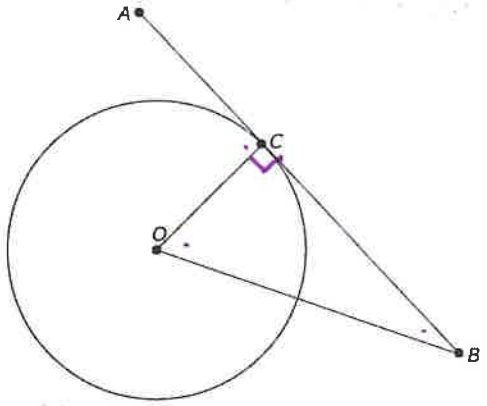
Cron

EOC Practice Test 2 questions

1.

In the circle shown, $\overline{AB}$ is tangent to circle O at point C and $\overline{OC}$ is a radius.



Which relationship is true?

- A. $\angle COB \cong \angle CBO$ – no way to know for sure
- B. $\angle COB \cong \angle ACO$ – no – ACO is a right angle
- C. $\overline{OB} \perp \overline{OC}$ – def. not perpendicular
- (D.) $\overline{OC} \perp \overline{AB}$ – Yes! Tangent lines & radii always make $\perp$ ($90°$) angles

2.

When using the Pythagorean theorem to write the equation of a circle with radius r and center (m, n), which of the following is true?

(A.) $a^2 = x - m$
$b^2 = y - n$
$c^2 = r$

$(x-m)^2 + (y-n)^2 = r^2$
a b c

B. $a = x + m$
$b = y + n$
$\times = r$

C. $a = x - m$
$b = y - n$
$\times = r$

D. $a^2 = x \times m$
$b^2 = y \times n$
$c^2 = r$

3.

Which expression is equivalent to $12^3 - 10^3$? Diff. of Cubes → $(12-10)(144+120+100)$
S. D. A.P.

- A. $(12 - 10)(144 + 100)$
- B. $(12 + 10)(144 - 100)$
- (C.) $(12 - 10)(144 + 120 + 100)$
- D. $(12 + 10)(144 - 120 + 100)$

or you could crank all these values out w/ calculator...

4.

A supermarket owner wants to know where in the supermarket he should locate the bread to maximize sales. He puts the bread in one location for two weeks, counts the loaves of bread sold, changes the location for two more weeks, and counts again.

Which of these methods is the owner using?

- (A.) experiment
- B. observational study
- C. sample survey
- D. two-stage sampling

The owner changed something — he's testing locations
Experiment!

5.

What is the value of x in the following equation?

$\sqrt{x-4}=9$

- A. $x=7$
- B. $x=10$
- (C.) $x=85$
- D. $x=169$

$(\sqrt{x-4})^2 = 9^2$

$x-4=81$

$+4 \quad +4$

$x=85$

or plug in values ...

6.

Select all expressions that are equivalent to $3x^5-6x^4y+3x^3y^2$

- (A.) $3x^3(x-y)^2$
- (B.) $3x^3\left(x^2-2xy+y^2\right)$
- C. $3x^3(x+y)^2$
- D. $3x^3\,(x-y)\,(x+y)$
- (E.) $3x^3\,(x-y)\,(x-y)$

GCF: $3x^3(x^2-2xy+y^2) \rightarrow B$

Quad. Form.: $3x^3(x-y)(x-y) \rightarrow E$

Combine: $3x^3(x-y)^2 \rightarrow A$

7.

Which expression is equivalent to $\frac{9x^3+18x^2-x-2}{3x+1}$ for $x \neq -\frac{1}{3}$?

- A. $(3x-2)\,(x+1)$
- (B.) $(3x-1)\,(x+2)$
- C. $(3x+1)\,(x-2)$
- D. $(3x+2)\,(x-1)$

$3x+1=0$

$-1 \quad -1$

$8x=-1$

$x=-\frac{1}{3}$

Divide 1st:

$-\frac{1}{3}$ | 9 18 −1 −2

↓ −3 −5 2

$9x^2$ $15x$ $-6c$ | 0 R

Factor: GCF: $3(3x^2+5x-2)$

$(3x-1)(x+2)$

or... you could... plug in a value to all - see which match or graph them & see which match

8.

