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Math Education Tech

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Section 1 - Absolute Value

1. What is the solution(s) to the equation given below?

$|4x + 6| = 18$

I. 3
II. 6
III. -6

a. I and II
b. II and III
c. I and III
d. I, III and III

---

2. What two values would make the equation below true?

$2|-3x + 6| = 36$

a. -4, 8
b. -8, 4
c. -10, 14
d. -22, 26

---

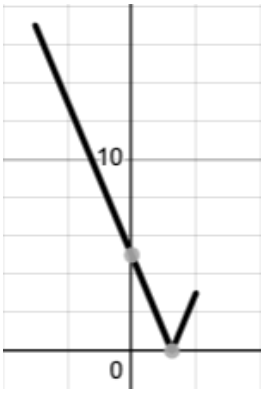
3. How many correct answers are there for the equation written below?

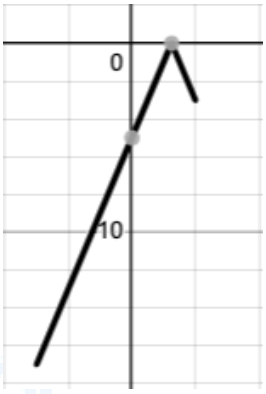
$|5x + 4| = -21$

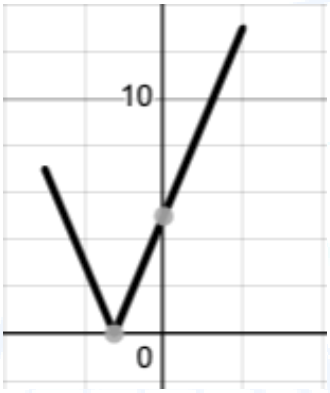
a. Zero
b. One
c. Two
d. Not enough information is provided

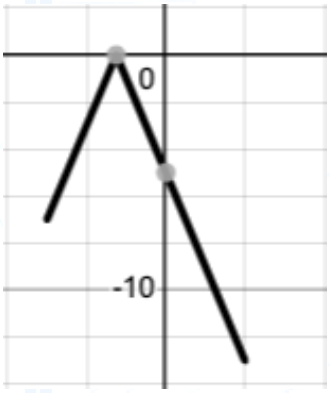
---

4. What would the graph of $y = |4x - 5|$ look like when $-3 \leq x \leq 2$?

a. 

b. 

c. 

d. 

---

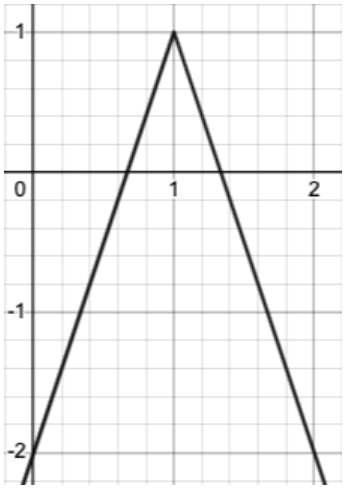
5. Which different integer values satisfy the equation written below?

$$|-5x + 10| < 15$$

a. -1, 0, 1, 2, 3, 4, 5
b. 0, 1, 2, 3, 4
c. -5, -4, -3, -2, -1, 0, 1
d. -4, -3, -2, -1, 0

---

6. Which equation represents the graph below?



a. $y = -|3x - 3| + 1$
b. $y = -|3x + 3| - 1$
c. $y = |3x - 3| + 1$
d. $y = |3x + 3| - 1$

---

7. Which of the following expressions is equal to -8 for some value of x?

a. $|x - 12| - 12$
b. $|x - 14| + 6$
c. $|x + 12| - 4$
d. $|x + 12| + 8$

---

8. Ian needs to make a fence around his rectangular yard. He can't remember the exact perimeter of the yard, but he does know the perimeter of the yard measures in between 260 - 280 feet . Which inequality best represents the given situation?

   a. $|x - 270| < 5$
   b. $|x - 270| < 10$
   c. $|x - 260| < 20$
   d. $|x - 280| < 20$

---

9. Given the equation below, which value does not fall within the range on the *xy*-coordinate plane?

   $y = -|x| + 2$

   a. 0
   b. 1
   c. 2
   d. 3

---

10. What is the product of the two solutions to the given equation below?

    $|2x - 6| = 2$

---

11. How many different integers make the equation given below true?

$$|x + 5| < 2$$

---

12. If a and b are the solutions to the given equation $-5|-2x + 6| = -50$, what is the value of $a^2 + b^2$?

END OF SECTION

Section 2 - Algebra

1. If $2x + 5 = 12$, what is the value of $4x$?

   a. 3.5
   b. 4
   c. 8.5
   d. 14

---

2. In the equation $9x - 10 = -x^2$, what are the solutions?

   a. 1 and 10
   b. 1 and -10
   c. -1 and 10
   d. -1 and -10

---

3. Andrew's pipes broke and he needs to hire a plumber. In the equations below, h represents the number of hours worked and c represents the total cost of hiring the plumber. The equations represent two different companies. At how many hours would the cost be the same no matter which company was hired?

   Company 1: $c = 100h + 75$
   Company 2: $c = 90h + 135$

   a. 6
   b. 10
   c. 60
   d. 105

---

4. If $y = kx$, where k is a constant, and y = 36 when x = 12, what is the value of y when x = 3.5

    a. 3
    b. 6.5
    c. 7.5
    d. 10.5

---

5. Tyrone loves to run. He is practicing to run a marathon. Each day he ups the amount of miles he runs. It is represented by the equation $f(x) = .25x + 3$ where *f(x)* represents his total distance *x* days after he started his training. If his initial training began on May 10, how many miles will he be running on May 20, assuming he takes no days off?

---

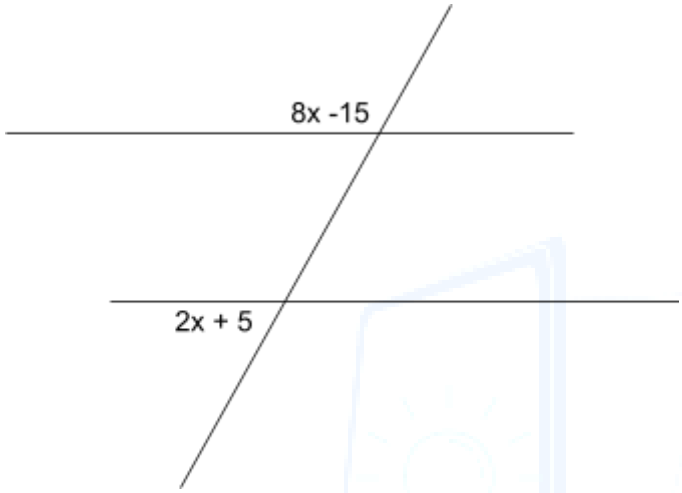
6. In the equation given below, what is the sum of the solutions?

    $(x^2 - 4)(x + 5)(x + 3) = 0$

END OF SECTION

Section 3 - Angles

1. Given the drawing below, what is the value of x? Parallel lines with transversal cutting them



a. $3\frac{2}{3}$
b. 17
c. 19
d. 37

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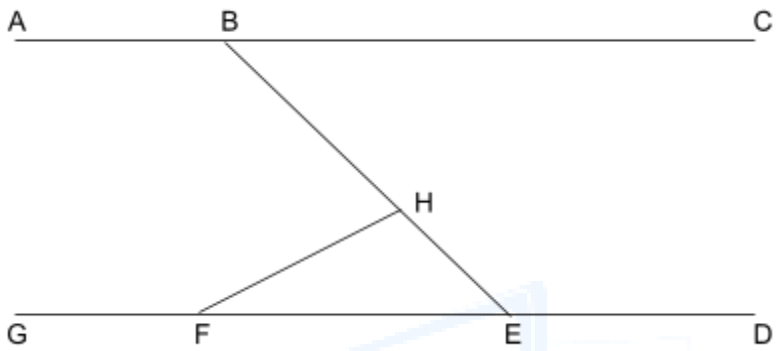
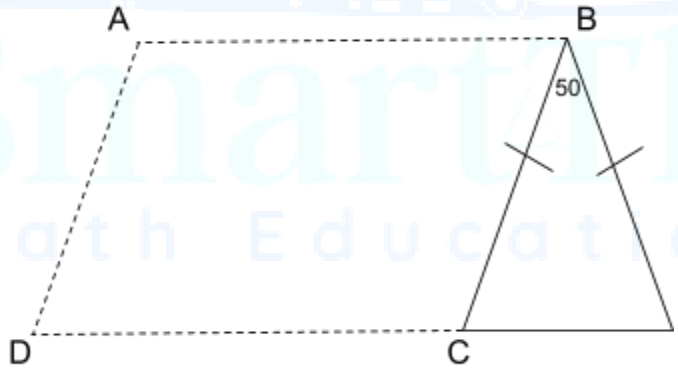
2. In the drawing below, $\overline{AC} \parallel \overline{GD}$. If angle CBE = 45 and angle BHF = 80, then what is the measure of angle HFE?



a. 32
b. 42
c. 45
d. 48

---

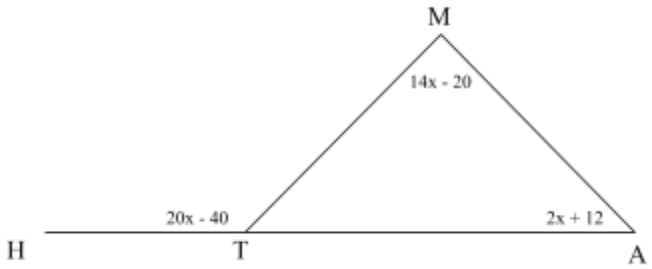
3. Given parallelogram ABCD, what is the value of angle ADC?



a. 50
b. 65
c. 115
d. 130

---

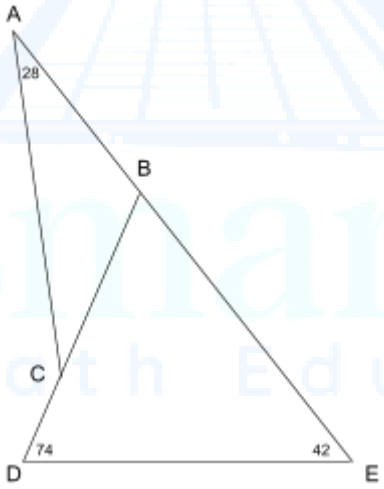
4. What is the value of angle HTM?



a. 8
b. 28
c. 92
d. 120

---

5. In the figure below, ABC is a straight line. Find the value of angle ACB.



a. 28
b. 36
c. 42
d. 64

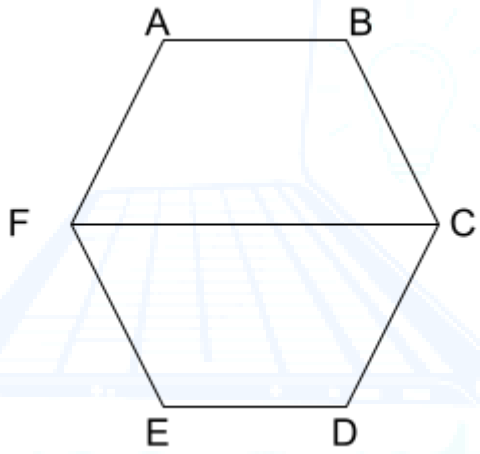
---

6. In triangle MNO angle M = 5x, angle N = 3x - 20, and angle O = 2x + 10. Which of the following must be true based on that information?

   a. M < N < O
   b. O < M < N
   c. N < O < M
   d. M < O < N

---

7. Shape ABCDEF is a regular hexagon. $\overline{FC}$ is an angle bisector. How many degrees is angle BCF?



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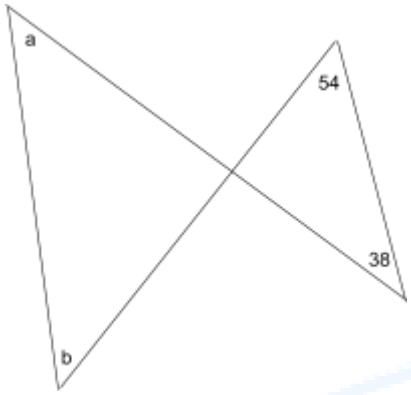
8. In the figure drawn below, what is the value of a + b?



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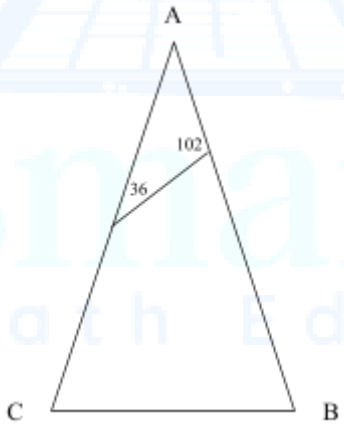
9. In the figure below, triangle ABC is an isosceles triangle. What is the value of angle ABC?



END OF SECTION

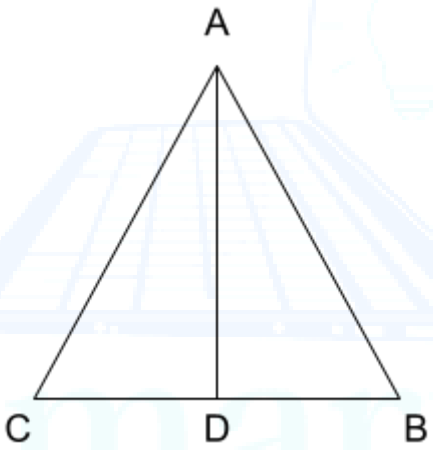
Section 4 - Area and Perimeter

1. The area of a square is 625 square units. What is the perimeter of the square?

    a. 25
    b. 50
    c. 100
    d. 312.5

---

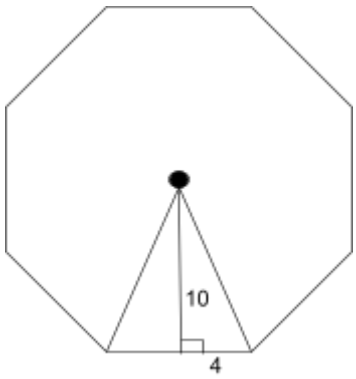
2. Shape ABC is an isosceles triangle. If $\overline{AB} = \overline{AC}$, $\overline{AB} = 10$ and $\overline{BD} = 6$, what is the perimeter of triangle ADB?



    a. 24
    b. 30
    c. 32
    d. 48

---

3. What is the area of the regular octagon shown below?



a. 40
b. 240
c. 320
d. 640

---

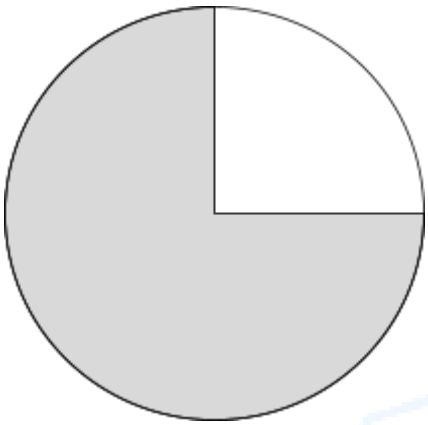
4. In the figure below, MATH is a parallelogram. AY = 20, TH = 13, and YH = 12. What is the area of parallelogram MATH?



a. 240
b. 260
c. 300
d. 325

---

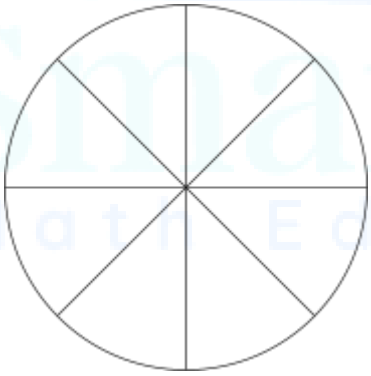
5. If the diameter of the circle is 16 what is the area of the shaded section?



a. 256π
b. 48π
c. 64π
d. 16π

---

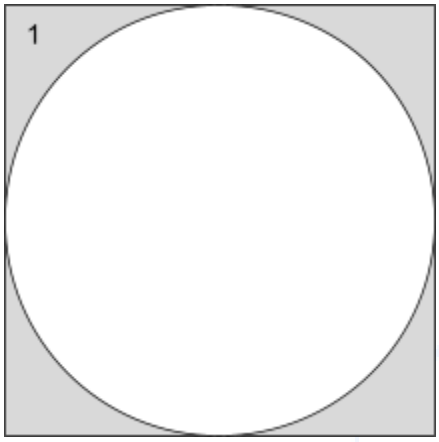
6. A circle is cut into 8 equal parts. If the radius of the circle is 8, what is the circumference of 5 of these slices?



a. 6π
b. 8π
c. 10π
d. 16π

---

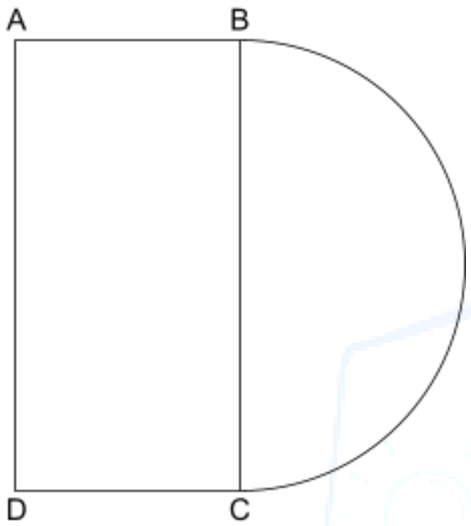
7. Given a square with a circle inside of it, what is the area of section 1 if the edge of the square is 12?



a. $144 - 36\pi$
b. $46 - 9\pi$
c. $72 - 18\pi$
d. 9π

---

8. Given that $\overline{BC} = 12$, $\overline{AB}$ is half of $\overline{BC}$, and a semicircle is on the edge of $\overline{BC}$, what is the perimeter of the shape you see below?



