Math 27 QUESTIONS

DIRECTIONS

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NOTES

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REFERENCE



The number of degrees of arc in a circle is 360.

The number of radians of arc in a circle is 2π .

The sum of the measures in degrees of the angles of a triangle is 180.



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x + 45 = 48

What is the positive solution to the given equation?

- A) 3
- B) 48
- C) 93
- D) 96

2

x = 4y = 5 - x

The solution to the given system of equations is (x, y). What is the value of y ?

A) 1

- B) 4
- C) 5

D) 9

3

A mixture consisting of only vitamin D and calcium has a total mass of 150 grams. The mass of vitamin D in the mixture is 50 grams. What is the mass, in grams, of calcium in the mixture?

- A) 200
- B) 150
- C) 100
- D) 50

4

A contract for a certain service requires a onetime activation cost of \$35 and a monthly cost of \$23. Which equation represents this situation, where c is the total cost, in dollars, of this service contract for t months?

A)
$$c = \frac{t}{23} + 35$$

B) $c = \frac{t}{35} + 23$
C) $c = 23t + 35$

D)
$$c = 35t + 23$$

5

The function *f* is defined by f(x) = 3x - 8. What is the value of f(7) ?

- A) 29
- B) 13
- C) -5
- D) -29





The *y*-intercept of the graph shown is (x, y). What is the value of *y* ?

7
/

8x - 7x + 130 = 260

What value of *x* is the solution to the given equation?

8

A geologist needs to collect at least 67 samples of lava from a volcano. If the geologist has already collected 63 samples from the volcano, what is the minimum number of additional samples the geologist needs to collect?

- A) 130
- B) 63
- C) 4
- D) 0

9

Each of 157 gemstones can be classified as one of three classifications, as shown in the frequency table.

Classification	Frequency
color X	119
color Y	3
color Z	35

If one of the gemstones is selected at random, what is the probability of selecting a gemstone of color Y?

A)
$$\frac{3}{157}$$

B) $\frac{35}{157}$
C) $\frac{119}{157}$
D) $\frac{154}{157}$



The shaded region shown represents the solutions to which inequality?

A) $y \ge \frac{2}{3}x - 6$ B) $y \ge \frac{2}{3}x + 6$ C) $y \ge \frac{2}{3}x - 9$ D) $y \ge \frac{2}{3}x + 9$

11

In triangle *ABC*, AB = 4,680 millimeters (mm) and BC = 4,680 mm. Which statement is sufficient to prove that triangle *ABC* is equilateral?

- A) AC = 4,680 mm
- B) AC = 468 mm
- C) AC = 46.8 mm
- D) AC = 4.68 mm

12

$P(t) = 24.8(1.036)^t$

The function *P* gives the predicted population, in millions, of a certain country for the period from 1984 to 2018, where *t* is the number of years after 1984. According to the model, what is the best interpretation of the statement "P(8) is approximately equal to 32.91"?

- A) In 1984, the predicted population of this country was approximately 8 million.
- B) In 1984, the predicted population of this country was approximately 32.91 million.
- C) 8 years after 1984, the predicted population of this country was approximately 32.91 million.
- D) 32.91 years after 1984, the predicted population of this country was approximately 8 million.

13

A right circular cylinder has a volume of 377 cubic centimeters. The area of the base of the cylinder is 13 square centimeters. What is the height, in centimeters, of the cylinder?

14

The list gives the mass, in grams, of 5 alpine marmots.

4,010; 4,010; 3,030; 4,050; 3,050

What is the mean mass, in grams, of these 5 alpine marmots?

$$x = 3$$
$$y = (15 - x)^2$$

A solution to the given system of equations is (x, y). What is the value of xy ?

- A) 432
- B) 54
- C) 45
- D) 18

17

A circle has a radius of 43 meters. What is the area, in square meters, of the circle?



- B) 43π
- C) 86π
- D) 1,849π



What is the value of $\cos A$ in the triangle shown?

- A) $\frac{42}{41}$
- B) $\frac{41}{42}$
- C) $\frac{1}{42}$
- D) $\frac{1}{41}$

18

An object has a mass of 168 grams and a volume of 24 cubic centimeters. What is the density, in grams per cubic centimeter, of the object?

- A) 7
- B) 144
- C) 192
- D) 4,032

A company has a newsletter. In January 2018, there were 1,300 customers subscribed to the newsletter. For the next 24 months after January 2018, the total number of customers subscribed to the newsletter each month was 7% greater than the total number subscribed the previous month. Which equation gives the total number of customers, *c*, subscribed to the company's newsletter *m* months after January 2018, where $m \le 24$?

- A) $c = 1,300(0.07)^m$
- B) $c = 1,300(1.07)^m$
- C) $c = 1,300(1.7)^m$
- D) $c = 1,300(7)^m$





In the figure, RT = TU, the measure of angle *VST* is 29°, and the measure of angle *RVS* is 41°. What is the value of *x* ?