On a coordinate plane, what are the center and radius of the circle represented by $(x+3)^2+(y-5)^2=25$?

A. Center: $(-3, 5)$; Radius: 25

B. Center: $(3, -5)$; Radius: 25

C. Center: $(3, -5)$; Radius: 5

(D) Center: $(-3, 5)$; Radius: 5

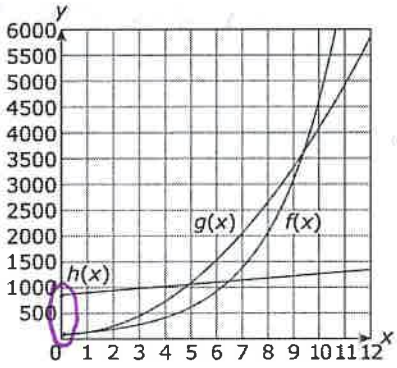
-3 5 r=5

Remember – for center of circle, change signs

+ last # in equation = r^2

9.

The graphs represent the growth patterns of three different functions, $f(x)$, $g(x)$, and $h(x)$.



which 'y' is bigger for given 'x'?

A.) at x=0, is h bigger than f? yes!
is h bigger than g? yes!

Which statements comparing the functions are true?

Select all that apply.

☐ (A) $h(x) \geq f(x)$ and $h(x) \geq g(x)$ at $x=0$ yes! (yes, yes)

☐ B. $h(x) \geq f(x)$ and $h(x) \geq g(x)$ on the interval $0 \leq x \leq 6$ (yes, no)

☐ C. $g(x) \geq f(x)$ and $g(x) \geq h(x)$ on the interval $1 \leq x \leq 10$ (no)

☐ (D) $g(x) \geq f(x)$ and $g(x) \geq h(x)$ on the interval $7 \leq x \leq 9$ yes! (yes, yes)

☐ E. $f(x) \geq g(x)$ and $f(x) \geq h(x)$ on the interval $x \geq 0$ (no)

☐ (F) $f(x) \geq g(x)$ and $f(x) \geq h(x)$ on the interval $x \geq 10$ yes! (yes, yes)

10.

A construction company is hired to resurface a straight section of road.

- The section is 100 yards long and 18 feet wide. (300 ft)
- The company's truck can haul 250 cubic feet of gravel per load.

What is the minimum number of truckloads required to completely cover the section of road to a depth of 6 inches? (0.5 ft)

Be careful with units!!!

A. 3 C. 10

B. 4 (D.) 11

Volume of new road = 300(18)(0.5) = 2700 ft^3

How many 250's do we need? $\frac{2700}{250} = 10.8$

More than 10! → 11 would be → 2750 ft^3

11.

A post is being driven into the ground. The first strike drives the post 25 inches into the ground. Each additional strike drives the stake $\frac{4}{5}$ the distance farther.

What is the total distance (to the nearest inch) that the post is driven into the ground after 7 strikes?

A. 79 (C.) 99

B. 92 D. 104

1.) 25 $\times \frac{4}{5}$ or 0.8

2.) 20 $\times 0.8$

3.) 16 $\times 0.8$

4.) 12.8 $\times 0.8$

5.) 10.24 $\times 0.8$

6.) 8.19 $\times 0.8$

7.) 6.55

Add up all 7 strikes = 98.78

12.

Which system of equations has only **one** solution?

○ (A) $y = x + 5$ and $y = -3x + 6$ – 2 lines can only intersect one time!

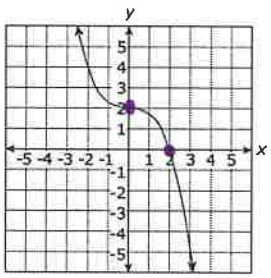
○ B $y = x - 2$ and $y = x + 4$ – parallel lines never intersect...

○ C. $y = |x - 5|$ and $y = 0.2x + 1$ – abs. value + line can intersect twice

○ D. $y = x^2 - 1$ and $y = 1.5x + 1$ – quad. funct. + line can intersect twice

13.

Which function is represented by the graph?