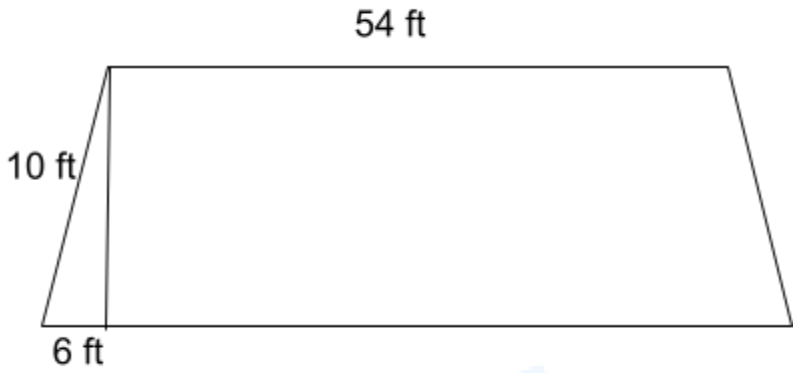
a. $36 + 6\pi$
b. $24 + 6\pi$
c. $36 + 12\pi$
d. $24 + 12\pi$

---

9. Square A has an edge of 2 cm. Square B has an edge of 4 cm. How many times greater is the area of Square B than Square A?

---

10. Find the area of the isosceles trapezoid pictured below.



---

11. In the picture below there is a square within a square. What is the perimeter of the bigger square if the little square has a diagonal of $6\sqrt{2}$?



END OF SECTION

Section 5 - Circles

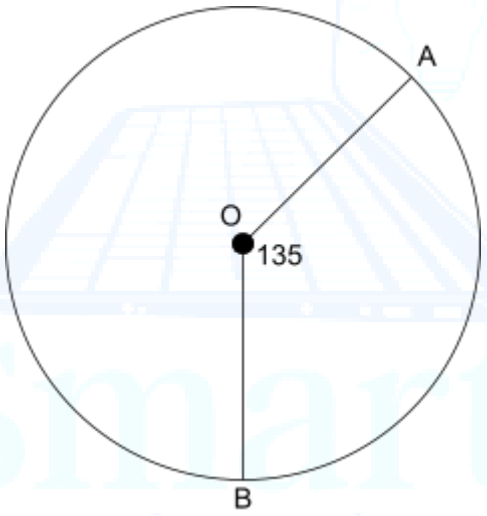
1. Given the equation of a circle below, what is the center and radius of the circle?

$$36 = (x - 3)^2 + (y + 4)^2$$

   a. Center = (3,-4); Radius = 6
   b. Center = (-3,4); Radius = 36
   c. Center = (3,-4); Radius = 6
   d. Center = (-3,4); Radius = 36

---

2. In Circle O, shown below, the circumference is equal to 64π. How long is minor arc AB?



   a. 24π
   b. 40π
   c. 128π
   d. 8640π

---

3. Circle O has center coordinates (5,-2). It also has a diameter of 16. What is the equation for the circle?

   a. $(x - 5)^2 + (y + 2)^2 = 256$
   b. $(x - 5)^2 + (y + 2)^2 = 4$
   c. $(x - 5)^2 + (y + 2)^2 = 64$
   d. $(x + 5)^2 + (y - 2)^2 = 64$

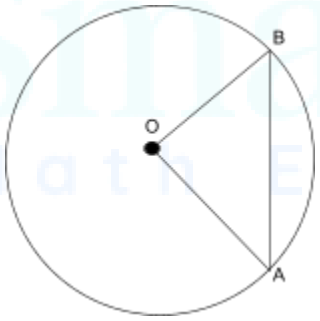
---

4. Given the equation, $x^2 + 6x + y^2 - 10x = 30$, what is the center and radius of the circle?

   a. Center = (3,-5); Radius = 64
   b. Center = (3,-5); Radius = 8
   c. Center = (-3,5); Radius = 64
   d. Center = (-3,5); Radius = 8

---

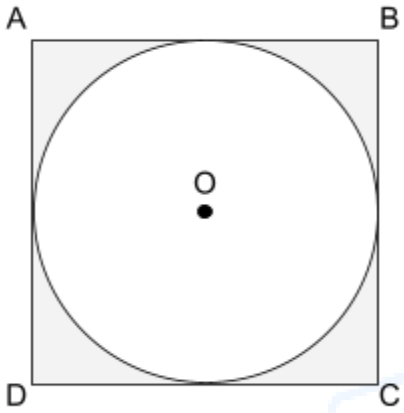
5. In circle O, with center O, and radius OB and OA, the area is 100π. What is the area of right △ OBA?



   a. $100\sqrt{2}$
   b. $10\sqrt{2}$
   c. $50\sqrt{2}$
   d. 50

---

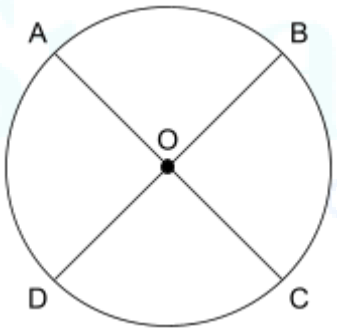
6. If the circumference of circle O is 20π, what is the area of the shaded region?



a. 80 - 10π
b. 400 - 100π
c. 100 - 40π
d. 400 - 10π

---

7. Circle O, with center O, is divided into 4 equal regions. What is the perimeter of one of the regions if the circumference of the entire circle is 36π?



a. 18 + 9π
b. 18 + 36π
c. 36 + 36π
d. 36 + 9π

---

8. Given the equation of the circle, $x^2 + 10x + y^2 - 8x = 5$, what is the area of the circle?

   a. 100π
   b. 64π
   c. 25π
   d. 5π

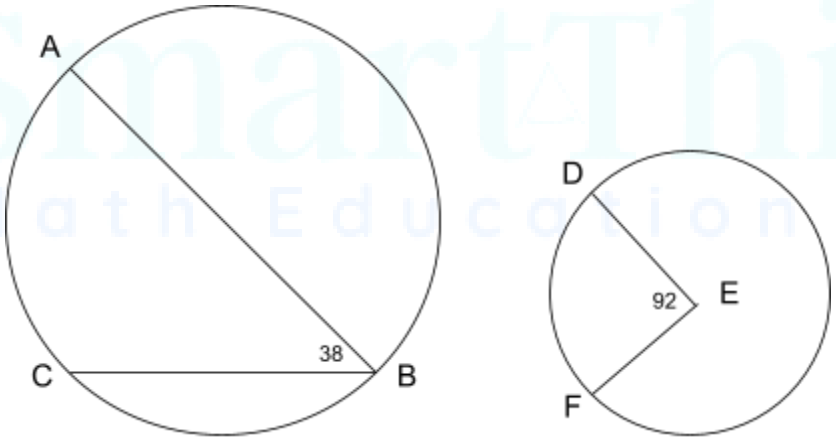
---

9. In the *xy*-plane, Circle *O* has coordinates (0,4) as its center and another point that lies on the circle at (-5,4). What is the equation of the circle?

   a. $25 = x^2 + (y - 4)^2$
   b. $16 = x^2 + (y - 4)^2$
   c. $25 = (x + 5)^2 + (y - 4)^2$
   d. $16 = (x + 5)^2 + (y - 4)^2$

---

10. How much more is minor arc AC than minor arc DF?



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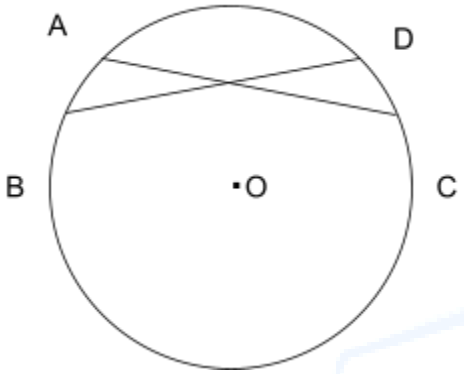
11. In circle O, $\overline{AC} = \overline{BD}$. If the value of minor arc AB = 25 and arc BAD = 95 then what is the value of major arc BC?



END OF SECTION

Section 6 - Complex Fractions

1. Which equation is equivalent to $\frac{2}{3x} + \frac{1}{2x}$?

   a. $\frac{3}{6x^2}$
   b. $\frac{3}{5x}$
   c. $\frac{7}{6x}$
   d. $\frac{3}{6x}$

---

2. What is the sum of $\frac{\frac{3}{5}}{\frac{3}{20}}$ and $\frac{\frac{5}{8}}{\frac{1}{4}}$?

   a. 6.5
   b. $\frac{5}{66}$
   c. $\frac{69}{40}$
   d. 8

---

3. When x > 0 and x ≠ equal 5, which of the following expressions is equivalent to the problem below?

$$\frac{1}{\frac{1}{x-5} + \frac{1}{x+3}}$$

   a. $\frac{(x-5)(x+3)}{2x-2}$
   b. $\frac{(2x-2)}{(x-5)(x+3)}$
   c. $\frac{(x-5)(x+3)}{x^2-2x-15}$
   d. $\frac{(x+5)(x-3)}{2x+2}$

---

4. Find the value of the expression listed below

$$2 - \frac{-12}{\frac{2}{9} + \frac{1}{6}}$$

a. $\frac{230}{7}$
b. $-\frac{202}{7}$
c. 122
d. - 118

---

5. Which of the following is equivalent to the expression given below?

$$\frac{\frac{x^2 + 5x - 6}{x^2 - 36}}{\frac{x^2 - 1}{x^2 + 7x + 6}}$$

a. $\frac{x+6}{x-6}$
b. $\frac{x-6}{x+6}$
c. $\frac{x+1}{x-1}$
d. $\frac{x-1}{x+1}$

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6. Simplify the following expression

$$\frac{\frac{x}{5}}{\frac{\frac{5}{x}}{\frac{5}{x}}}$$

a. $\frac{x}{5}$
b. 1
c. $\frac{5}{x}$
d. $\frac{x^2}{5}$

---

7. If $(\frac{m}{3} - \frac{n}{4})^2$ is rewritten in $ax^2 + bx + c$ form, what is the value of $a + c$?

a. $\frac{m^2}{3} - \frac{n^2}{4}$
b. $\frac{m}{9} - \frac{n}{16}$
c. $\frac{m^2}{9} - \frac{n^2}{16}$
d. $\frac{m^2}{9} - \frac{mn}{6} - \frac{n^2}{16}$

---

8. Frank has decided he wants to bake chocolate chip cookies. The recipe tells him that he needs $2\frac{1}{4}$ pounds of sugar for the 22 people he is baking for. If he has 66 people coming over, how many pounds of sugar will he need?

---

9. If $\frac{a^2}{a+b} = \frac{4}{9}$, what is the value of $\frac{b^3}{b}$?

---

10. If the equation given below is simplified in the terms of $ax^2 + bx + c$, what is the value of a?.

$$\frac{10 + \frac{2}{x}}{\frac{1}{4x + x^2}}$$

a. 8
b. 10
c. 42
d. 60

END OF SECTION

Section 7 - Congruence and Similarity

1. Which statement best describes a reflection and then a dilation of a preimage to the image?

    a. It is rigid and congruent
    b. It is not rigid and not congruent
    c. It is not rigid but it is similar
    d. It is neither congruent or similar

---

2. Triangle ABC has vertices A(3,2), B(6,8), and C(0,9). Under which transformation do both distance and angle measure remain the same?

    a. A reflection over the line $y = x$ followed by a dilation with a scale factor of $\frac{1}{2}$
    b. A translation of $(x, y) \rightarrow (x + 2, y + 3)$ followed by a dilation with scale factor 2.
    c. A 90° counterclockwise rotation followed by a dilation with scale factor 1.
    d. A reflection over the line $y = -x$ followed by a dilation with a scale factor of 10

---

3. Which of the following information is enough to prove Triangle MAP is an isosceles triangle?

    I. Side MA = AP
    II. ∠M = 50 and ∠A = 80

    a. I only
    b. II only
    c. I and II
    d. Neither

---

4. What information will be sufficient enough to prove Triangle ABC ~ Triangle DEF?

   a. ∡A = ∡D and ∡B = ∡E
   b. ∡A = ∡F and $\overline{AB} = \overline{DE}$
   c. ∡A = ∡D
   d. $\overline{AB} = \overline{DE}$ and $\overline{BC} = \overline{EF}$

---

5. Evan wants to prove △ ABC is congruent to △ GHI. If angle A is congruent to angle I and angle C is congruent to angle G, what information will be enough for Evan to prove the triangles are congruent?

   a. Angle B ≅ Angle H
   b. $\overline{AC} \cong \overline{IH}$
   c. $\overline{AC} \cong \overline{IG}$
   d. $\overline{BC} \cong \overline{HG}$

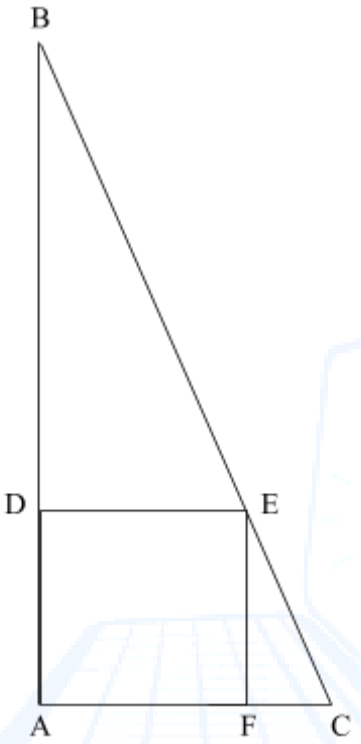
---

6. Triangle ABC has points A(1,2), B(7,2) and C(4,6). It is translated 6 units left and 4 units up and then reflected across the x-axis. Which quadrant is △ABC located in?

   a. Quadrant I
   b. Quadrant II
   c. Quadrant III
   d. Quadrant IV

---

7. Square ADEF is inscribed in right triangle ABC. If the area of square ADEF = 100 and $\overline{BD} = 24$, what is the value of $\overline{BE}$?



END OF SECTION

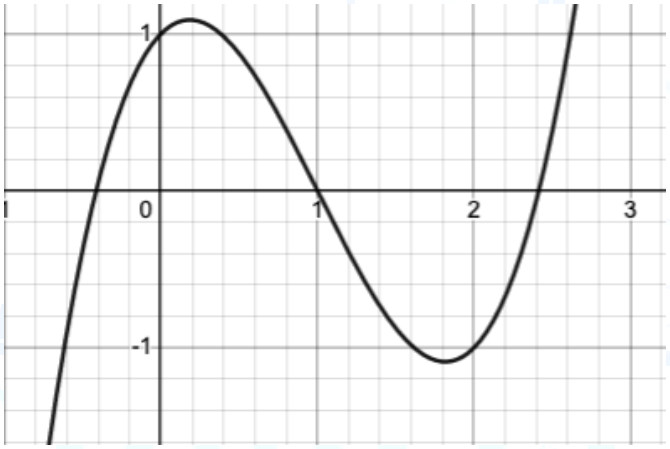
Section 8 - Coordinate Plane

1. In the *xy*-plane, line *m* is parallel to line *n*. If line *m* has points (0,-6) and (12,0) and line *n* has points (0,-3) and (*x*,0), then what is the value of *x*?

   a. -6
   b. 3
   c. 6
   d. 18

---

2. How many distinct zeros does the graph have below?



   a. 0
   b. 1
   c. 2
   d. 3

---

3. In the *xy*-plane, line *m* is perpendicular to line *n*. If the equation of line m is $y = \frac{3}{4}x - 6$ and the line *n* goes through the point (6,-4), what is the equation of line *n*?

   a. $y = \frac{4}{3}x + 4$
   b. $y = \frac{4}{3}x - 4$
   c. $y = -\frac{4}{3}x + 4$
   d. $y = -\frac{4}{3}x - 4$

---

4. What is the y-intercept of the graph $f(x) = (x + 5)^2 - 15$?

   a. (0,-5)
   b. (0,10)
   c. (0,5)
   d. (0,-15)

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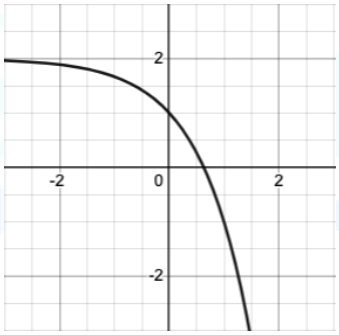
5. For the exponential function, *g*, the table shows values of x and their corresponding values of *g(x)*. What is the vertex of the exponential function based on the table below?

g	*g(x)*
-4	0
-3	-1
-2	0
-1	3
0	8

a. (-4,0)
b. (-3,-1)
c. (-2,0)
d. (0,8)

---

6. The graph below represents an exponential function. Which equation represents the function?



a. $y = -3^x + 1$
b. $y = -3^x + 2$
c. $y = 3^x + 2$
d. $y = 3^x + 1$

---

7. A linear function has a point (-3,6). Another point on the same linear function is (9,-2). At which point does it cross the *y*-axis?

   a. (6,0)
   b. (0,6)
   c. (4,0)
   d. (0,4)

---

8. A circle has the equation $(x - 4)^2 + (y + 4)^2 = 16$. Where does the circle touch both the *x*-axis and *y*-axis?

   a. *x*-axis (4,0); *y*-axis (0,-4)
   b. *x*-axis (4,0); *y*-axis (0,4)
   c. *x*-axis (-4,0); *y*-axis (0,-4)
   d. *x*-axis (-4,0); *y*-axis (0,4)

Question # 9 and # 10 are based on the information below.

Rectangle ABCD has coordinates A(4,2), B(4,-2), C(-4,-2), and D(-4,2).

9. If you make diagonal $\overline{AC}$, what would the area of triangle ACD be?

---

10. If you dilated the *x*-coordinate by 2 and the *y*-coordinate by $\frac{1}{2}$, what would the perimeter of the new rectangle be?

---

11. When given the equation $y = (x + 2)(x - 4)$, a graph in the *xy*-plane has coordinates (m,n). If $-8 \leq n \leq -6$, what is a possible value for m?

END OF SECTION

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Section 9 - Distance

1. On the *xy*-coordinate plane point A is at (3,6) and point B is at (-7,-8). Point C in the middle of these two points. What are the coordinates of point C?

   a. (-2,7)
   b. (2,7)
   c. (-2,-7)
   d. (2,-7)

---

2. In the line given below $\overline{AB} = 2x + 4$. If $\overline{BC}$ is double the length of $\overline{AB}$, what is the value of $\overline{AC}$



   a. $2x + 4$
   b. $4x + 4$
   c. $4x + 8$
   d. $6x + 12$

---

3. Given a straight line, with points A, B, C and B being the midpoint of A and C. If point A lies on the line at (-4, -8) and point B lies on the line at (3,-2), what is the coordinate pair of point C?

   a. (0,-5)
   b. (0,0)
   c. (12,4)
   d. (-5,0)

---

4. On the *xy*-coordinate plane, point A is at (3,2), Point B is at (6,2), and Point C is at (3,8). How much longer is $\overline{AC}$ than $\overline{BC}$?

   a. 1
   b. 2
   c. 3
   d. 4

---

5. Ted is a big fan of running. He especially loves running on the weekends. On Saturday he ran 5,100 yards in 24 minutes. How many inches per minute did he run?

   a. 212.5
   b. 637.5
   c. 7,650
   d. 122,400

---

6. A car was driving in a straight line. If the car traveled 4,500 meters in 3 minutes, how many millimeters per second did it drive?