20



The scatterplot shows the relationship between two variables, *x* and *y*. A line of best fit is also shown. For how many of the 11 data points does the line of best fit predict a greater *y*-value than the actual *y*-value? 22

$$-12x + 14y = 36$$

 $-6x + 7y = -18$

How many solutions does the given system of equations have?

- A) Exactly one
- B) Exactly two
- C) Infinitely many
- D) Zero

-8-

23

The expression 0.35x represents the result of decreasing a positive quantity x by what percent?

- A) 3.5%
- B) 35%
- C) 6.5%
- D) 65%

-10-8-6-4-2-0-2-4-6-

24

Objects R and S each travel at a constant speed. The speed of object R is half the speed of object S. Object R travels a distance of 4x inches in y seconds. Which expression represents the time, in seconds, it takes object S to travel a distance of 24x inches?

- A) 12y
- B) 3*y*
- C) 16*y*
- D) 6*y*

The graph shows a linear relationship between x and y. Which equation represents this relationship, where R is a positive constant?

-8 |-| 10

- A) Rx + 18y = 36
- B) Rx 18y = -36
- C) 18x + Ry = 36
- D) 18x Ry = -36

A sample of a certain alloy has a total mass of 50.0 grams and is 50.0% silicon by mass. The sample was created by combining two pieces of different alloys. The first piece was 30.0% silicon by mass and the second piece was 80.0% silicon by mass. What was the mass, in grams, of the silicon in the second piece?

- A) 9.0
- B) 16.0
- C) 20.0
- D) 30.0

27

The product of two positive integers is 462. If the first integer is 5 greater than twice the second integer, what is the smaller of the two integers?

STOP

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The bar graph shows the distribution of the number of walnuts per container for 20 containers at a grocery store.



How many of these containers of walnuts contain exactly 78 walnuts?

- A) 2
- B) 7
- C) 20
- D) 78





Day of the week

The line graph shows the probability of snow, as a percent, at a certain location for each day during a four-day period. According to the line graph, for which day during this four-day period is the probability of snow 30%?

- A) Tuesday
- B) Wednesday
- C) Thursday
- D) Friday



The graph of a system of a linear equation and a nonlinear equation is shown. What is the solution (x, y) to this system?

- A) (6,0)
- B) (-2, 6)
- C) (0, -2)
- D) (0,0)

w° z°

Note: Figure not drawn to scale.

In the figure, two lines intersect at a point. If w = 136, what is the value of *z* ?

- A) 36
- B) 44
- C) 68
- D) 136

5

Which expression is equivalent to $19(x^2 - 7)$?

- A) $19x^2 133$
- B) $19x^2 26$
- C) $19x^2 7$
- D) $19x^2 + 12$





The parabola shown intersects the *y*-axis at the point (x, y). What is the value of *y* ?

7

If 2x + 3 = 9, what is the value of 6x - 1?

8

The scatterplot shows the relationship between two variables, x and y.



Which equation is the most appropriate linear model for this relationship?

- A) y = -0.9x 2.2
- B) y = -0.9x + 2.2
- C) y = -0.9x
- D) y = 0.9x + 2.2

9

$$d = 16 - \frac{x}{30}$$

The equation shown gives the estimated amount of diesel *d*, in gallons, that remains in the gas tank of a truck after being driven *x* miles, where $0 \le x \le 480$. What is the estimated amount of diesel, in gallons, that remains in the gas tank of the truck when x = 300 ?

- A) 0
- B) 6
- C) 14
- D) 16

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g(x) = 11x + 4

For the given linear function g, which table shows three values of x and their corresponding values of g(x) ?









11

The pressure exerted on a scuba diver at sea level is 14.70 pounds per square inch (psi). For each foot the scuba diver descends below sea level, the pressure exerted on the scuba diver increases by 0.44 psi. What is the total pressure, in psi, exerted on the scuba diver at 105 feet below sea level?

- A) 60.90
- B) 31.50
- C) 14.70
- D) 0.44

12

The function *f* is defined by $f(x) = 4x^{-1}$. What is the value of f(21) ?

A) -84

B) $\frac{1}{84}$ C) $\frac{4}{21}$ D) $\frac{21}{4}$

13

The area of a rectangle is 57 square inches. The length of the longest side of the rectangle is 19 inches. What is the length, in inches, of the shortest side of this rectangle?

14

How many <u>yards</u> are equivalent to 77 rods? (5.5 yards = 1 rod)

15

 $x^2 - 12x + 27 = 0$

How many distinct real solutions does the given equation have?

- A) Exactly two
- B) Exactly one
- C) Zero
- D) Infinitely many

16

For the linear function *g*, the graph of y = g(x) in the *xy*-plane has a slope of 2 and passes through the point (1, 14). Which equation defines *g* ?