Graph goes thru (0,2) + (2,0)

○ A. $y = -2x^3$ – does not go thru (0,2)

○ B. $y = -2x^3 + 2$ – " (2,0)

○ (C) $y = -\frac{1}{4}x^3 + 2$ ✓

○ D. $y = \frac{1}{2}x^3 + 2$

lead coeff. not negative.

14.

A circle has a radius of 5 centimeters. What is the radian measure of the central angle corresponding to an arc length of 10 centimeters?

A. $\frac{1}{2}$ C. 5

(B) 2 D. 50

If they ask for radians, this is simply $s = r\theta$ where s = arc length.

$10 = 5\theta$

$\theta = 2$

15.

Joyce deposited \$5000 in an account with an annual interest rate of 6%, compounded annually. How much money will be in the account 10 years later?

simple interest

A. \$3954.24 C. \$8000.00

B. \$5600.00 (D) \$8954.24

$J(10) = 5000(1 + 0.06)^{10}$

$= \$8954.24$

16.

The value of a motorcycle each year follows the sequence \$12,000, \$9,600, \$7,680, \$6,144, ...

Which formula represents the recursive definition of the sequence where n represents the number of years?

(A) $a_n = a_{n-1}(0.8)$ C. $a_n = a_{n+1}(0.8)$

B. $a_n = a_{n-1} - 2{,}400$ D. $a_n = a_{n-1}\left(\frac{5}{4}\right)$

Geometric Sequence

Look @ choices:

- multiply by 0.8
- subtract 2400
- multiply by $\frac{5}{4}$

Only (0.8) gets next term every time.

a_{n-1} means multiply previous term to get next term

17.

The population, P, of Johnstown over a period of t years since the town was founded can be estimated by $P = 5{,}600e^{0.059t}$

In approximately how many years after the town's founding will the population reach 11,200?

A. 34 (C) 12

B. 17 D. 5

$\frac{11{,}200}{5600} = \frac{5600e^{0.059t}}{5600}$

$\ln 2 = \ln e^{0.059t}$

$\frac{\ln 2}{0.059} = \frac{0.059 \cdot t \cdot \ln e}{0.059}$

$t = 11.75$ years

18.

Consider the following studies:

- Study 1: Researchers want to know if a certain type of plant grows larger in soil treated with a supplement compared to soil that is not treated.
- Study 2: Researchers want to know what percent of people approve of the president's decisions.
- Study 3: Researchers want to know the relationship between attending private or public school and attendance rates.

Mark the boxes in the table that match each study to the **most** appropriate study design.

	Survey	Experiment	Observational study
Study 1	○	✓	○
Study 2	✓	○	○
Study 3	○	○	✓

19.

Some values for functions $W(x)$ and $Z(x)$ are shown in the table.

x	$W(x)$	$Z(x)$
0	1.0	9
2	1.9	−3
4	3.6	−7
6	6.8	−3
8	12.9	9

Which statement **best** describes the functions?

- ○ A. $W(x)$ is an exponential function, and $Z(x)$ is a polynomial function.
- ○ B. $W(x)$ is a polynomial function, and $Z(x)$ is an exponential function.
- ○ C. $W(x)$ is a polynomial function, and $Z(x)$ is a logarithmic function.
- ○ D. $W(x)$ is a trigonometric function, and $Z(x)$ is a polynomial function.

20.

A polynomial, $f(x)$, is divided by four different linear expressions, as listed in the table.

The resulting remainders after the division by each linear expression are as shown in the table.

Linear Expression	Remainder
$x-1$	0
$x+1$	−4
$x-3$	2
$x+3$	0

Which must be a root of the polynomial equation?

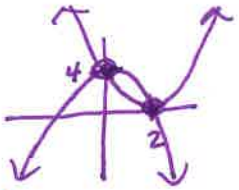
- A. -3
- B. -1
- C. 2
- D. 3

21.

The functions $f(x) = (x-2)^2$ and $g(x) = 4 - x^2$ are graphed on a coordinate plane.

What is the relationship between the graphs and the solutions of the equation $(x-2)^2 = 4 - x^2$?

f(x)=g(x)? intersections!



○ (A) $x = 0$ and $x = 2$ are solutions because $f(0) = g(0)$ and $f(2) = g(2)$. yes!