   1 centimeter = 10 millimeters
   1 meter = 100 centimeters

   a. 15,000 millimeters per second
   b. 25,000 millimeters per second
   c. 150,000 millimeters per second
   d. 1,500,000 millimeters per second

---

7. On line ABC the ratio of $\overline{AB}$:$\overline{BC}$ = 3:11. If the total distance of $\overline{AC}$ = 147, how long is $\overline{AB}$?



8. Sarah started her journey at home. She walked 300 meters directly north to the park. Next, she walked 400 meters directly east to the restaurant. Finally, she walked in a straight line back to her home. How many meters did she travel altogether?

9. Anni runs at a constant pace of 5 meters per second. Carlos runs at a constant rate of 3.5 meters per second. If Anni starts 45 meters behind Carlos, how many seconds will it take for Anni to catch Carlos?

END OF SECTION

Section 10 - Equations of a Line

1. Jennifer loves to go to the amusement park. Below is a graph that represents the number of rides (x) and the total cost (y). What does the point (10,15) represent?



   a. Jennifer went on 10 rides and spent $15.
   b. Jennifer went on 15 rides and spent $10.
   c. Jennifer was there for 10 hours and spent $15.
   d. Jennifer was there for 15 hours and spent $10.

---

2. Ryan was fundraising to help cure cancer. The initial donation was his own money. Each year he raised funds in a linear fashion. At the end of year 4 he had raised $200,000. At the end of year 7, he had raised $320,000. How much money was in his initial donation?

   a. $40,000
   b. $60,000
   c. $120,000
   d. $520,000

---

3. Which equation correctly represents the linear table?

x	y
3	.5
7	4.5
11	8.5
15	12.5

a. $y = 3x + .5$
b. $y = -x - 2.5$
c. $y = x - 2.5$
d. $y = x + 0$

Use the equation, $f(x) = (x + 5)^2 - 7$ for problems 4 and 5.

4. What is the *y*-intercept of the equation given above?

a. -2
b. 5
c. 7
d. 18

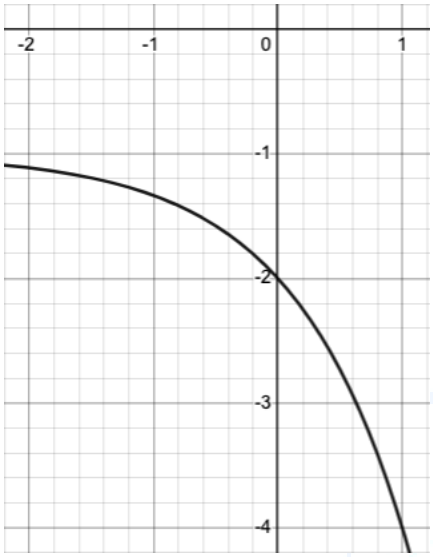
---

5. What is the vertex of the equation given above?

a. (5,-7)
b. (5,7)
c. (-5,-7)
d. (-5,7)

---

6. Which equation represents the graph seen below?



a. $y = 3^x - 1$
b. $y = -3^x - 2$
c. $y = 3^x - 2$
d. $y = -3^x - 1$

---

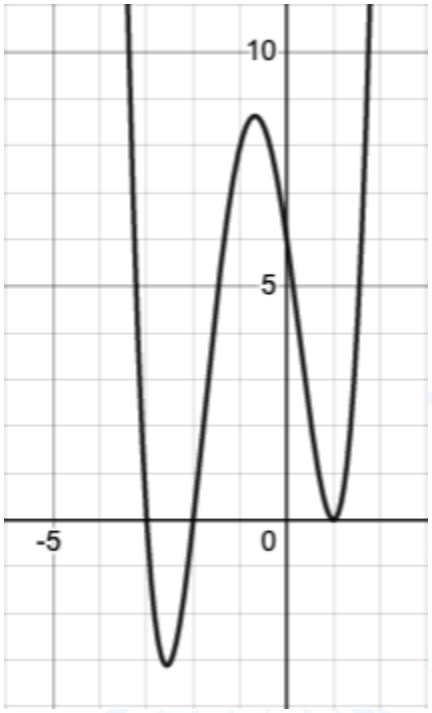
7. Given the table below, and knowing that $n \neq 0$, what is the equation of the line?

x	-2	0	2	4
y	$-n - 8$	n	$3n + 4$	$5n + 8$

a. $y = (2n + 4)x + n$
b. $y = (n + 2)x + n$
c. $y = (n)x + n$
d. $y = (n + 2)x + 2$

---

8. Which of the following functions models the graph below?



a. $f(x) = (x + 3)(x + 2)(x - 1)$
b. $f(x) = (x - 3)(x - 2)(x + 1)$
c. $f(x) = (x + 3)(x + 2)(x - 1)^2$
d. $f(x) = (x - 3)(x - 2)(x + 1)^2$

---

9. If the function $f(x) = mx^2 + 4$ crosses the point (0,4), what is the value of m?

a. 4
b. $\frac{1}{4}$
c. $-\frac{1}{4}$
d. -4

---

10. After years studying plants, a botanist has come up with the formula $m = 2.5n + 10$ to determine how tall in meters, m, the plant will be after n years. What is the difference in height between year 5 and year 10?

---

11. For the equation $f(x) = x^2 + 8x + 12$, what is the minimum value?

END OF SECTION

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Section 11 - Equivalent Equations and Expressions

1. If $\frac{10m}{n} = 5$, what is the value of $\frac{m}{n}$?

   a. 0.5
   b. 1
   c. 2
   d. 5

---

2. Which of the following equations is equivalent to $\frac{10 + 15m}{30m}$?

   a. $\frac{5}{6}$
   b. $\frac{2 + 3m}{30}$
   c. $\frac{2 + 3m}{6}$
   d. $\frac{5m}{6}$

---

3. Which equation is equivalent to $\frac{1}{x} + \frac{1}{x+1} + 2$

   a. $\frac{2x^2 + 4x + 1}{x^2 + x}$
   b. $\frac{4}{x^2 + x}$
   c. $\frac{2x^2 + 1}{x^2 + x}$
   d. $2x^2 + 4x + 1$

---

4. Given the equation, $16a^4 - b^4$, which equation is equivalent in simplest form?

   a. $(4a^2 - b^2)(4a^2 + b^2)$
   b. $(2a - b)(2a + b)(4a^2 + b^2)$
   c. $4a^2 - b^2$
   d. $4a^4 - b^4$

---

5. The expression $\frac{4x+8}{x-5}$ is equivalent to which expression?

   a. $2x - 5x$
   b. $2x - \frac{1}{3}$
   c. $3x - 5$
   d. 7

---

6. Which of the following equations is equivalent to $(x + 2)^2 - (y - 3)^2$?

   a. $x^2 - y^2 + 10xy - 5$
   b. $x^2 - y^2 - 2xy - 5$
   c. $x^2 - y^2 + 4x + 6y - 5$
   d. $x^2 - y^2 + 4x + 6y + 13$

---

7. When $x + 1$ is divided into $4x^2 + 3x - 6$ you have a remainder in the form of $\frac{A}{x+1}$? What is the value of A?

   a. 5
   b. 4
   c. -5
   d. -6

---

8. If $(mx + 4)(nx + 7) = 12x^2 + 50x + 28$, what is the value of $m + n$?

---

9. In the equation below, *a*, *b*, *c*, and *d* are constants. When the equation is true for all values of x, what is the value of $a + b + c + d$.

   $3x(x^2 + 2x) + 4(x^2 - 6x) + 5 = ax^3 + bx^2 + cx + d$

END OF SECTION

Section 12 - Exponential and Rate Problems: $P = A(1 + r)^t$ or $P = A(b)^t$

1. A bacteria grows at an annual rate of 6%. If the initial weight of the bacteria is .005 ounces, which of the following functions h, represents the weight of the substance, in ounces, t years later?

   a. $h(t) = .005(.06)^t$
   b. $h(t) = .06(1.005)^t$
   c. $h(t) = .005(1.06)^t$
   d. $h(t) = 6(1.005)^t$

---

2. A bacteria doubles in size every day for 30 days. During this time period, which type of function best represents this situation?

   a. Increasing exponential
   b. Decreasing exponential
   c. Increasing linear
   d. Decreasing linear

---

3. A substance decays at a rate of 12.5% annually. If the original substance had a mass of 40 lbs., which of the following functions, h, represents the remaining amount of the substance x years later?

   a. $h(x) = 40(.125)^x$
   b. $h(x) = 40(.875)^x$
   c. $h(x) = .125(40)^x$
   d. $h(x) = 40(1.125)^x$

---

4. Tamara bought a new car that decreases exponentially at a 27% rate each year. If she bought the car for $32,000, after how many years will it be equal to $4,843?

    a. 4
    b. 5
    c. 6
    d. 7

---

5. John goes to Annual Bank and they tell him the interest rate on a savings account is 2.2%. Jess goes to Monthly Bank and the interest rate there is 2.45%. How much more money will Jess have than John after 20 years if they each initially invest $500 and neither person puts more money in their account.

    a. 2.61
    b. 38.69
    c. 38.70
    d. 821.35

---

6. Anna likes to plant flowers. They "spread like wildfire" and grow at an exponential rate each day. If she planted 100 flowers in her garden and they increased at a 3% rate per day, how many flowers would she have after 20 days?

---

7. Sebastian found a new bacteria whose half life is every 2 hours. If the bacteria starts out weighing 400 picograms, how many minutes would it take to 6.25 picograms?

END OF SECTION

Section 13 - Exponents and Radicals

1. What is $\frac{(4x^2)^3}{(2x)^3}$ equivalent to?

   a. $2x^2$
   b. $2x^3$
   c. $6x^3$
   d. $8x^3$

---

2. When m = 10, what is the value(s) of x in the given equation below?

   $\sqrt{x^2 + 49} - m = 15$

   a. ∓24
   b. 24
   c. -24
   d. ∓1

---

3. What are the roots of the equation $y = x^3 - 5x^2 + 6x$

   a. {2,3}
   b. {0,2,3}
   c. {0,2}
   d. {0,3}

---

4. Which is equivalent to $\sqrt{m^2} \times \sqrt[4]{x^4} \times \sqrt[3]{x^3}$

a. $\sqrt{m}$
b. m
c. m^3
d. m^9

---

5. If $\frac{(m^{x^2})}{(m^{x^9})} = \frac{m^{30}}{m^5}$ and $x + 3 = 10$, then what is the value of $x - 3$?

a. -3
b. 3
c. 2.5
d. 6

---

6. What expression is equivalent to $\sqrt[4]{m^3}\,(m^{\frac{1}{2}})^{\frac{2}{3}}$ when m > 0?

a. $\sqrt[13]{m^{12}}$
b. $\sqrt[12]{m^{13}}$
c. $\sqrt[12]{m^{23}}$
d. $\sqrt[24]{m^6}$

---

7. What is the value of x if $x = 1^0 + 2^0 + 3^0 + 4^0 + \ldots + 20^0$

a. 0
b. 10
c. 20
d. 40

---

8. Given the equation below, which is equivalent to $\sqrt[3]{216x^{10}}$?

a. $6x^5$
b. $6x^3\sqrt[3]{x}$
c. $108x^3\sqrt[3]{x}$
d. $6x^3$

---

9. Given the equation, $8^{2x-4} = (16)^{\frac{3}{2}}$, what is the value of x?

---

10. If $(m^{x^2})(m^{6x-9}) = m$, then what is one possible value of x?

END OF SECTION

Section 14 - Expressions

1. Which is equivalent to the expression listed below?

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

a. $7x^2 + 8x$
b. $6x^2 + 8x$
c. $1x^2 + 7x$
d. $8x^2 + 6x$

---

2. Which equations is equivalent to $(3x^2 + 2x - 1) - (4x^2 + 2x - 1)$?

a. $-x^2$
b. $-x^2 + 4x - 2$
c. $-x^2 + 2$
d. $x^2 + 4x - 2$

---

3. Which equation is equivalent to
$(4x^3 - 3x^2 + 5x - 2) - (4x^3 + 6 - 4x^2 + 3x)$?

a. $(x - 4)(x + 2)$
b. $(x + 4)(x - 2)$
c. $(x + 4)(x + 2)$
d. $(x - 4)(x - 2)$

---

4. Which of the following is equivalent to $\frac{m^2 - m}{n - mn}$?

   a. $\frac{m}{n}$
   b. $-\frac{m}{n}$
   c. $\frac{m-1}{1-m}$
   d. -1

---

5. Given $g(x) = 3x^2 + 5x + 8$. What is the value of the remainder when $g(x)$ is divided by $x + 2$.

   a. -2
   b. 2
   c. 8
   d. 10

---

6. If $\frac{2(x-1)}{x+1} + \frac{4(x+1)}{x-1} = 0$, what is the value of x?

   a. $-\frac{1}{3}$
   b. 3
   c. 1
   d. -1

---

7. If $2a + 2b = -8$, what does $(a + b)^3 = ?$

   a. -512
   b. -64
   c. -8
   d. -4

---

8. What is the product of the greatest common factor and least common multiple of the numbers 6 and 9?

---

9. What is the value for c?

$(2x + a)(3x - 9) = 6x^2 + 6x - c$

---

10. In the equation below, a, b, and c are all constants. If $2(3x + 8x^2) - 4(5 + 2x) = ax^2 + bx + c$, what is the value of $(a * c)$?

END OF SECTION

Section 15 - FOIL and Factoring

1. Which equation is equivalent to $(2m + n^2)^2$?

   a. $4m + n^4$
   b. $4m^2 + n^4$
   c. $4m^2 + 4mn^2 + n^4$
   d. $2m^2 + n^4$

---

2. Which of the following expressions is equivalent to $16x^6 + 40x^3y^3 + 25y^6$

   a. $(4x + 20xy + 5y)^2$
   b. $(4x^6 + 5y^6)^2$
   c. $(4x^3 + 5y^3)^2$
   d. $(4x^3 - 5y^3)^2$

---

3. Which equation is equivalent to $\frac{5-2x}{50-8x^2}$ where x ≠ 2.5?

   a. $\frac{1}{2(5-2x)}$
   b. $\frac{1}{(5-2x)}$
   c. $\frac{5-2x}{2(25-4x^2)}$
   d. $2(5 - 2x)$

---

4. What is $16x^4 - 81$ factored completely?

a. $(8x^2 - 9)(8x^2 + 9)$
b. $(4x^2 - 9)(4x^2 + 9)$
c. $(2x - 3)(2x + 3)(4x^2 + 9)$
d. $(2x - 3)(2x + 3)(2x - 3)(2x + 3)$

---

5. Given the table below, which of the following must be a factor of $f(x)$?

x	$f(x)$
-2	4
-1	0
0	3
1	-1
2	2

a. $x + 1$
b. $x - 1$
c. $x + 3$
d. $x - 3$

---

6. What is the sum of the solutions to the equation $x^2 + 4x - 14 = 0$?

---

7. Given the equation $x^2 - y^4 = 20$, what is the value of $x + y^2$ when $x - y^2 = 10$?

END OF SECTION

Section 16 - Functions

1. For the function g, defined as $g(x) = 3x^2 + 5$, what is the value of $g(-2)$?

   a. -7
   b. 11
   c. 17
   d. 29

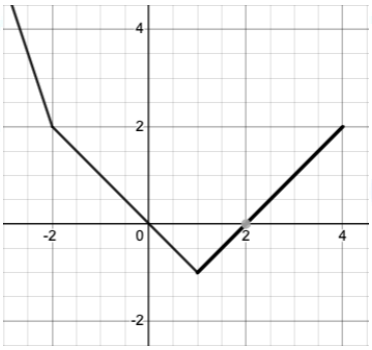
---

2. For the function h, defined as $h(x) = 2x^3 + 12$, what is the value when $h(x) = -4$

   a. -116
   b. -2
   c. 4
   d. 12

---

3. The graph of the function is shown below in the xy-coordinate plane. If $f(x) = f(3)$, which could be the value for x?



   a. 2
   b. 1
   c. 0
   d. -1

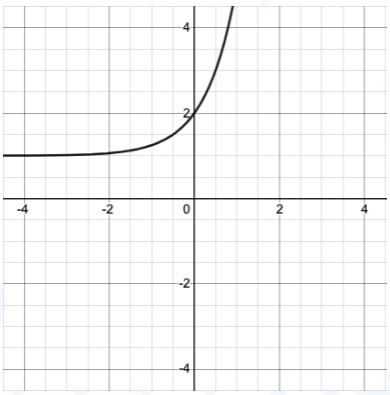
---

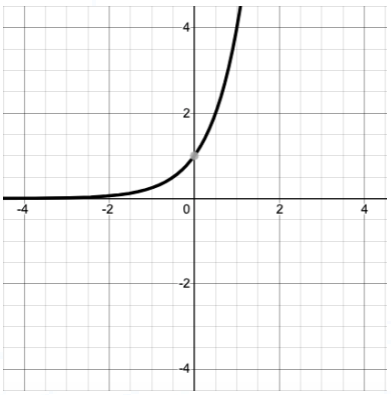
4. The function g is defined as $g(x) = \frac{5x+4}{3x-6}$. What is the value of of $g(\frac{5}{2})$?

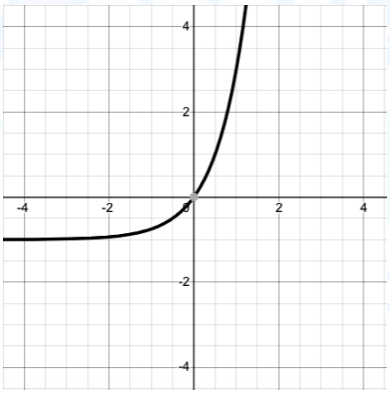
a. $\frac{5}{4}$
b. 7.6
c. 11
d. 16

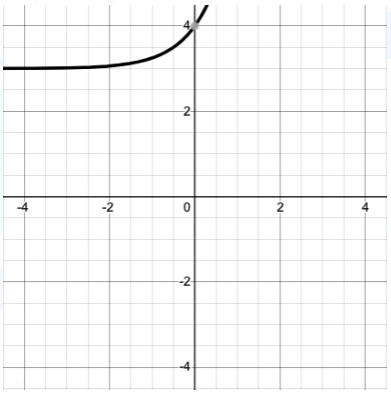
---

5. What is the graph of $f(x) = 4^x + 1$.

a. 

