 8$

D. $f(x) = 4x^3 + 2x^2$

[Key: C]

3) Which statement BEST describes how the graph of $g(x) = -3x^2$ compares to the graph of $f(x) = x^2$?

A. The graph of $g(x)$ is a vertical stretch of $f(x)$ by a factor of 3.

B. The graph of $g(x)$ is a reflection of $f(x)$ across the x-axis.

C. The graph of $g(x)$ is a vertical shrink of $f(x)$ by a factor of $\frac{1}{3}$ and a reflection across the x-axis.

D. The graph of $g(x)$ is a vertical stretch of $f(x)$ by a factor of 3 and a reflection across the x-axis.

[Key: D]

EOCT Practice Items

1) A table of values is shown for $f(x)$ and $g(x)$.

x	$f(x)$
0	0
1	1
2	4
3	9
4	16
5	25

x	$g(x)$
0	–2
1	–1
2	1
3	5
4	13
5	29

Which statement compares the graphs of $f(x)$ and $g(x)$ over the interval [0, 5]?

A. The graph of $f(x)$ always exceeds the graph of $g(x)$ over the interval [0, 5].

B. The graph of $g(x)$ always exceeds the graph of $f(x)$ over the interval [0, 5].

C. The graph of $g(x)$ exceeds the graph of $f(x)$ over the interval [0, 4], the graphs intersect at a point between 4 and 5, and then the graph of $f(x)$ exceeds the graph of $g(x)$.

D. The graph of $f(x)$ exceeds the graph of $g(x)$ over the interval [0, 4], the graphs intersect at a point between 4 and 5, and then the graph of $g(x)$ exceeds the graph of $f(x)$.

[Key: D]

2) Which statement is true about the graphs of exponential functions?

A. The graphs of exponential functions never exceed the graphs of linear and quadratic functions.

B. The graphs of exponential functions always exceed the graphs of linear and quadratic functions.

C. The graphs of exponential functions eventually exceed the graphs of linear and quadratic functions.

D. The graphs of exponential functions eventually exceed the graphs of linear functions, but not quadratic functions.

[Key: C]

3) Which statement BEST describes the comparison of the function values for $f(x)$ and $g(x)$?

x	$f(x)$	$g(x)$
0	0	–10
1	2	–9
2	4	–6
3	6	–1
4	8	6

A. The values of $f(x)$ will always exceed the values of $g(x)$.

B. The values of $g(x)$ will always exceed the values of $f(x)$.

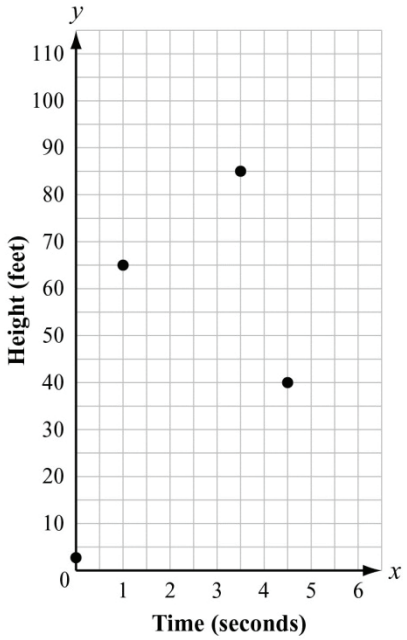
C. The values of $f(x)$ exceed the values of $g(x)$ over the interval [0, 5].

D. The values of $g(x)$ begin to exceed the values of $f(x)$ within the interval [4, 5].

[Key D]

EOCT Practice Items

1) This scatter plot shows the height, in feet, of a ball launched in the air from an initial height of 3 feet, and the time the ball traveled in seconds.



Based on an estimated quadratic regression curve, which is the BEST estimate for the maximum height of the ball?

A. 75 feet

B. 85 feet

C. 100 feet

D. 120 feet

[Key: C]

2) The quadratic function $f(x) = -45x^2 + 350x + 1{,}590$ models the population of a city, where x is the number of years after 2005 and $f(x)$ is the population of the city in thousands of people. What is the estimated population of the city in 2015?

A. 45,000

B. 77,000

C. 590,000

D. 670,000

[Key: C]

EOCT Practice Items

1) Which is an equation for the circle with a center at (–2, 3) and a radius of 3?

A. $x^2 + y^2 + 4x - 6y + 22 = 0$

B. $2x^2 + 2y^2 + 3x - 3y + 4 = 0$

C. $x^2 + y^2 + 4x - 6y + 4 = 0$

D. $3x^2 + 3y^2 + 4x - 6y + 4 = 0$

[Key: C]

2) What is the center of the circle given by the equation $x^2 + y^2 - 10x - 11 = 0$?

A. (5, 0)

B. (0, 5)

C. (–5, 0)

D. (0, –5)

[Key: A]

3) Which shows an equation for the parabola with a focus at (10, 0) and a directrix of $x = 2$?

A. $x = \frac{1}{4}(y-6)^2$

B. $x = \frac{1}{16}(y-6)^2$

C. $x - 6 = \frac{1}{4}y^2$

D. $x - 6 = \frac{1}{16}y^2$

[Key: D]

4) Which shows an equation for the parabola with a focus at (4, –5) and a directrix of $y = -1$?