○ B. The ordered pair $(0, 4)$ is the solution because $f(0) = 4$ and $g(0) = 4$.
This is true, but solutions are x-values – NOT ordered pair!

○ C. $x = -2$ and $x = 2$ are solutions because they are the x-intercepts of both functions. Intersections not x-intercepts

○ D. The ordered pair $(2, 0)$ is the solution because it is the only point where the graphs of both $f(x)$ and $g(x)$ cross the x-axis.

22.

Consider the functions shown.

$f(x) = |x+2|$

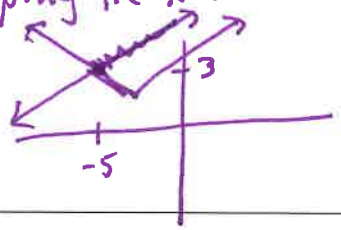
$g(x) = x+8$

What is the solution to $f(x) = g(x)$? Intersection!

Graph in calc. or plug in x-values...

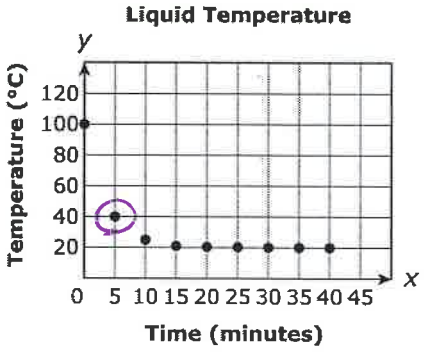
(A) $(-5, 3)$ C. $(-2, -8)$

B. $(-3, 1)$ D. $(0, 8)$



23.

During a science experiment, a chemist boils a liquid and then sets it on the lab table and records the temperatures as it cools. The graph shows y, the temperature in degrees Centigrade, and x is the number of minutes after the liquid is set on the table.



Pick a point & plug in x to get y out...

If you pick (0, 100) they all work.

I picked (5, 40).

The rest are too close together (y-values).

Which equation is the best model for this data?

○ A. $y = 100(0.75)^x$ ^{5} → 23.7

○ B $y = (0.75)^x + 100$ ^{5} → 100.2

○ (C) $y = 80(0.75)^x + 20$ ^{5} → 38.98 → closest to 40 by far

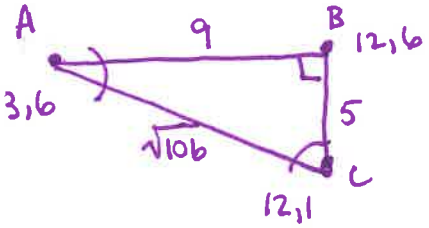
○ D $y = 20(0.75)^x + 80$ ^{5} → 84.74

24.

On a coordinate plane, $\triangle ABC$ has vertices at $A(3, 6)$, $B(12, 6)$ and $C(12, 1)$. Which statements are true?

Select **all** that apply.

- [x] A. $\triangle ABC$ is a right triangle. (Horiz. & Vert. sides)
- [ ] B. $\triangle ABC$ is an equilateral triangle.
- [ ] C. $\triangle ABC$ is an isosceles triangle.
- [x] D. $\triangle ABC$ is a scalene triangle.
- [x] E. $\angle A$ and $\angle C$ are complementary. $= 90°$
- [ ] F. $\angle A$ and $\angle C$ are supplementary. $= 180°$

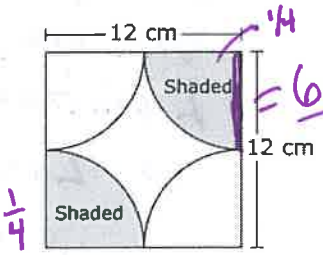


$5^2 + 9^2 = c^2$
$25 + 81 = c^2$
$106 = c^2$
$\sqrt{106} = c$

If $\angle B$ is 90°, then $\angle A + \angle C$ must $= 90°$

25.

A mosaic is created using shaded and unshaded tiles. Each of the four corner tile pieces is a sector of a circle with its center located at the vertex of the mosaic.