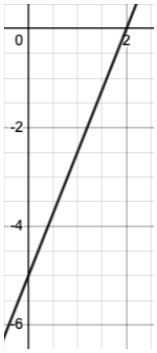
b. 

c. 

d. 

---

6. A line is shown in the graph below. Which of the following represents the line?



a. $5x - 2y = 10$
b. $5x + 2y = 10$
c. $5x - 2y = -10$
d. $5x + 2y = -10$

---

7. If the table below represents a linear function, which of the following equations represents the table?

x	f(x)
1.5	.25
2.5	.75
3.5	1.25
4.5	1.75

a. $f(x) = \frac{1}{2}x - \frac{1}{2}$
b. $f(x) = 2x - \frac{1}{2}$
c. $f(x) = -\frac{1}{2}x - 2$
d. $f(x) = \frac{1}{2}x - 2$

---

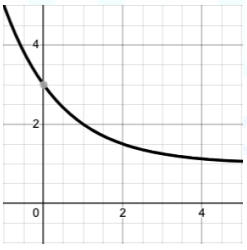
8. The functions f and g are defined in the table shown below. What is the value of $g(f(0))$?

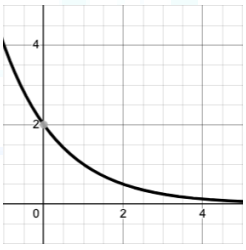
x	f(x)	g(x)
-2	-6	9
-1	-2	6
0	2	3
1	6	0
2	10	-3
3	14	-6

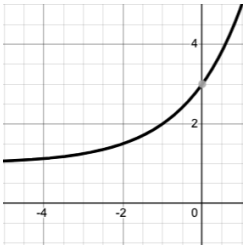
a. 14
b. 10
c. 0
d. -3

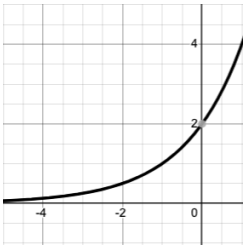
---

9. Which of the following graphs is represented by the equation $y = 2(2)^{-x} + 1$

a. 

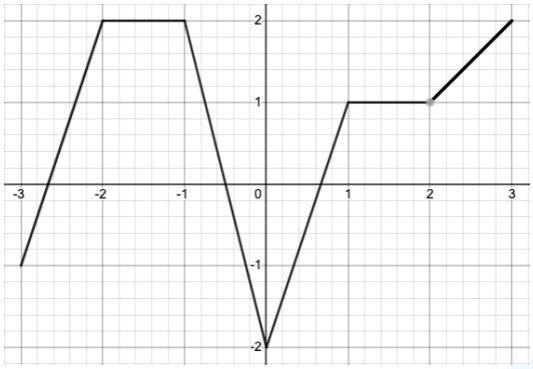
b. 

c. 

d. 

---

10. Given the function below, what is one possible value when f(x) = -1



a. -3
b. -1
c. 1
d. 2

---

11. Given the equation $f(x) = 4x^3 + 2x^2 + x - 2c$, where c is a constant, what is the value of c when $f(2) = 42$?

a. 25
b. -25
c. 21
d. 244

---

12. The original function $f(x) = x^2$. If the image of the original function is $f(x) = (x - 3)^2 + 5$, which direction has the image moved in comparison to the original?

a. 3 left, 5 up
b. 3 left, 5 down
c. 3 right, 5 up
d. 3 right, 5 down

---

13. Which function will make the statement below true?

$$f(-5) = f(5)$$

a. $f(x) = (2x)^2 + 5$
b. $f(x) = 2x + 5$
c. $f(x) = -2x + 5$
d. $f(x) = (2x)^3 + 5$

---

14. For the function h, defined as $h(x) = \sqrt{4x - 11} + 2$, what is the value of $h(x) = 9$?

---

15. Two functions are defined below. What is the value of $g(h(-2))$?

$$g(x) = x^2 + 2x + 1$$
$$h(x) = 6 - 2x$$

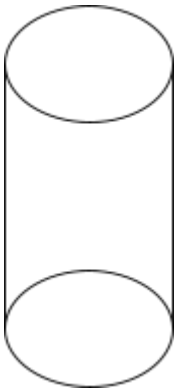
---

16. Given the function, $f(x) = bx^3 + 12$, b is a constant and f(2) = 36. What is the value when $f(x) = 93$?

END OF SECTION

Section 17 - Geometric Shapes

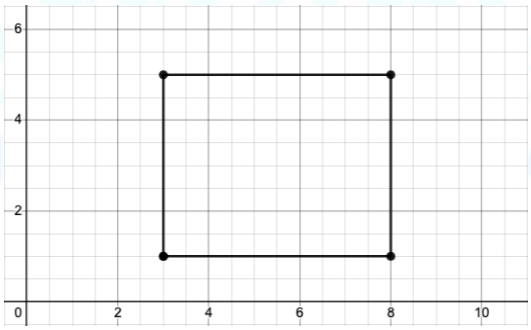
1. Cylinder question. If the volume of the right circular cylinder is 144π and the height is 4, what is the diameter of the base?



a. 6
b. 12
c. 36
d. 72

---

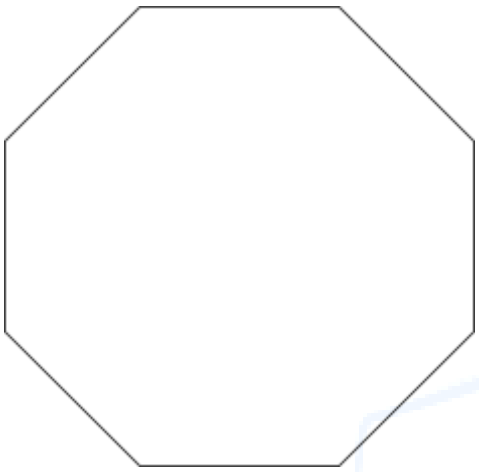
2. Which line would reflect the image onto itself?



a. $x = 3$
b. $y = 3$
c. $y = 1$
d. $y = 5$

---

3. Given the regular octagon you see below, what is the measure of an exterior angle?



a. 15
b. 45
c. 60
d. 135

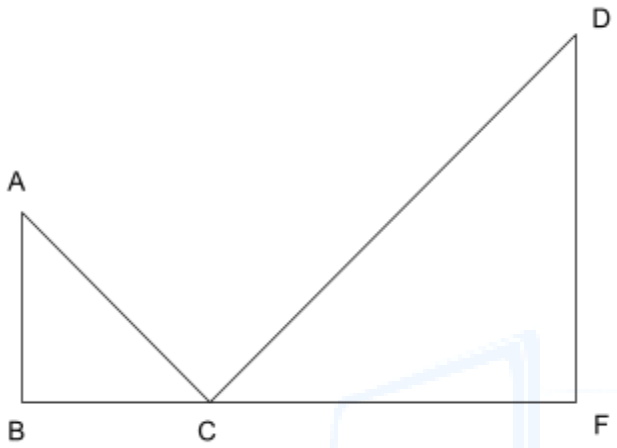
---

4. Which rotation would map a regular pentagon onto itself?

a. 90
b. 180
c. 216
d. 270

---

5. If △ABC ~ △DFC, which of the following statements is true?



a. $\frac{\overline{AC}}{\overline{BC}} = \frac{\overline{AB}}{\overline{CF}}$

b. $\frac{\overline{AC}}{\overline{DC}} = \frac{\overline{CB}}{\overline{DF}}$

c. $\frac{\overline{CB}}{\overline{AB}} = \frac{\overline{CF}}{\overline{DF}}$

d. $\frac{\overline{AB}}{\overline{DF}} = \frac{\overline{AC}}{\overline{CF}}$

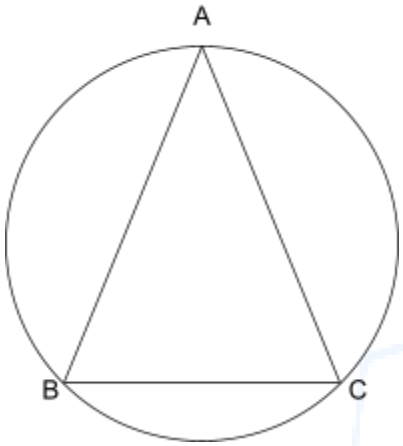
---

6. A circle has the equation $x^2 + y^2 = 36$. What is the area of the circle that falls only only in Quadrant III?

a. 4π
b. 9π
c. 18π
d. 36π

---

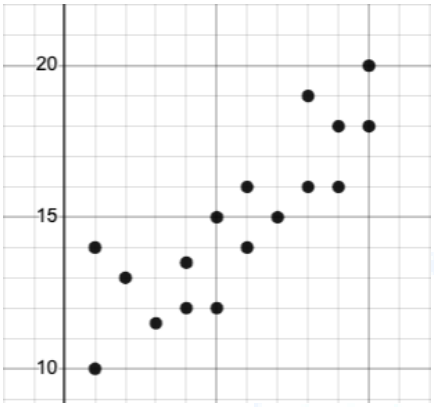
7. The circle below has isosceles triangle ABC inscribed in it. If angle A = 56, then what is the value of arc AB?



END OF SECTION

Section 18 - Histograms, Tables, and Scatter Plots

1. Which equation best estimates the scatterplot seen below?



a. $y = .8x + 10.2$
b. $y = -.8x + 10.2$
c. $y = .8x - 10.2$
d. $y = -.8x - 10.2$

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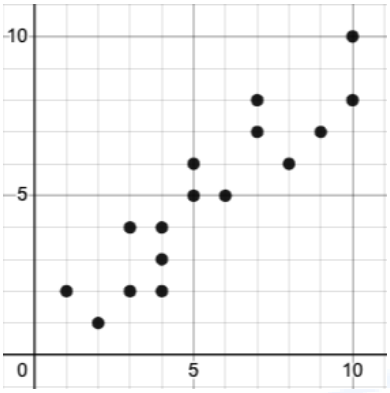
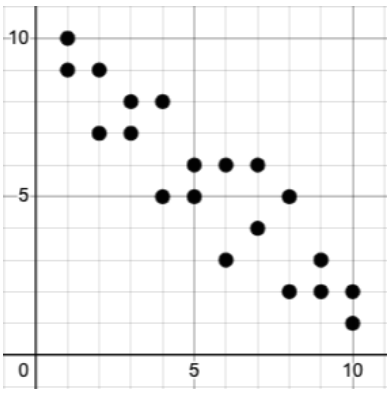
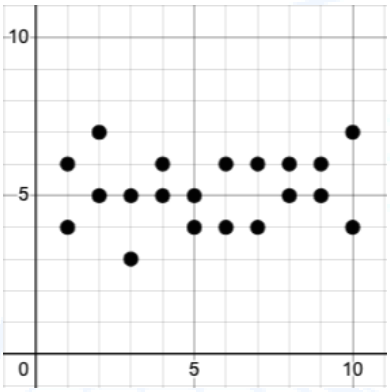
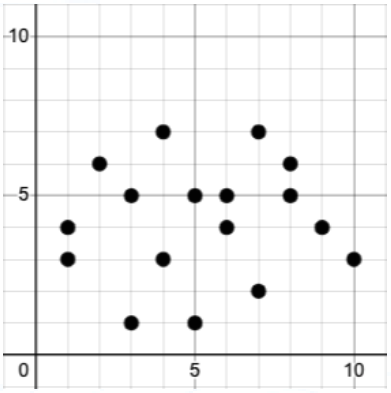
2. Which graph has a negative correlation?

a. 

b. 

c. 

d. 

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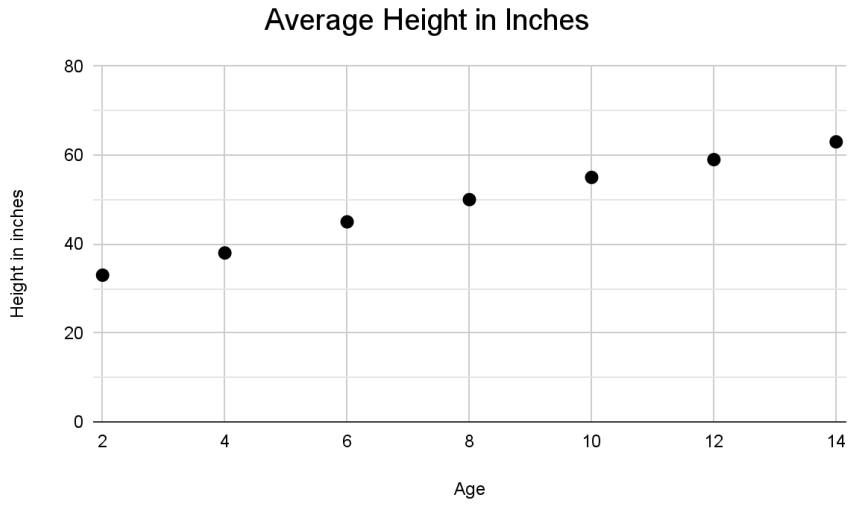
3. Based on the graph below, what is the best predicted height for a 9 year old?



a. 50
b. 55
c. 60
d. 65

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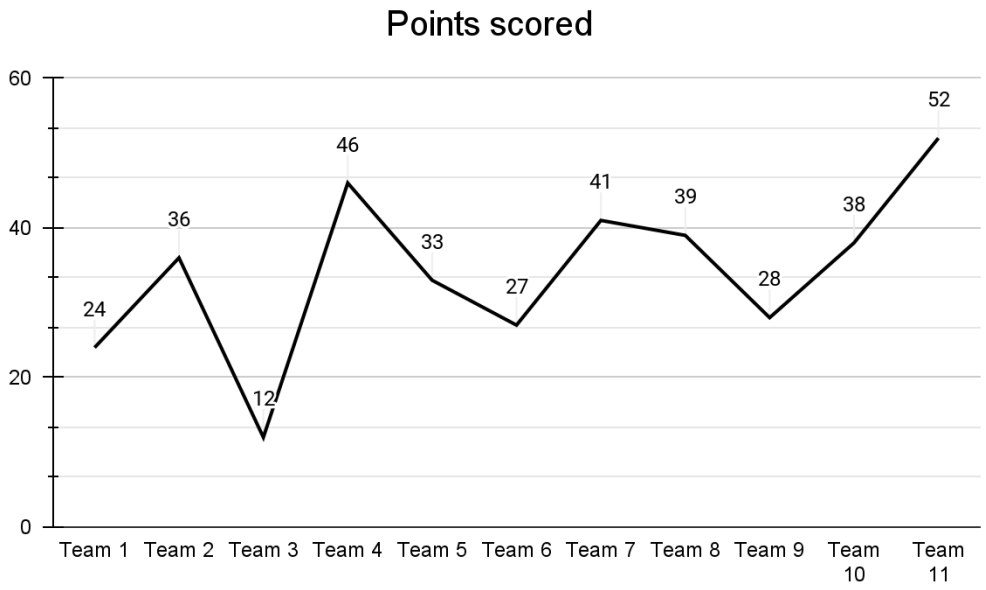
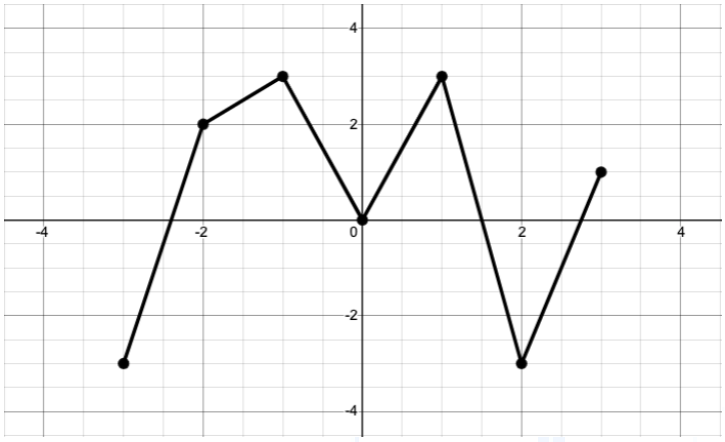
4. Based on the graph below, what is the median value of the points scored by each team?



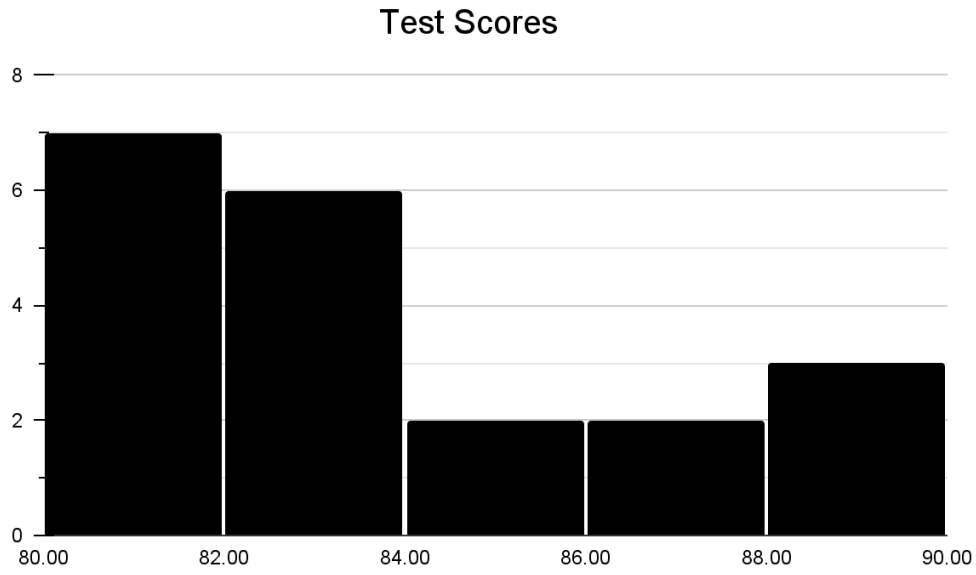
a. 12
b. 27
c. 28
d. 33

5. The graph for the function h(x) is shown below on the xy-plane. For what two values of x is h(x) at it's minimum?



a. {-3, 0}
b. {-3, 3}
c. {-3, 2}
d. {-2, -3}

6. Based on the histogram below, what range does the median value of test scores fall between?



a. 80 - 82
b. 82 - 84
c. 84 - 86
d. 86 - 88

---

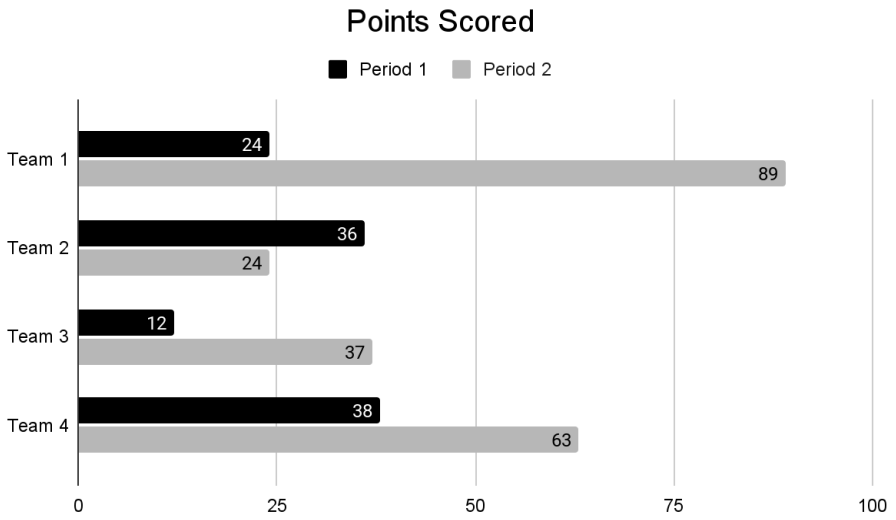
7. The table below shows the frequency of the times in the 100 meter dash. The time does not count if it's below 10.2 or above 10.8. Based on the table, approximately how many times would not count if 4,000 runners were timed in the 100 meter dash.