A. $y+3=\frac{1}{4}(x-4)^2$

B. $y-4=\frac{1}{4}(x+3)^2$

C. $y+3=-\frac{1}{8}(x-4)^2$

D. $y-4=-\frac{1}{8}(x+3)^2$

[Key: C]

To find the *y*-coordinates of the solutions, substitute the values for $x = -\sqrt{2.5}$ and $x = \sqrt{2.5}$ into either equation and solve for *y*.

$y = 3x$	$y = 3x$
$y = -3\sqrt{2.5}$	$y = 3\sqrt{2.5}$
$y \approx -4.74$	$y \approx 4.74$

The solutions are approximately (–1.58, –4.74) and (1.58, 4.74).

EOCT Practice Items

1) A circle is centered at the origin and has a radius of 3 units. A horizontal line passes through the point (0, 3). In how many places does the line intersect the circle?

A. 0

B. 1

C. 2

D. infinitely many

[Key: B]

2) A circle is centered at the origin and has a radius of $\sqrt{10}$ units. A line has a slope of –3 and passes through the origin. At which points does the line intersect the circle?

A. (–3, 1) and (3, –1)

B. (–1, 3) and (1, –3)

C. (1, 3) and (–1, –3)

D. (3, 1) and (–3, –1)

[Key: B]

EOCT Practice Items

1) A parabola has a focus at (–3, 6) and a directrix of $y = -4$. For which value of a does the point (a, 6) lie on the parabola?

A. 1

B. 7

C. 10

D. 13

[Key: B]

2) Which information is needed to show that a parallelogram is a rectangle?

A. The diagonals bisect each other.

B. The diagonals are congruent.

C. The diagonals are congruent and perpendicular.

D. The diagonals bisect each other and are perpendicular.

[Key: B]

3) Which point is on a circle with a center of (3, –9) and a radius of 5?

A. (–6, 5)

B. (–1, 6)

C. (1, 6)

D. (6, –5)

[Key: D]

EOCT Practice Items

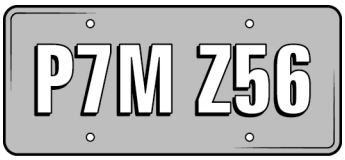
1) In a particular state, the first character on a license plate is always a letter. The last character is always a digit from 0 to 9.

If V represents the set of all license plates beginning with a vowel, and O represents the set of all license plates that end with an odd number, which license plate belongs to the set $V \cap O'$?

A. 

B. 

C. 

D. 

[Key: A]

2) Which of the following events are independent given $P(A)$, $P(B)$, and $P(A \text{ and } B)$?

A. $P(A) = 0.25$; $P(B) = 0.25$; $P(A \text{ and } B) = 0.5$

B. $P(A) = 0.08$; $P(B) = 0.4$; $P(A \text{ and } B) = 0.12$

C. $P(A) = 0.16$; $P(B) = 0.24$; $P(A \text{ and } B) = 0.32$

D. $P(A) = 0.3$; $P(B) = 0.15$; $P(A \text{ and } B) = 0.045$

[Key: D]

3) Assume that the following events are independent:

- **The probability that a high school senior will go to college is 0.72.**
- **The probability that a high school senior will go to college and live on campus is 0.46.**

What is the probability that a high school senior will live on campus, given that the person will go to college?

A. 0.26

B. 0.33

C. 0.57

D. 0.64

[Key: D]

4) A random survey was conducted about gender and hair color. This table records the data.

Hair Color

	Brown	**Blonde**	**Red**
Male	548	876	82
Female	612	716	66

What is the probability that a randomly selected person has blonde hair, given that the person selected is male?

A. 0.51

B. 0.55

C. 0.58

D. 0.63

[Key: C]

Identify the combinations that are in both lists.

2, 3	3, 2	3, 4	4, 3

The combinations in both lists represent the intersection. The probability of the intersection is the number of outcomes in the intersection divided by the total possible outcomes.

P(at least one roll is a 3 **and** a prime sum) = $\frac{4}{36}$.

If two events share outcomes, then outcomes in the intersection are counted twice when the probabilities of the events are added. So you must subtract the probability of the intersection from the sum of the probabilities.

P(at least one roll is a 3 **or** a prime sum) = $\frac{11}{36} + \frac{15}{36} - \frac{4}{36} = \frac{22}{36} = \frac{11}{18}$.

EOCT Practice Items

1) Mrs. Klein surveyed 240 men and 285 women about their vehicles. Of those surveyed, 155 men and 70 women said they own a red vehicle. If a person is chosen at random from those surveyed, what is the probability of choosing a woman or a person that does NOT own a red vehicle?

A. $\frac{14}{57}$

B. $\frac{71}{105}$

C. $\frac{74}{105}$

D. $\frac{88}{105}$

[Key: C]

2) Bianca spins two spinners that have four equal sections numbered 1 through 4. If she spins a 4 on at least one spin, what is the probability that the sum of her two spins is an odd number?

A. $\frac{1}{4}$

B. $\frac{7}{16}$

C. $\frac{4}{7}$

D. $\frac{11}{16}$

[Key: C]

3) Each letter of the alphabet is written on a card using a red ink pen and placed in a container. Each letter of the alphabet is also written on a card using a black ink pen and placed in the same container. A single card is drawn at random from the container. What is the probability that the card has a letter written in black ink, the letter A, or the letter Z?

A. $\frac{1}{2}$

B. $\frac{7}{13}$

C. $\frac{15}{26}$

D. $\frac{8}{13}$

[Key: B]