$\frac{1}{4}$ "M" $= 6 = r$

Each shaded semi-circle is $\frac{1}{4}$ of a circle.
$\frac{1}{4} + \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$

$A = \pi r^2$
$= \pi 6^2$
$= 113.1$ → but only $\frac{1}{2}$ of whole circle.
$\frac{}{2}$
$= 56.55$

What is the area, in square centimeters, of the shaded tiles?

- A. 30.90
- C. 113.10
- B. 56.55
- D. 144.00

26.

GCF $3(2x^2 + 9x - 5)$ → Quad. Form. → $3(2x - 1)(x + 5)$

Four students rewrote the function $y = 6x^2 + 27x - 15$ in factored form and stated the zeros.

Which solution correctly shows the function in factored form and identifies the zeros of the function?

A. $y = (6x - 3)(x + 5)$
zeros: 2 and –5

C. $y = 3(2x - 1)(x + 5)$
zeros: –0.5 and 5

B. $y = (6x - 3)(x + 5)$
zeros: –2 and 5

D. $y = 3(2x - 1)(x + 5)$
zeros: 0.5 and –5

$2x - 1 = 0$ $\quad x + 5 = 0$
$2x = 1$ $\quad x = -5$
$x = \frac{1}{2}$

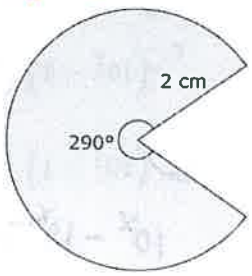
or graph & find x-intercepts

27.

A character in a video game is shown.

What is the approximate area, in square centimeters, of the character?

- A. 2.4
- C. 12.6
- B. 10.1
- D. 15.0



$A = \pi r^2 \left(\frac{\theta}{360}\right)$
$= \pi (2)^2 \left(\frac{290}{360}\right)$
$= 10.12 \text{ cm}^2$

Area of Sector (partial or fraction of area)

28. $m = -\frac{3}{4}$ $\frac{1}{\ }$

What is the equation of the line parallel to the line with equation $y = -\frac{3}{4}x - 5$ and passing through the point $(8, -3)$?

A. $y = -\frac{3}{4}x + 3$ C. $y = -\frac{3}{4}x - 3$

B. $y = \frac{1}{3}x - 5$ D. $y = \frac{1}{3}x - \frac{41}{3}$

$y = -\frac{3}{4}x + b$

$-3 = -\frac{3}{4}(8) + b$

$-3 = -6 + b$

$+6 \quad +6$

$b = 3$

$y = -\frac{3}{4}x + 3$

29. GCF $x(x^2-1) \rightarrow$ D.o.S. $\rightarrow \frac{x(x+1)(x-1)}{x-1} = x(x+1)$

$= x^2 + x$

Which expression is equivalent to $\frac{x^3-x}{x-1}$ for $x \neq 1$?

A. x^2 C. $x^2 - 1$

B. $x^2 + x$ D. $\frac{x^2(x-1)}{x-1}$

30. What are the real zeros of the function $f(x) = x^4 - 3x^3 + 2x^2 - 6x$?

A. $x = 0$ and $x = 3$

B. $x = 0$ and $x = -3$

C. $x = -\sqrt{2}, x = 0, x = \sqrt{2}$, and $x = -3$

D. $x = -\sqrt{2}, x = 0, x = \sqrt{2}$, and $x = 3$

GCF $x(x^3 - 3x^2 + 2x - 6)$

Grouping $x(x^2(x-3) + 2(x-3))$

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

$x = 0$ | can't factor | $x = 3$

↳ produces imaginary solutions.

If you graph this one, there are 2 x-intercepts... so, 2 real & 2 imaginary. (degree 4)

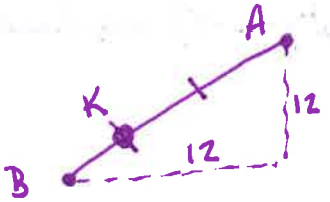
31. The coordinates of the endpoints of $\overline{AB}$ are given $A(7, 6)$ and $B(-5, -6)$

Point K is located on $\overline{AB}$ so that $\frac{AK}{KB} = \frac{2}{1}$

What is the x-coordinate of point K?