Time	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9
Frequency	4	8	12	13	12	8	8	5	2

a. 6
b. 72
c. 333
d. 1056

---

8. How many points greater was Team 1's average than the average of Team 2?



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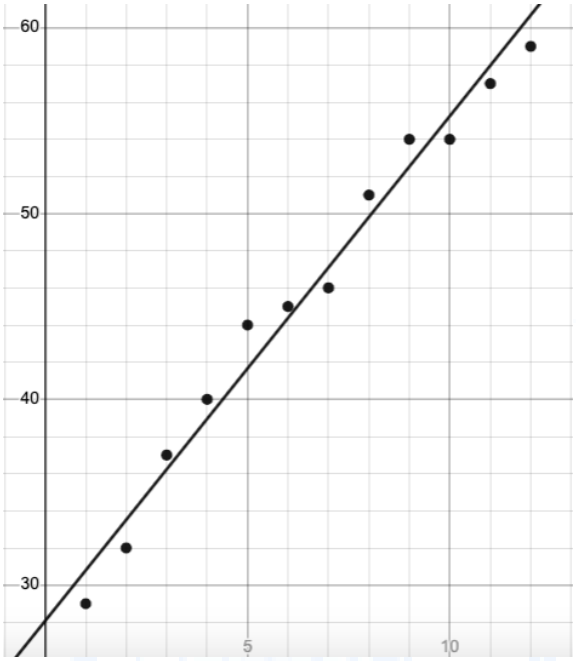
9. Jayla is doing a study on the correlation between age and height. Below is the data she gathered on the height of children ages 1 - 12. How many children fell below their predicted height based on the information she gathered?



END OF SECTION

Section 19 - Imaginary Numbers

1. When $i = \sqrt{-1}$, what is $(12 + 2i) + (5i - 14)$ equivalent to?

   a. $17i + 16$
   b. $7i - 2$
   c. $17i - 2$
   d. $7i + 26$

---

2. When $i = \sqrt{-1}$, what is $(3i + 6) - (8 - 4i)$ equivalent to?

   a. $-5i + 10$
   b. $-i - 2$
   c. $7i - 2$
   d. $7i^2 + 2$

---

3. When $i = \sqrt{-1}$, , which of the following is equal to i^{57}?

   a. i
   b. $-i$
   c. 1
   d. -1

---

4. What is the product of $(3 + 2i)(4 - 5i)$?

   a. $12 - 10i$
   b. $2 - 7i$
   c. $22 - 7i$
   d. $22 + 7i$

---

5. When $i = \sqrt{-1}$, which of the following is equivalent to $\frac{2i + 6}{3i - 4}$?

a. $\frac{18 + 26i}{-25}$
b. $\frac{18 + 26i}{-7}$
c. $\frac{30 + 26i}{-25}$
d. $\frac{-18 + 26i}{-25}$

---

6. Which type of roots does the equation $y = 2x^2 + 6x + 10$ have?

a. Real and distinct
b. Real and equal
c. Imaginary
d. Not able to tell

---

7. In the equation given below, what is the sum of the solutions?

$x^2 - 4x + 20 = 0$

a. 4
b. $4 + 8i$
c. $4 - 8i$
d. -4

---

8. When $i = \sqrt{-1}$, what is the value of the expression given below?

$$4i^2 + 6 + i^0$$

END OF SECTION

Section 20 - Inequalities

1. What is the solution to the inequality listed below?

   $-2x + 8 < -24$

   a. $x < 8$
   b. $x < 16$
   c. $x > 8$
   d. $x > 16$

---

2. When graphed on the *xy*-plane, which point is a solution to the given inequalities listed below?

   $y > x + 2$
   $y < -3x + 4$

   a. (0,3)
   b. (2,0)
   c. (0,4)
   d. (-4,-4)

---

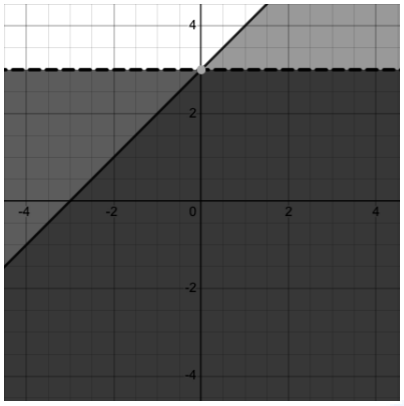
3. In the system of inequalities, with the given equations below, which quadrants have solutions to the systems of equations?

   $y > \frac{2}{5}x + 2$
   $y > -\frac{5}{4}x + 1$

   a. Quadrant I and Quadrant III
   b. Quadrant I and Quadrant IV
   c. Quadrant II and Quadrant III
   d. Quadrant I and Quadrant II

---

4. Which of the following inequalities is represented by the graph given below?



a. $y \leq x + 3$
   $y < 3$
b. $y < x + 3$
   $y \leq 3$
c. $y > x + 3$
   $y > 3$
d. $y \geq x + 3$
   $y \geq 3$

---

5. Which of the following is **not** a solution to the inequality $3x + 8 \geq 10x - 6$?

a. 6
b. -2
c. 2
d. 6

---

6. What is the greatest possible whole number for x in the inequality seen below?

$$6(\frac{7}{3} + \frac{1}{3}x \leq -\frac{1}{2} + 7.5x)$$

a. -2
b. -1
c. $-\frac{1}{2}$
d. 1

---

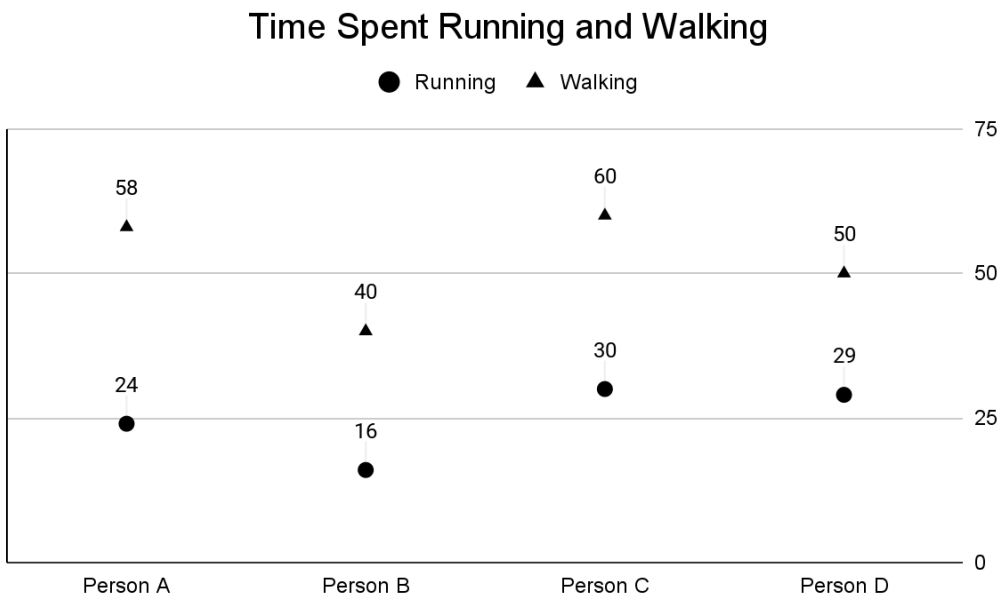
7. Gabriel works two jobs. One job is working with a construction company and the other job is working at a pizza place. At his construction job he earns $15 per hour. At the pizza place he earns $12 per hour. If *c* represents the number of hours of construction and *p* represents the number of hours he works at the pizza place, and he wants to make at least $250 while working no more than 30 hours in one week, which set of inequalities represents this scenario?

a. $12c + 15p \geq 250$
   $c + p \leq 30$
b. $15c + 12p \geq 250$
   $c + p \leq 30$
c. $12c + 15p \geq 250$
   $c + p \geq 30$
d. $15c + 12p \geq 250$
   $c + p \geq 30$

END OF SECTION

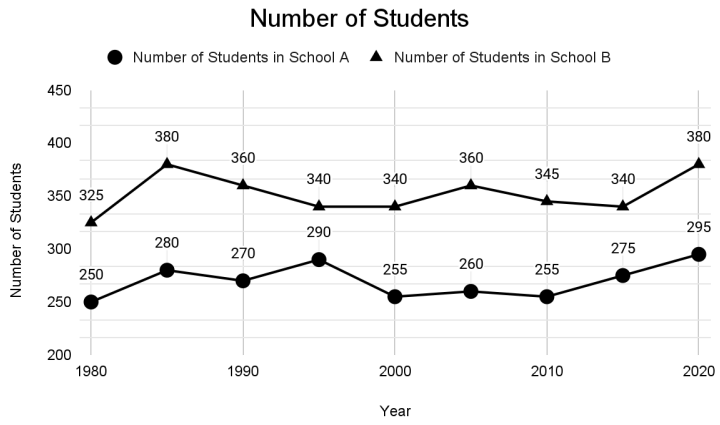
Section 21 - Interpreting Data, Graphs and Tables

1. Which person spent the most time running and walking combined according to the graph below?



a. Person A
b. Person B
c. Person C
d. Person D

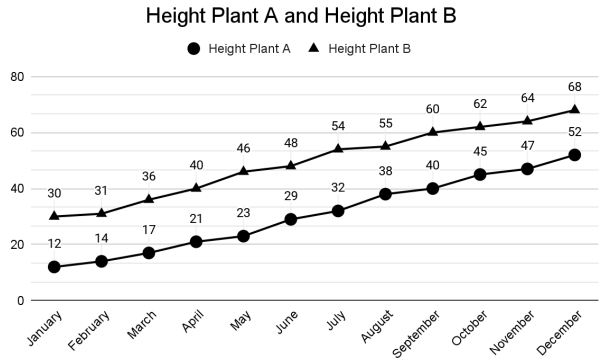
2. In between which years and school was the decrease the most?



a. School A: 1985 - 1995
b. School A: 1990 - 2000
c. School B: 1985 - 1995
d. School B: 1990 - 2000

---

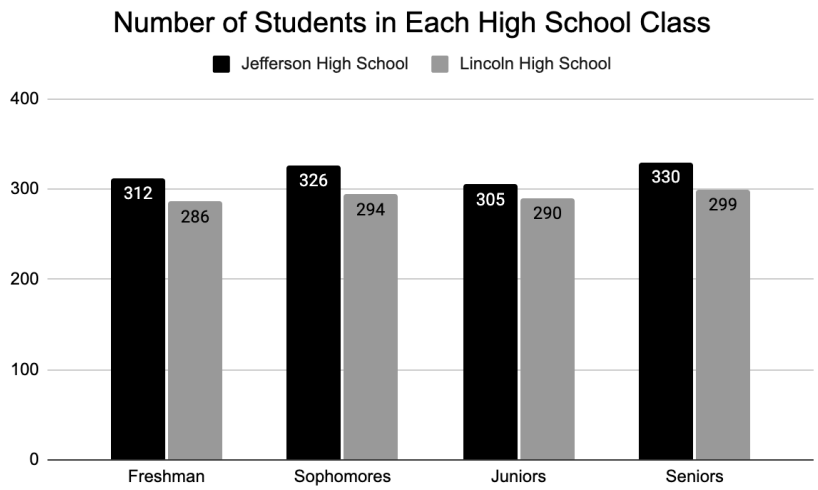
3. Which of the statements is true based on the following graph?



a. Plant A and Plant B both increased at the exact same rate each month
b. Plant A and Plant B both increased but at different rates
c. Plant A increased while Plant B decreased
d. Plant A decreased while Plant B increased

---

4. Which class had the biggest difference in the amount of students in their respective grade?



a. Freshman
b. Sophomores
c. Juniors
d. Seniors

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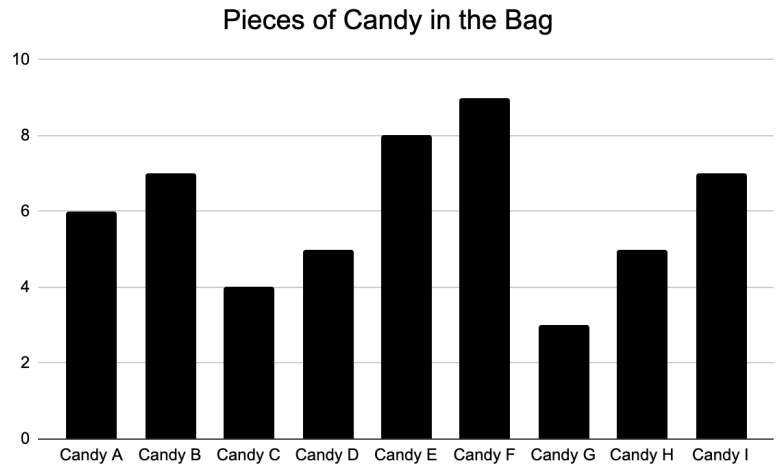
5. Which candy had the median amount of pieces in the bag?



a. Candy A
b. Candy C
c. Candy E
d. Candy H

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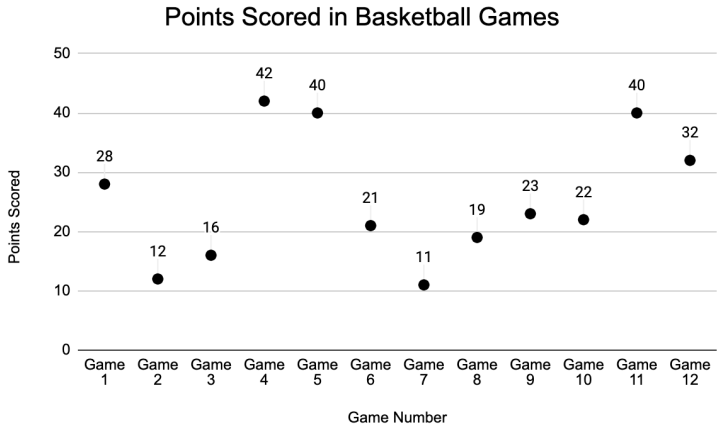
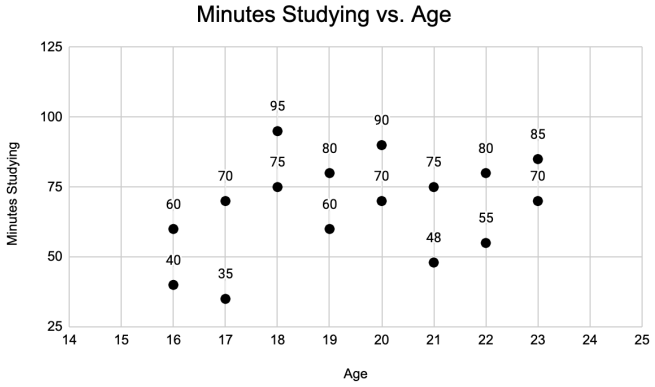
6. What percentage of games were there more than 32 points scored?



---

7. What is the age difference between the person who studies the most amount of time and the person who studies the least amount of time?



END OF SECTION

Section 22 - Literal Equations

1. Given the equation $N = \frac{O}{M}$, which of the following gives M, in terms of N and O?

   a. $M = \frac{N}{O}$
   b. $M = O + N$
   c. $M = NO$
   d. $M = \frac{O}{N}$

---

2. Albert Einstein came up with one of the most important formulas the world has ever seen. His formula states $E = mc^2$. Which of the following expresses the speed of light in terms of energy and mass?

   a. $\sqrt{\frac{E}{m}}$
   b. $\frac{E}{m^2}$
   c. $\sqrt{\frac{m}{E}}$
   d. $\sqrt{\frac{E}{m^2}}$

---

3. Given the equation below, what is p in terms of m, q, and r?

   $m = pq + rm$

   a. $\frac{m(1-r)}{q}$
   b. $\frac{(1-r)}{q}$
   c. $\frac{q(1-r)}{m}$
   d. $\frac{m-r}{q}$

---

4. Given the equation $d = \frac{2e}{\sqrt{f}}$, what are f and d in terms of e?

a. $e = \frac{2d}{f}$

b. $e = \frac{df^{\frac{1}{2}}}{2}$

c. $e = \frac{d}{f^{\frac{1}{2}}}$

d. $e = \frac{df}{2}$

---

5. When given the equation $m = \frac{n-o}{n+p}$, what is p in terms of m, n, and o?

a. $p = \frac{n(1-m)-o}{m}$

b. $p = \frac{n(1-m)+o}{m}$

c. $p = \frac{m(1-n)-o}{m}$

d. $p = \frac{n(1-m)-o}{o}$

---

6. Which of the following, in terms of x and y, is equal to z?

$$\frac{2}{x} + \frac{2}{y} = \frac{2}{z}$$

a. $z = 2x - 2y$

b. $z = \frac{xy}{y+x}$

c. $z = 2x + 2y$

d. $z = \frac{y+x}{xy}$

END OF SECTION

Section 23 - One Solution, No Solutions, or Infinite Solutions

1. Which equation has exactly one solution?

   a. $2x + 3 = 2x + 3$
   b. $-2x + 3 = 2x + 3$
   c. $2x + 5 = 2x + 3$
   d. $x + x + 3 = 2x + 3$

---

2. Which lines have no solution?

   I. $y = 3x + 5$
   II. $2y = 6x + 6$
   III. $3y + 9x = 15$

   a. I & II
   b. I & III
   c. II & III
   d. Not enough information

---

3. How many solutions does the equation $3x + 5 = 2(2x + 4) - (-x - 3)$?

   a. 0
   b. 1
   c. 2
   d. No solutions

---

4. In the given equation below, *a* is a constant. Which value for *a* will make the lines have no solutions?

$\frac{3}{2}x + 8 = 6 - ax$

a. $\frac{3}{2}$
b. $-\frac{3}{2}$
c. $\frac{2}{3}$
d. $-\frac{2}{3}$

---

5. In the system of equations listed below, *m* is a constant. If there are infinite solutions to the system of equations, what is the value of *m*?

$15x + 20y = -50$
$mx - 2y = 5$

a. -1.5
b. 1.5
c. 15
d. -10

END OF SECTION

Section 24 - Parallel and Perpendicular Lines

1. What is an equation of a line that is perpendicular to the y-axis and and has a y-intercept of -3

   a. $x = 3$
   b. $y = 3$
   c. $x =$ -3
   d. $y =$ -3

---

2. Which statements are true?

   I. Parallel lines have the same slope
   II. Parallel lines have the same y-intercept
   III. Perpendicular lines have negative reciprocals

   a. I & II
   b. I & III
   c. II & III
   d. I, II, & III

---

3. Given the equation below, which line would form a 90° angle when they intersect?

   $2x - 3y = 15$

   a. $4x - 6y = 18$
   b. $4x + 6y = 18$
   c. $6x - 4y = 18$
   d. $6x + 4y = 18$

Questions 4 and 5 are based on the graph of line *l* below.



4. Line *m* is parallel to line *l*. Line *m* crosses the y-intercept at 4. Where does line *m* cross the *x*-axis on the *xy*-coordinate plane?

   a. 4
   b. 8
   c. 12
   d. 16

---

5. On the xy-coordinate plane line *n* is perpendicular to the line *l* (above graph). Line *n* intersects line *l* at the point (4,1). What is the equation of line *n*?

   a. $y = -\frac{1}{4}x - 15$
   b. $y = \frac{1}{4}x - 15$
   c. $y = -4x - 15$
   d. $y = 4x - 15$

---

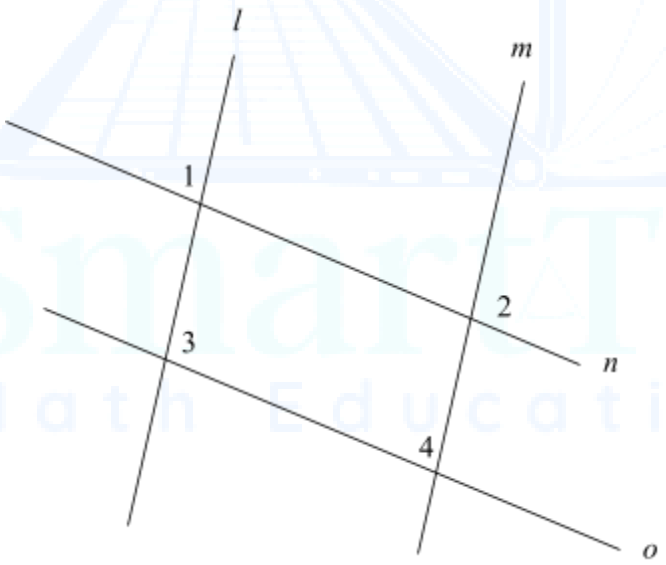
6. In the given equations below i is a constant. What value of i will make the equations form perpendicular lines?

$$y = \frac{5}{4}x - 3$$
$$y = \frac{1}{8}xi - 3$$

a. 10
b. $-\frac{32}{5}$
c. $-\frac{11}{8}$
d. -3

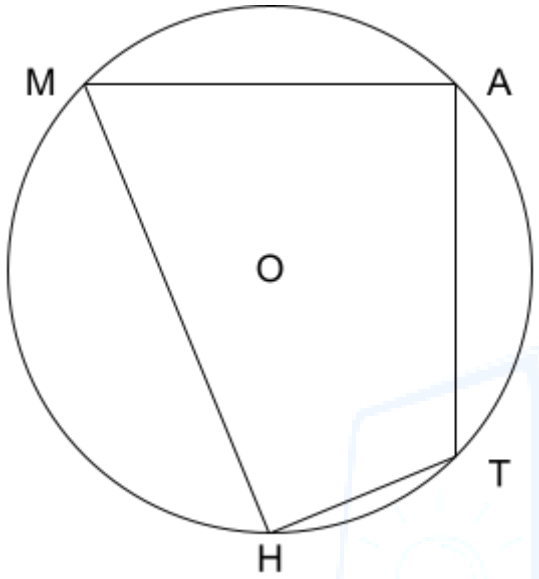
---

7. In the diagram below line l is parallel to line m and line n is parallel to line o. If the angle 1 = 80°, what is the value of $\frac{1+2}{3+4}$?



---

8. Quadrilateral MATH is inscribed in Circle O, as shown below. Angle A = $3x + 20$ and angle H = $5x - 24$. What is the measure of angle A?



END OF SECTION

Section 25 - Percent

1. What percentage of 24.8 is 6.2?

    a. 25%
    b. 62%
    c. 75%
    d. 400%

---

2. Carolyn loved baseball. Each year she rooted for her team, but year after year they did not have much success. In the 10th year of rooting for her team they won 60 games. Finally, her luck changed and they won 90 games in her 11th year of rooting for the team. What was the percent increase in games won from year 11 to year 12?

    a. 30%
    b. 50%
    c. 75%
    d. 150%

---

3. David went out to a restaurant with Anne and paid $92.00 after a 15% tip. There was no tax on his bill. How much was the original bill?

    a. $77.00
    b. $78.20
    c. $80.00
    d. $105.80

---

4. Drew's gas bill increased by 12% from December - February. For the month of December his total bill was $200. How much did he pay, in total, from December - February?

   a. $224
   b. $600
   c. $624
   d. $674.88

---

5. Sean paid $50 for a video game in 2020. In 2021, he bought the same game, but paid 20% more. In 2022, he once again bought the same game, but it had increased another 20% from the prior year. What was the percent increase in the cost of the game from 2020 to 2022?

   a. 12%
   b. 20%
   c. 22%
   d. 44%

---

6. Antonio and Salvador both sell cars. Antonio earns $1,500 plus 20% commission on d, his sales, each month. Salvador earns $2,500 plus 12% commission on d, his sales, each month. How much in sales volume would Antonio need to have in one month in order for him to earn more money than Salvador?

   a. $d > 12,500$
   b. $d < 12,500$
   c. $d > 125$
   d. $d > 6,250$

---

7. 25% of 60 is the same as what percent of 20?

    a. 15%
    b. 33%
    c. 50%
    d. 75%

---

8. The price of a new 50” TV was $850 in January. In April, a shortage of TV's caused the price to increase by 30%. In September it was discounted by 20% from the new price. What is the price of the 50” TV?

    a. $1,326
    b. $1,105
    c. $884
    d. $680

---

9. Mr. Perri has a rectangular basketball court in his backyard. He decides to enlarge the court by making each side 20% bigger. After the enlargement, the area of Mr. Perri’s court will have increased by what percent?

    a. 20%
    b. 44%
    c. 50%
    d. Not able to be determined

---

10. Tom was studying to get his law degree. Over the course of the marking period he studied for 120 hours. If Carolyn studied 150% more hours, how many hours did she study in all during the same marking period?

---

11. A saleswoman makes 12% commission on all of the makeup she sells. A bottle of perfume sells for $40. If customers only buy this one type of perfume that sells for $40 and her goal is to make $62.40, how many bottles of perfume would she have to sell?

---

12. Rectangle ABCD is shown below. AB = 12 and BC = 6. If rectangle ABCD doubles in size, by what percent will the area have increased (Grid in your answer without the percent symbol)?



END OF SECTION

Section 26 - Probability Tables

1. Josh is a huge baseball fan. He loves to count statistics. The numbers below list the amount of hits his team got in each game. What percent of the games did they get over 10 hits?

   7, 12, 4, 6, 10, 11, 6, 14, 10, 1, 10, 5, 3, 7, 8

   a. 10%
   b. 20%
   c. 40%
   d. 50%

---

2. Phil likes to dress differently each day he goes to work. He has 6 pairs of shirts in the color purple, pink, blue, green, orange, and yellow. He has 5 pairs of pants in the colors gray, white, tan, and black. He has 4 pairs of socks in the colors green, blue, black and white. He has 3 belts in the colors brown, black, and white. Assuming he randomly picks one shirt, one pair of pants, one pair of socks, and one belt, what are the odds he picks a pink shirt, white pants, green socks, and black belt?

   a. $\frac{1}{18}$
   b. $\frac{1}{360}$
   c. $\frac{4}{18}$
   d. $\frac{1}{90}$

Questions 3 and 4 are based on the table seen below

	Females	Males	Total
Before 9:00	22	16	38
9:00 - 11:00	50	47	97
After 11:00	18	27	45
	90	90	180

3. A group of people were asked what time they go to bed. Based on the information in the table, what percent of females go to bed in between 9:00 - 11:00?

   a. 28
   b. 50
   c. 56
   d. 90

---

4. Which of the following categories accounts for 9% of all the people surveyed

   a. Males who went to bed after 11:00
   b. Females who went to bed after 11:00
   c. Males who went to bed before 9:00
   d. Females who went to bed before 9:00

Questions 5 & 6 refer to the following information.

The table below shows how many televisions were sold that were either less than 50” or more than 50” at an electronics store over the course of four months.

Month	January	February	March	April	Total
Less than 50”	112	68	47	73	300
More than 50”	54	39	47	60	200
Total	166	107	94	133	500

5. Which month accounted for 30% of all televisions more than 50” sold?

   a. January
   b. February
   c. March
   d. April

---

6. Which percentage (approximately) of all televisions sold came from March?

   a. 50%
   b. 47%
   c. 18.8%
   d. 9.4%

---

7. A box of marbles has 5 different colors in it. The percent of each marble is represented in the table below. What percent of marbles are not blue or orange?

Color	Percent
Pink	12
Silver	26
Blue	32
Green	
Orange	16

a. 14%
b. 48%
c. 52%
d. 86%

---

8. In Anne's school, there was a tally of the number of people in the cafeteria and which grade they were in. The results are shown below in the frequency table. If there were 400 students in the school, how many of them would be Juniors based on the results shown?

Grade	Frequency
Freshmen	12
Sophomores	15
Juniors	9
Seniors	4

END OF SECTION

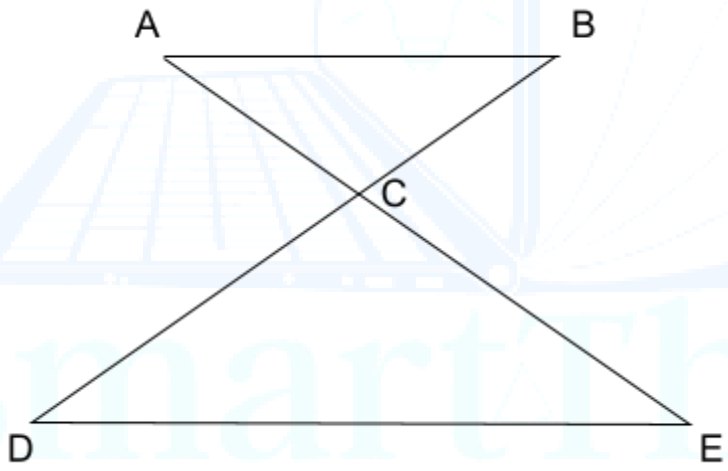
Section 27 - Proportions

1. Edwin loves to look at tall buildings. The tallest building in the USA is One World Trade Center. It is 592 yards tall. How many inches tall is One World Trade Center?

   a. 1,184
   b. 1,776
   c. 7,104
   d. 21,312

---

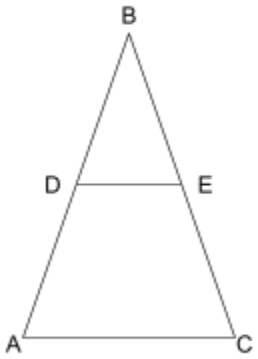
2. In the figure below $\overline{AB} \parallel \overline{DE}$. Segment $\overline{AE}$ and $\overline{DB}$ intersect at C. If side length $\overline{AB}$, $\overline{BC}$, $\overline{DE}$ measure 10, 6, and 25 respectively, what is the length of of $\overline{DC}$?



   a. 42.5
   b. 16
   c. 15
   d. 12

---

3. In $\triangle$ ABC, $\overline{DE} \parallel \overline{AC}$. $\overline{DE} = 12$, $\overline{AC} = 20$, and $\overline{BD} = 15$. What is the value of $\overline{BA}$?



a. 10
b. 20
c. 25
d. 30

---

4. Frank is picking apples from a tree. By 11:00 am he had picked 30 apples. At 2:00 pm he had picked 120 apples. At 4:30 pm, assuming he continued picking apples at the same rate, how many apples will Frank have picked?

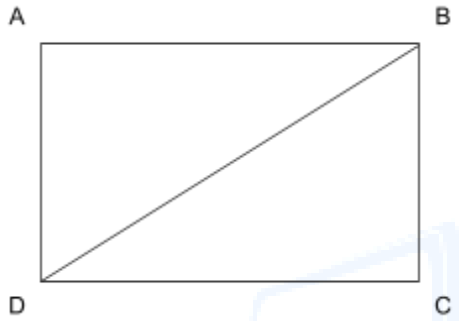
---

5. In $2\frac{1}{4}$ hours Jake is able to read 126.5 pages. If he reads the same amount every night, how many hours will it take him to read a book that is 759 pages?

END OF SECTION

Section 28 - Pythagorean Theorem

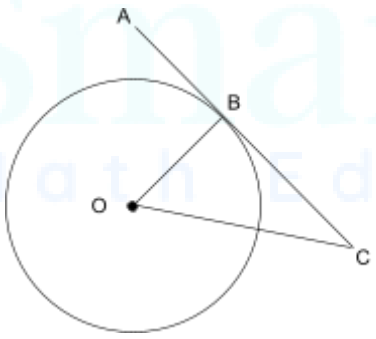
1. In rectangle ABCD, what is the value $\overline{BC}$ given $\overline{AB}$ = 36 and $\overline{BD}$ = 39?



a. 6
b. 9
c. 12
d. 15

---

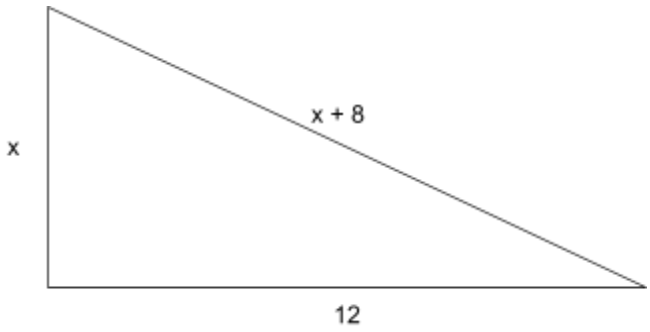
2. In circle O, seen below, line $\overline{AC}$ is tangent to the circle O at point B. The radius of the circle is 6 and $\overline{AB}$ = $\overline{BC}$, find $\overline{OC}$ if $\overline{AC}$ = 16.



a. $2\sqrt{73}$
b. 10
c. 11
d. $2\sqrt{55}$

---

3. What is the value of x in the triangle given below?



END OF SECTION

Section 29 - Radicals

1. What is the value of x when $\sqrt{3x + 1} = 5$

   a. 1
   b. 2
   c. 4
   d. 8

---

2. Solve for x in the given equation below.

   $\sqrt{2x + 13} = (x + 5)$

   a. {-6}
   b. {-2}
   c. {-6, -2}
   d. {0}

---

3. Solve for x in the given equation below.

   $(3\sqrt{2})(4\sqrt{x}) = 36\sqrt{10}$

   a. 5
   b. 15
   c. 22.5
   d. 45

---

4. What is the value of $\sqrt[2]{x} + \sqrt[3]{x} + \sqrt[6]{x}$ when $x = 64$?

END OF SECTION

Section 30 - Radians

1. How many radians is 315°?

   a. $\frac{7\pi}{4}$

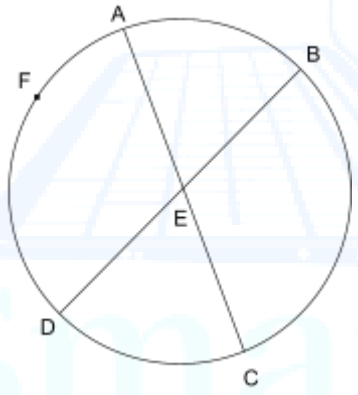
   b. $\frac{3\pi}{4}$

   c. $\frac{7\pi}{8}$

   d. $\frac{3\pi}{8}$

---

2. In the circle below, point E is the center of the circle. If $\overline{AE}$ = 24 and arc AFD = 18π, what is the measure of angle AED in radians?



   a. $\frac{3}{4}\pi$

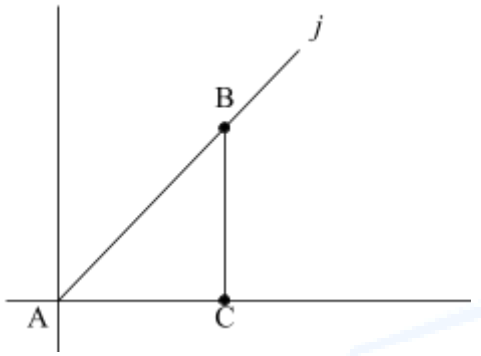
   b. $\frac{3}{2}\pi$

   c. $\frac{4}{3}\pi$

   d. $\frac{1}{4}\pi$

---

3. In the xy-plane, line j passes through the origin. In triangle ABC, $\overline{AB} = 3\sqrt{2}$. What is the value of angle BAC in radians?



a. $\frac{\pi}{6}$

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

c. $\frac{\pi}{3}$

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

---

4. How many degrees is $\frac{3\pi}{5}$?

END OF SECTION

Section 31 - Ratios

1. There are 30 children in Professor Scipioni's homeroom class. There are 2 boys for every 3 girls. How many boys are in the class?

    a. 6
    b. 12
    c. 18
    d. 20

---

2. The sides of the perimeter of a triangle are in the ratio 2:3:5. If the perimeter of the triangle is 95 inches, how much longer is the longest side than the shortest side?

    a. 9.5 inches
    b. 22.5 inches
    c. 27 inches
    d. 49.5 inches

---

3. A delivery truck estimates that it can deliver 6 - 8 packages per hour. During the week a truck makes deliveries for 8 hours per day for 4 days, and only 4 hours on the 5th day, what is a good estimate for the number of packages a truck can deliver in total over that 5 day period?

    a. $216 < x < 288$
    b. $192 < x < 256$
    c. $240 < x < 320$
    d. $48 < x < 64$

---

4. Joan has her own online shop where she sells paintings of dogs. Each painting costs her $3.50 in expenses. She sells each picture for $8.75. If she wants to make $68.25 in profit, how many paintings does she have to sell?