A. -2 C. 1

B. -1 D. 3



$x \rightarrow -5 + \left(\frac{1}{3}\right)(12) = -1$ (4)

32. Tricky, tricky... is a D.o.S. problem

Which expression is equivalent to $10^x - 1$?

A. $(5^x - 1)^2(5x - 1)$ 25^{2x} no

B. $(5^x - 1)(5^x + 1)$ 25^{2x} no

C. $\left(10^{\frac{x}{2}} - 1\right)^2 \left(10^{\frac{x}{2}} - 1\right) = 10^{\frac{x}{2}+\frac{x}{2}} - 10^{x/2} - 10^{x/2} + 1$

$10^{\frac{2x}{2}} - 2(10)^{x/2} + 1$ No.

D. $\left(10^{\frac{x}{2}} - 1\right)\left(10^{\frac{x}{2}} + 1\right)$

$10^x - 10^{x/2} + 10^{x/2} - 1$

33.

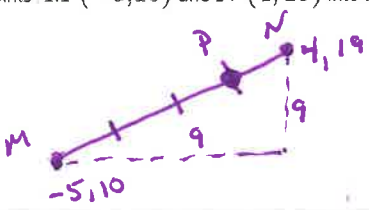
On a coordinate plane, point P divides the line segment $\overline{MN}$ with endpoints $M\,(-5,10)$ and $N\,(4,19)$ into two parts that have a ratio of $3:1$, with $\overline{MP}$ being the longer part. What are the coordinates of point P?

A. $(-2.75,12.25)$

C. $(-1.25,7.75)$

B. $(-0.5,14.5)$

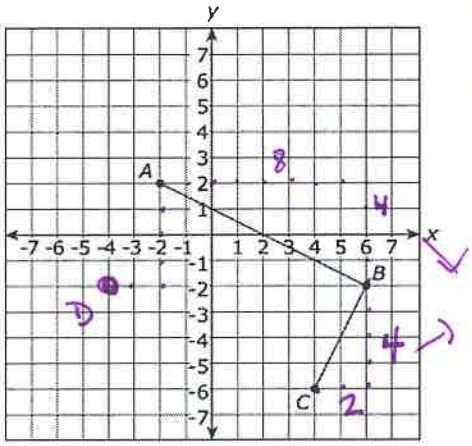
D. $(1.75,16.75)$



$x \to -5 + \frac{3}{4}(9) = 1.75$

34.

Three points of rectangle $ABCD$ are shown on a coordinate plane.



$\overline{BC} = \overline{AD} = \sqrt{20} \approx 4.47$

$\overline{AB} = \overline{CD} = \sqrt{80} \approx 8.94$

$\overline{BC} \Rightarrow 2^2 + 4^2 = (BC)^2$

$4 + 16 = (BC)^2$

$\sqrt{20} = BC$

$\overline{AB} \Rightarrow 8^2 + 4^2 = (AB)^2$

$64 + 16 = (AB)^2$

$\sqrt{80} = AB$

Which statement is true? Select **all** that apply.

- [x] A. The coordinates of D are $(-4,-2)$.
- [ ] B. The perimeter of rectangle $ABCD$ is about 13.41 units. no → 26.82
- [x] C. The length of $\overline{CD}$ is about 8.94 units. yes
- [x] D. The area of the rectangle is about 40 square units. $4.47 \cdot 8.94 = 39.96$ yes!
- [x] E. The length of $\overline{AD}$ is about 4.47 units. yes

35.

A craft store sells wooden boxes shaped like rectangular prisms. They come in heights from 5 inches to 10 inches. The table represents the function $f(x)$, which gives the volume of a box as a function of its height.

x
y

Height (in.)	5	6	7	8	9	10
Volume (in.³)	210	336	504	720	990	1,320

Which statements accurately describe the function $f(x)$?

Select **all** that apply.

- [x] A. The function is increasing. y's getting bigger? yes!
- [ ] B. The volume increases by a common factor of 1.6. $210 \cdot 1.6 = 336$, but $336 \cdot 1.6 \neq 504$ & $990 \cdot 1.6 \neq 1320$
- [ ] C. The function is decreasing. can't incr. & decr?
- [x] D. The function is **not** linear. B isn't true, so change in y isn't constant
- [x] E. The maximum value of the function is $1,320$. yes!