END OF SECTION

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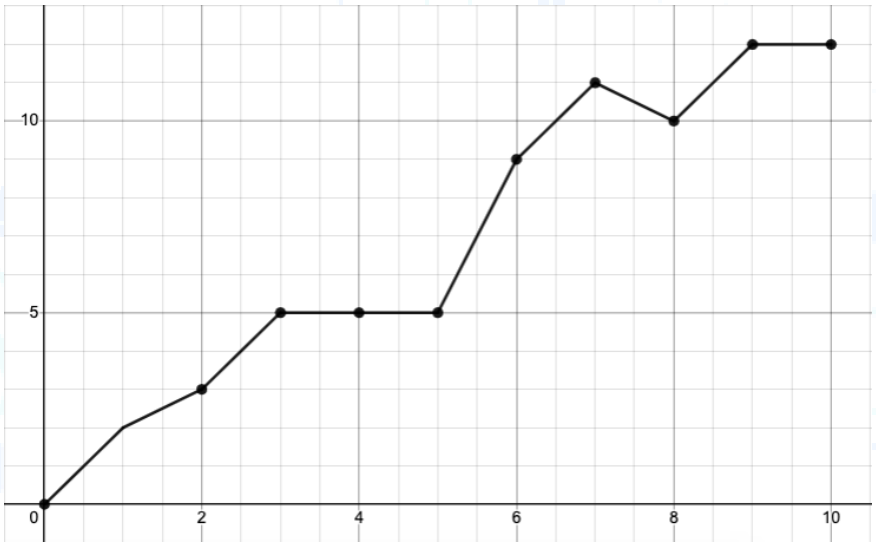
Section 32 - Slope

1. Line q, located on the *xy* plane, has a slope of -3. It has a y-intercept of -2.5. Which equation represents this line?

   a. $y = -\frac{5}{2} + 3x$
   b. $y = -\frac{5}{2} - 3x$
   c. $y = -3x + \frac{5}{2}$
   d. $y = 3x + \frac{5}{2}$

---

2. The graph below indicates the distance, *y*, Zach is from his house after *x* minutes. Between which two periods was his rate of change the greatest?



   a. 0 – 3 minutes
   b. 3 – 6 minutes
   c. 5 – 6 minutes
   d. 6 – 10 minutes

---

3. The equation below represents the temperature (in fahrenheit), y, of a cup of coffee, x minutes after it is brewed. Assuming you get your cup of coffee at 9:12 am, at what time will the temperature be 168.6℉?

$$y = 212 - 6.2x$$

a. 9:05
b. 9:18
c. 9:19
d. 9:20

---

4. A gym offers membership for new members. The cost of the gym is modeled by the linear equation $y = 100 + 25x$, where y is the cost and x is the number of months you join for. Based on the equation, which statement can you say to be true?

a. A membership costs $100 per month
b. For each additional month the membership costs you $100 more per month
c. The initiation fee is $25
d. The gym fee is $25 per month

---

5. Line *m,* located on the *xy* plane, has a slope of -4. It also passes through the point (-2,2). Which of the following points also lies on the line *m*?

a. (0,10)
b. (6,0)
c. (0,6)
d. (0,-6)

---

6. Below is a table that shows the population of tigers in the world. What was the average rate of change for tiger population from 1970 until 2010? All populations are listed in thousands in the table.

Year	1970	1980	1990	2000	2010
Population	40	30	18	5	4

a. .9
b. 36
c. 900
d. 36,000

---

7. A line on the *xy-coordinate* plane goes through the y-intercept at 2 and has a slope of $-\frac{2}{3}$. Which point does the line also go through?

a. (3, 0)
b. (3, 4)
c. (2, -1)
d. (-2, 5)

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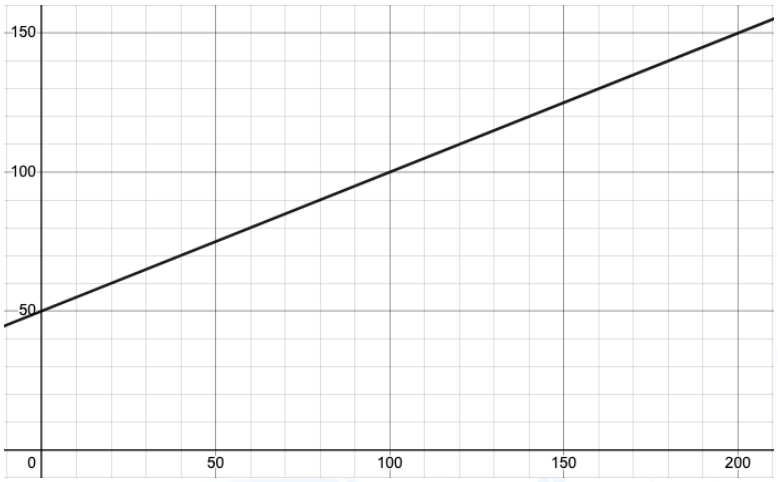
For questions 8 & 9 use the graph shown below.

The graph shown below represents the cost of renting a jet ski. The x-coordinate represents the number of minutes and the y-coordinate represents the total cost in dollars.



8. What does the slope represent in terms of this problem?

   a. The total cost of renting a jet ski
   b. The increase in price per minute
   c. How long it takes to rent the jet ski
   d. The initial cost of renting the jet ski

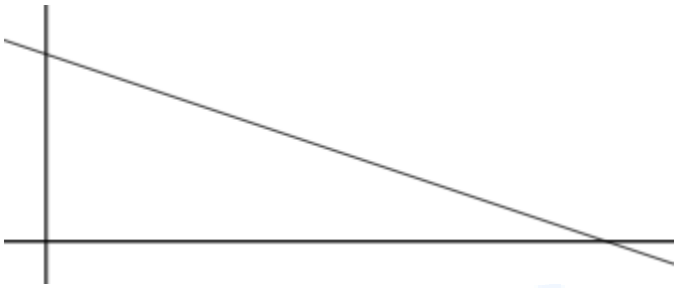
---

9. What is the cost of the non refundable deposit for the jet ski?

   a. 50
   b. 100
   c. 150
   d. 200

---

10. Line *m,* shown below, can be represented by the equation $y = mx + b$. Which of the following must be true about $\frac{m}{b}$?



a. $\frac{m}{b} > 0$

b. $\frac{m}{b} < 0$

c. $\frac{m}{b} = 0$

d. $\frac{m}{b} = 1$

---

11. Two lines are perpendicular. If, on the xy-plane, the first line has the points (2,6) and (4,15) and the second line has the points (a,10) and (20,8), what is the value of *a*?

---

12. A line has the coordinates (-2, -4). It has a slope of $\frac{2}{5}$. If another point on the line is (8,*c*), what is the value of *c*?

END OF SECTION

Section 33 - Statistics - Mean, Median, Mode, Range, and Standard Deviation

1. The table below shows the number of miles a truck has been driven over the last 5 days. Which of the following statements are true about the number of miles driven?

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Miles	25	46	13	13	43

i. The mode is greater than the mean
ii. The range is greater than the median
iii. The mean and median are equal

a. i and ii
b. i and iii
c. ii and iii
d. i, ii, iii

---

2. Brooke loved to run sprints. During the month of April Brooke ran ten 100 meter sprints. During the month of May Brooke ran twelve 100 meter sprints. What was the difference in her median between months based on the data listed below?

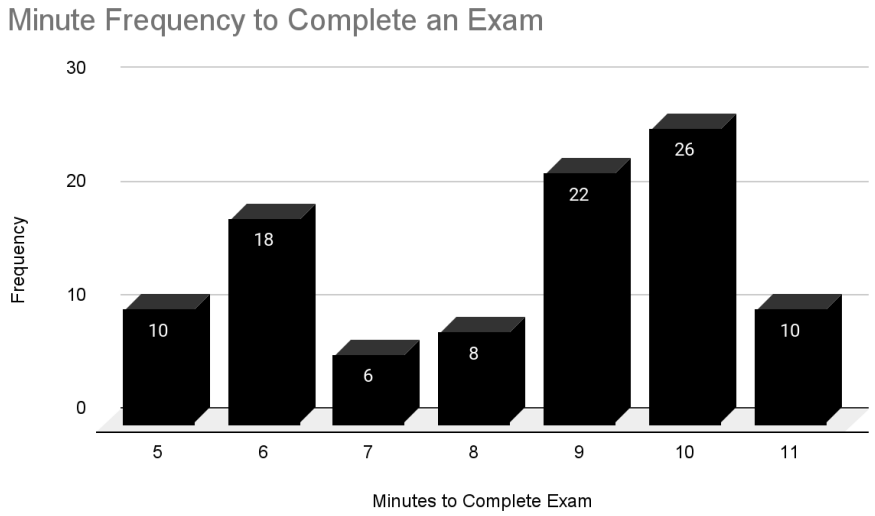
April									
12.8	11.9	13.3	13.5	12.7	12.9	13.4	13.4	11.9	12.4

May											
11.6	12.8	13.4	11.3	11.3	11.9	12.7	13.1	12.8	12.2	11.1	12.1

a. 0.5
b. 0.6
c. 0.7
d. 0.8

---

3. The chart below shows how long it took students to complete an exam. What would be the median number of minutes it took a student to complete an exam?



a. 6
b. 7
c. 8
d. 9

---

4. The list below shows how many points were scored in a basketball game over the course of 10 games.

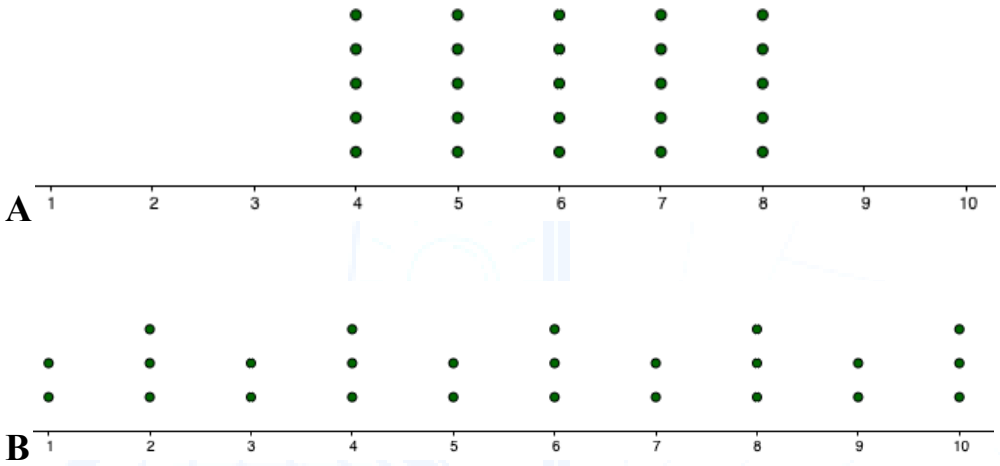
   95, 86, 102, 78, 72, 96, 95, 84, 90, 101

   In the 11th game the team scored 98 points. Which of the following statements is true?

   a. After the 11th game, the range increased.
   b. After the 11th game, the range decreased.
   c. After the 11th game, the range remained unchanged.
   d. You can't tell what happened to the range after the 11th game.

Questions 5 and 6 are based on the dot plot shown below

5. Dot Plot A shows how many runs the Bomb Squad scored in their spring softball season over the course of 25 games. Dot Plot B shows how many runs they scored in the fall softball season over the course of 25 games. Which of the following statements correctly compares the standard deviations of the two different seasons?



   a. The standard deviation of the fall season is greater than the standard deviation of the spring season.
   b. The standard deviation of the spring season is greater than the standard deviation of the fall season.
   c. The standard deviations of the fall and spring season are the same.
   d. You can't compare the standard deviations of the fall and spring season.

---

6. Which statement is true about the mean, median and range of the fall season?

   a. mean < median < range
   b. median < mean < range
   c. range < median < mean
   d. mean < range < median

---

7. Sebastian has taken 4 tests so far this semester. If his average is an 82 thus far, what is the lowest possible grade he can get to keep his average above 80?

    a. 78
    b. 76
    c. 74
    d. 72

---

8. James had an average of 86 on his first 4 tests. On his next test he scored a 96. What was his new average?

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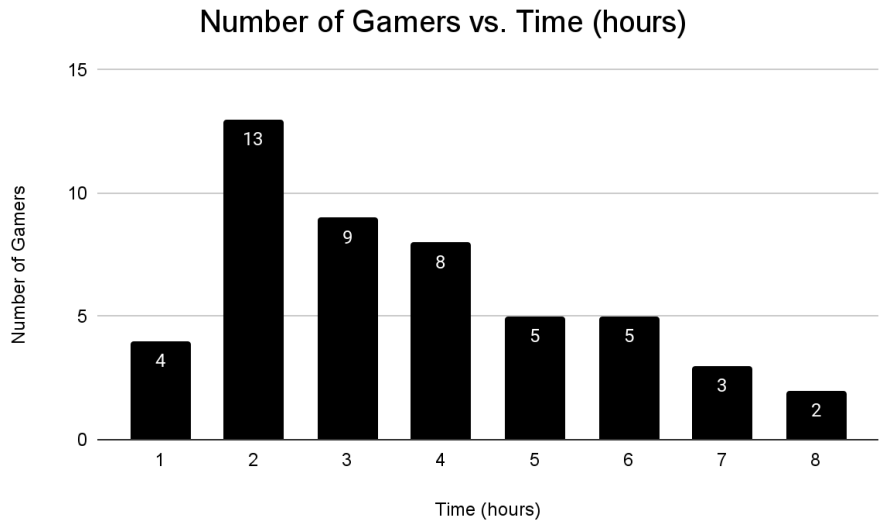
Base your answers to 9 & 10 on the graph shown below.



9. What is the mean of the time spent gaming in the graph shown above?

10. What is the median of time spent gaming in the graph shown below?

END OF SECTION

Section 34 - System of Equations - Elimination, Substitution & Graphing

1. Given the equation below, which of the following ordered pairs (x,y) gives the solution set to the equation below?

$3x + 2y = 5$
$4y - 2x =$ -14

a. (-3,2)
b. (-3,-2)
c. (3,-2)
d. (9,1)

---

2. What is the solution (*x,y*) to the system of equations shown below?

$2x + 6y = 12$
$x = 3y - 6$

a. (0, -2)
b. (2, 0)
c. (0, 2)
d. (-2, 0)

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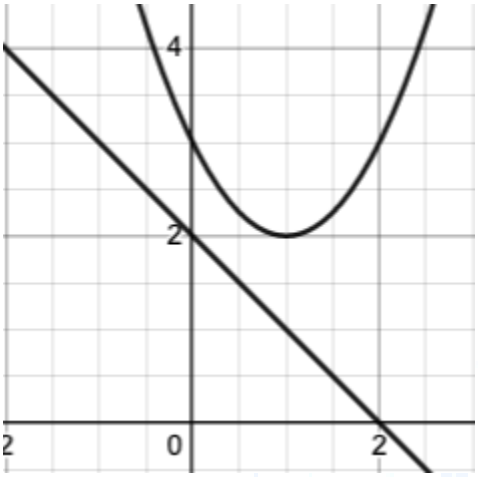
3. A system of equations is shown in the graph below. How many solutions does the system of equations shown below have?



a. 0
b. 1
c. 2
d. 3

---

4. The Diner's most popular two items are its cheeseburgers and milkshakes. Cheeseburgers sell for $11.50 and milkshakes sell for $4.50. On Saturday the Diner sold $228 worth of food by selling 32 cheeseburgers and milkshakes. How many milkshakes did they sell?

a. 12
b. 16
c. 20
d. 24

---

5. Matthew is a growing boy who absolutely loves to eat. His favorite meal is pizza. A pizza from Mario's costs $16.00 plus $1.75 per topping. A pizza from Domenic's costs $18.00 plus $1.25 per topping. How many toppings would Matthew have to have on his pizza for the cost to be exactly the same?

   a. 3
   b. 4
   c. 5
   d. 6

---

6. If the systems of equations given below have infinite solutions, what is the value of a.

$$\frac{1}{6}x + \frac{2}{9}y = 1$$
$$\frac{3}{2}x + \frac{1}{6}ay = 9$$

   a. 0
   b. 6
   c. 12
   d. 18

---

7. Two equations are given below. What is the y-value of the solution?

$$3x - 6y = 6$$
$$3x + 6y = 54$$

---

8. In the system of equations below k is a constant. What value of k will make the system of equations have no solutions?

$y = 4.5x + 10$
$y = .75kx + 8$

END OF SECTION

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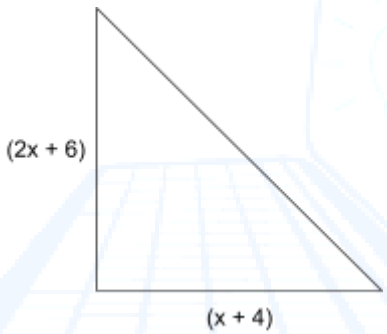
Section 35 - Triangles

1. Triangle ABC has angle A = $3x + 6$, angle B = $4x - 30$, and angle C = $5x + 12$. What type of triangle is triangle ABC?

   a. Scalene
   b. Isosceles
   c. Equilateral
   d. Right

---

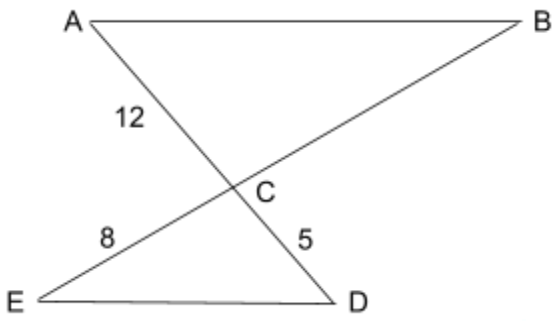
2. What is the area of the triangle you see below?



   a. $x^2 + 7x + 12$
   b. $2x^2 + 14x + 24$
   c. $2x^2 + 24$
   d. $3x + 10$

---

3. In the diagram below triangle ABC is similar to DEC. $\overline{AB}$ // $\overline{ED}$. What is the value of $\overline{BC}$?



a. 7.5
b. 16
c. 19.2
d. 24

---

4. Equilateral triangle ABC has altitude $\overline{AD}$. If $\overline{BC}$ = 20, what is $\overline{AD}$?

a. 10
b. 20
c. $10\sqrt{3}$
d. $20\sqrt{3}$

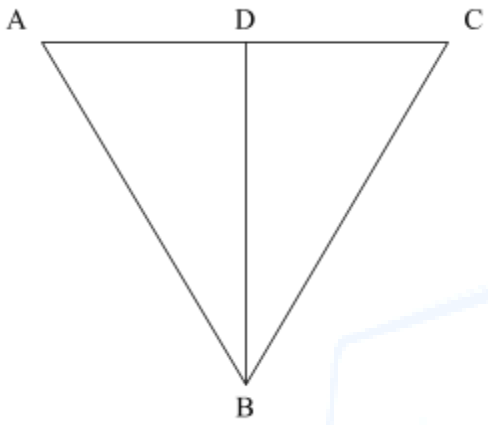
---

5. Triangle ABC is an isosceles right triangle. If angle B = 90° and $\overline{AB}$ = 10, then what is the value of $\overline{AC}$?

a. 50
b. 25
c. $5\sqrt{2}$
d. $10\sqrt{2}$

---

6. In the diagram below, ABC is an equilateral triangle. If $\overline{BC} = 20$, what is the length of $\overline{BD}$?



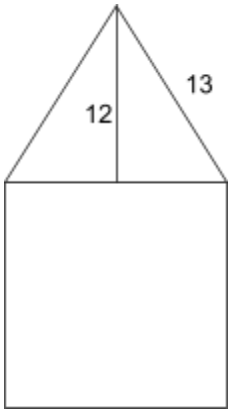
a. 5
b. 10
c. $10\sqrt{2}$
d. $10\sqrt{3}$

---

7. In rectangle ABCD, $\overline{CD}$ is a diagonal. If $\overline{AB} = 24$ and $\overline{CD} = 26$, what is the area of triangle BCD?

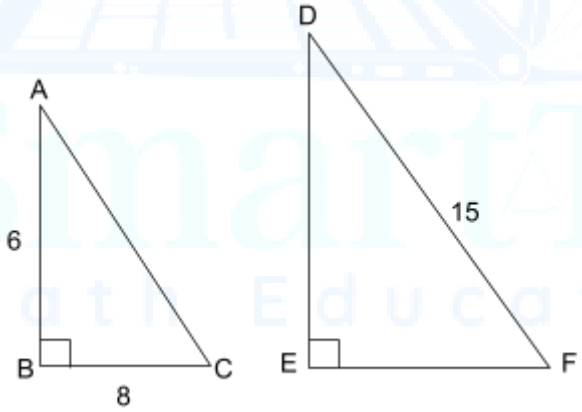
---

8. What is the total area of the figure shown below?



---

9. If right triangle *ABC* is similar to the right triangle DEF, what is the area of the right triangle DEF?



END OF SECTION

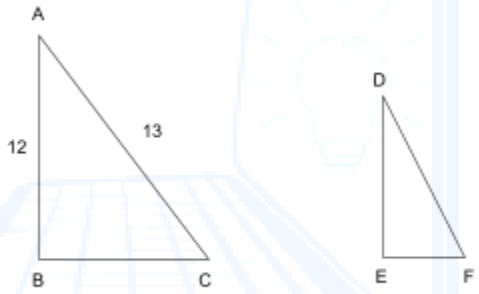
Section 36 - Trigonometry - SOHCAHTOA - Sine, Cosine, Tangent

1. $\triangle ABC$, has angle B = 90°. What is the length of $\overline{AC}$ if angle C = 58° and $\overline{BC}$ = 10. Round your answer to the nearest tenth.

   a. 2.7
   b. 5.3
   c. 8.5
   d. 16.0

---

2. Right triangle *ABC* is similar to right triangle DEF. What is the cosine of ∡A?



   a. $\frac{12}{13}$
   b. $\frac{5}{12}$
   c. $\frac{13}{12}$
   d. $\frac{5}{13}$

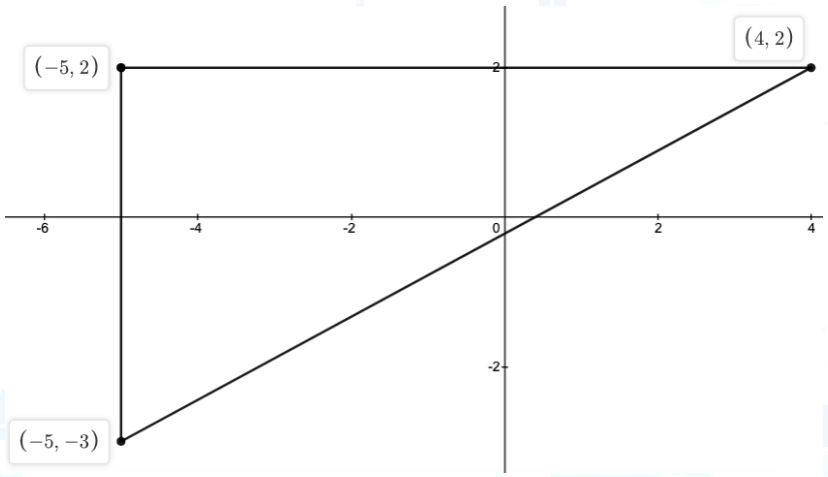
---

3. In right triangle EFG, the measure of angle F is 90°. If $\cos E = \frac{5}{8}$ and $\overline{EG} = 40$, what is the length of $\overline{EF}$?

   a. 50
   b. 40
   c. 30
   d. 25

---

4. There is a right triangle shown below. What is the value of $\tan x$ from vertex (4,2)?



   a. $\frac{5}{9}$
   b. $\frac{9}{5}$
   c. $-\frac{5}{9}$
   d. $-\frac{9}{5}$

---

5. In △ ABC, angle B is a right angle. If sin A = $\frac{3}{5}x - 8$ and cos C = $.9x - 20$, what is the value of x?

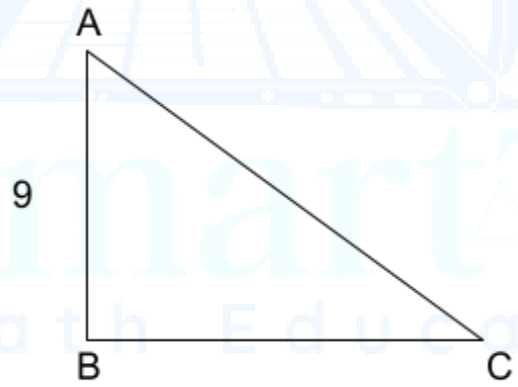
   a. 8
   b. 28
   c. 40
   d. 47.2

---

6. In right triangle *ABC*, cos (*x*) = $\frac{7}{8}$. What does sin (90 - *x*) equal?

---

7. If tan x = 0.75, what is the length of $\overline{BC}$?



END OF SECTION

Section 37 - Vertexes and Parabolas

1. A soccer player kicks the ball down the field. The equation below shows the height of the soccer ball h(m) meters as a function of horizontal distance, m, the ball travels until it hits the ground. What is the maximum height of the ball?

$h(m) = -.5(x - 4)^2 + 8$

   a. .5
   b. 4
   c. 8
   d. 16

---

2. Given the equation $y = x^2 - 6x + 8$, which of the following is an equivalent equation from which the vertex could be identified as constants in the equation

   a. $y = (x - 4)(x - 2)$
   b. $y = (x + 8)(x - 2)$
   c. $y = (x - 3)^2 - 1$
   d. $y = (x + 3)^2 - 1$

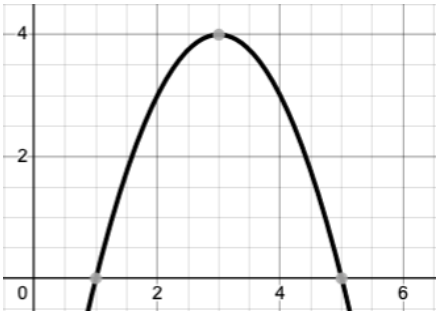
---

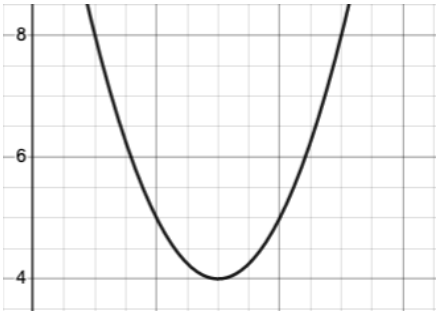
3. What is the minimum value of the equation $y = 4x^2 + 16x + 12$?

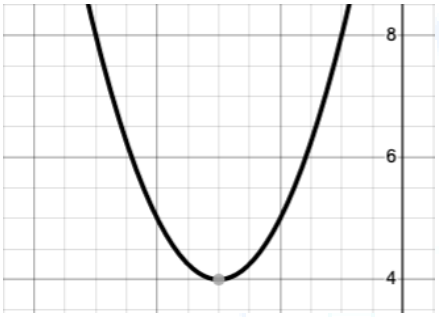
   a. -2
   b. 2
   c. 8
   d. 12

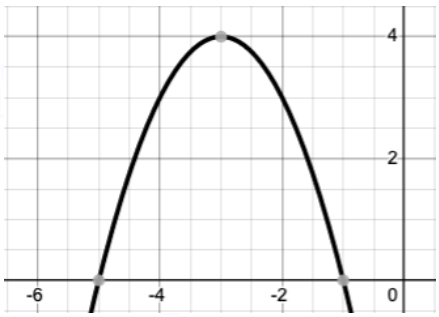
---

4. Which equation represents $y = -(x - 3)^2 + 4$?

a. 

c. 

c. 

d. 

---

5. The function $f(x) = -(x^2)$ is graphed in the *xy*-plane. If the function $g(x) = -(x - 3)^2 + 5$ is graphed on the same *xy*-plane, which coordinate would be the new vertex for $g(x)$?

   a. $(-3, 5)$
   b. $(-3,-5)$
   c. $(3, 5)$
   d. $(3,-5)$

---

6. A table of a parabola is given below. What is the value when $x = 4$?

x	-4	-3	-2	-1	0	1	2
y	31	17	7	1	-1	1	7

---

7. Alex has a toy rocket that he launches. The equation $f(x) = -\frac{1}{10}(x - 5)^2 + 10$ represents its flight path, with x representing time in seconds, and $h(x)$ representing height in meters. After how many seconds does the rocket touch the ground.

END OF SECTION

Section 38 - Volume

1. Stuart has boxes that are all rectangular prisms. Each box has a dimension of 6 in. x 18 in. x 48 in. If each box is packed right next to the other box and Stuart rents out a space to store all of his boxes that have dimensions of 6 ft. x 10 ft. x 5 ft., then how many boxes can Stuart store overall?

    a. 4
    b. 48
    c. 5,184
    d. 20,736

---

2. A cube has an edge of 12 centimeters. If a sphere fits perfectly inside of the cube, what is the volume of the sphere?

    a. 16π
    b. 192π
    c. 288π
    d. 2304π

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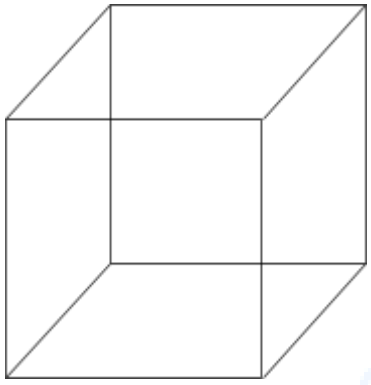
3. If the volume of the cube seen below is 125 m^3, what is the diagonal length across one of the faces?



a. 5
b. 25
c. $5\sqrt{2}$
d. 50

---

4. A sphere has a volume of 36π and its diameter is the same length as the cube it sits inside. What is the volume of the cube?

a. 27
b. 81
c. 216
d. 729

---

5. The radius of Sphere A is $\frac{1}{4}$ the radius of Sphere B. How many times greater is the volume of Sphere B?

a. 4
b. 8
c. 16
d. 64

---

6. Jonah has a right cylindrical fish tank with a diameter of 16 inches and a height of 24 inches. If a hose can fill 24π cubic inches of water every 5 minutes, how long would it take to fill the tank?

    a. 64 minutes
    b. 256 minutes
    c. 320 minutes
    d. 1280 minutes

---

7. An igloo is in the shape of a perfect hemisphere. If the igloo has a volume of $144\boldsymbol{\pi}$ cubic yards, what is the exact diameter of the igloo?

    a. $3\sqrt[3]{4}$
    b. 6
    c. 12
    d. 24

---

8. Professor Doran is switching his office. As he has just received tenure, he has been reassigned to a bigger office. His older, smaller office has dimensions of length = 6, width = 8. And height = 10. His newer, bigger office has dimensions that are exactly double that of his old office. How many times bigger is the volume of his new office than that of his old office?

---

9. An ice cream cone is modeled by a right circular cone. Gianfranco wants to know the amount of ice cream that could fit into the cone. If the volume of the cone is 60π cubic centimeters and the diameter of the cone is 6 centimeters, what is the height of the cone?

END OF SECTION

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Section 39 - Wordy Word Problems

1. The half life of an atom is 12 days. This tells us that at the end of 12 days only half of the original amount is left that was present at the beginning of the time period is left. Which statement best describes how the atom changes over time?

    a. It increases exponentially
    b. It decreases exponentially
    c. It increased linearly
    d. It decreases linearly

---

2. The town of West Creek is a small town that originated in 1955. The population, in hundreds, of the town of West Creek can be represented by the function $f(x) = 1.68x + 23.56$. Based on the function, what is the population of the town in 1980?

    a. 48.76
    b. 4,876
    c. 5,044
    d. 334,996

---

3. Jacob spends j hours per day studying for his exams during the week (Monday - Friday). Brandon spent b hours on the weekend (Saturday - Sunday) studying for his exams. Which of the following expressions represents how many hours they spent studying combined?

    a. $j + b$
    b. $2j + 5b$
    c. $5j + 2b$
    d. $7jb$

---

4. Lisa loves to play softball. Of her team's 64 games, she plays 50% at second base, 25% at shortstop, and the rest of the games (x) at third base. Which equation below represents how many games she plays at third base?

   a. $\frac{64}{.25x}$
   b. $\frac{.25x}{64}$
   c. $\frac{64}{.75x}$
   d. $\frac{64}{64x}$

---

5. A square backyard is cut evenly into 100 sections. Each section measures 2 feet by 2 feet. After day 1, one section is completely covered by paver stones. Each day the amount of the garden that is covered by paver stones doubles. After how many days is 63% of the backyard covered with paver stones?

   a. 5 days
   b. 6 days
   c. 7 days
   d. 8 days

---

6. A dining room in a restaurant has room for 180 people to be seated in it. The only tables they have are in the shapes of squares and rectangles. The square table seats four people and the rectangular table seats 8 people. How many tables are there of each if there are double the amount of square tables compared to rectangular tables?

   a. Square = 8
      Rectangle = 4
   b. Square = 12
      Rectangle = 24
   c. Square = 20
      Rectangle = 10
   d. Square = 16
      Rectangle = 8

---

7. The Lions lost 12 of the first 20 games in the first half of their season. If, at the end of the season, they finished with the exact same amount of wins as losses, how many more games would they win in the second half of the season?

   a. 2
   b. 4
   c. 8
   d. 12

---

8. Tyler has half the number of tennis balls that McKenzie has. Tyler gives four to McKenzie. Now Tyler has $\frac{1}{4}$ the amount of tennis balls that McKenzie has. How many tennis balls does McKenzie end up with?

   a. 2
   b. 4
   c. 6
   d. 8

---

9. Mia is creating a rectangular garden. The longer side of the garden is 3 times the length of the shorter side of the garden. If the diagonal of the garden is 30, what is the length of the longer side of the rectangle?

   a. $3\sqrt{10}$
   b. $9\sqrt{10}$
   c. 10
   d. 22.5

---

10. Katherine exercises $\frac{2}{5}$ hour 5 days per week. She has a goal of exercising 2,400 minutes. How many weeks will it take Katherine to reach this goal?

---

11. One number is 5 times the smallest number. The other number is 3 times the smallest number. The sum of the numbers is 72. What is the difference between the middle number and the smallest number?

---

12. Rodrigo is an avid artist. He loves to make drawings of all kinds. He has saved his money from mowing lawns and decides it is time to buy new supplies. If colored pencils cost $1.25 per box, crayons cost $1.50 per box, and markers cost $1.75 per box, what is the most amount he could spend if he has to buy the same amount of each item and wants change back in a whole number from his $100 bill.

---

13. Henry loves going to baseball games. His two favorite teams are the Blue Birds and the Red Jays. Blue Birds tickets cost $25 per ticket and Red Jays tickets cost $20 per ticket. If he has $500 dollars to spend in total on tickets and he wants to go to as many Blue Birds games as possible while still seeing at least three Red Jays games, what is the most possible amount of Blue Jays games he can buy tickets to?

---

14. Nylah starts off her video game with 200 points. Each time she powers up she gains 2 points. Each time an opponent strikes her she loses 5 points. If she ends up with 140 points at the end of round 1, and she powered up and was struck by her opponent the same amount of times, how many power ups did she attain in the round?

END OF SECTION AND PRACTICE PROBLEMS

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