- A) g(x) = 2x
- B) g(x) = 2x + 2
- C) g(x) = 2x + 12
- D) g(x) = 2x + 14



The graph gives the estimated population *y*, in thousands, of a town *x* years since 2003, where $0 \le x \le 5$. Which of the following best describes the increase in the estimated population from x = 0 to x = 1?

- A) The estimated population at x = 1 is 0.5 times the estimated population at x = 0.
- B) The estimated population at x = 1 is 1.5 times the estimated population at x = 0.
- C) The estimated population at x = 1 is 2.5 times the estimated population at x = 0.
- D) The estimated population at x = 1 is 3.5 times the estimated population at x = 0.

In March, the price of a collectible card was \$15.50. In April, the price of the collectible card was \$17.36. The price of the collectible card in April was p% of the price of the collectible card in March. What is the value of p ?

- A) 12
- B) 88
- C) 112
- D) 188

20



Line j is shown in the xy-plane. Line k (not shown) is parallel to line j. What is the slope of line k ?

19

x = 8a(b+9)

The given equation relates the positive numbers a, b, and x. Which equation correctly expresses a in terms of b and x?

A)
$$a = \frac{x}{8} - (b+9)$$

$$B) \quad a = \frac{x}{8(b+9)}$$

$$C) \quad a = \frac{8(b+9)}{x}$$

D)
$$a = 8x(b + 9)$$

21

A line segment that has a length of 115 centimeters (cm) is divided into three parts. One part is 47 cm long. The other two parts have lengths that are equal to each other. What is the length, in cm, of one of the other two parts of equal length?

 $p(x) + 57 = x^2$

The given equation relates the value of *x* and its corresponding value of p(x) for the function *p*. What is the minimum value of the function *p* ?

- A) -3,249
- B) -57
- C) 57
- D) 3,249

23

x	у
-18	-48
7	52

The table shows two values of *x* and their corresponding values of *y*. In the *xy*-plane, the graph of the linear equation representing this relationship passes through the point $\left(\frac{1}{7}, a\right)$. What is the value of *a* ?

A) $-\frac{4}{11}$ B) $-\frac{4}{77}$ C) $\frac{4}{7}$ D) $\frac{172}{7}$

24

 $y = 576^{(2x+2)}$

The graph of the given equation in the *xy*-plane has a *y*-intercept of (r, s). Which of the following equivalent equations displays the value of *s* as a constant, a coefficient, or the base?

A)
$$y = 331,776^{(x+1)}$$

B)
$$y = 24^{(4x+4)}$$

C)
$$y = \frac{1}{24} (24)^{(4x+5)}$$

D) $y = \frac{1}{576} (576)^{(2x+3)}$

25

If k - x is a factor of the expression $-x^2 + \frac{1}{29}nk^2$, where *n* and *k* are constants and k > 0, what is the value of *n* ? A) -29

B)
$$-\frac{1}{29}$$

C) $\frac{1}{29}$

D) 29



Note: Figure not drawn to scale.

In the figure, \overline{LQ} intersects \overline{MP} at point *R*, and \overline{LM} is parallel to \overline{PQ} . The lengths of \overline{MR} , \overline{LR} , and \overline{RP} are 6, 7, and 11, respectively. What is the length of \overline{LQ} ?



B) $\frac{77}{6}$ C) $\frac{113}{6}$

D)
$$\frac{119}{6}$$

27

$$5(x+7) = 15(x-17)(x+7)$$

What is the sum of the solutions to the given equation?

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PSAT/NMSQT Practice Test Worksheet: Answer Key

Mark each of your correct answers below, then add them up to get your raw score on each module.

Reading and Writing					Math								
Module 1 Modul		e 2	Module 1				Module 2						
QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS		QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS	QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS		QUESTION #	CORRECT	MARK YOUR CORRECT ANSWERS
1	С			1	А		1	А			1	В	
2	А			2	В		2	А			2	С	
3	В			3	D		3	С			3	В	
4	А			4	С		4	С			4	D	
5	В			5	А		5	В			5	A	
6	А			6	В		6	40			6	7	
7	С			7	В		7	130			7	17	
8	С			8	С		8	С			8	D	
9	D			9	В		9	А			9	В	
10	D			10	В		10	А			10	С	
11	В			11	В		11	А			11	A	
12	С			12	А		12	С			12	С	
13	А			13	D		13	29			13	3	
14	В			14	А		14	3630			14	423.5; 847/2	
15	В			15	С		15	А			15	А	
16	С			16	D		16	В			16	С	
17	В			17	В		17	D			17	В	
18	А			18	D		18	А			18	С	
19	В			19	D		19	В			19	В	
20	В			20	С		20	6			20	4	
21	D			21	D		21	156			21	34	
22	С			22	А		22	D			22	В	
23	С			23	С		23	D			23	D	
24	В			24	А		24	В			24	А	
25	D			25	А		25	С			25	D	
26	А			26	А		26	В			26	D	
27	В			27	С		27	14			27	10.33; 31/3	
28	D			28	В								
29	В			29	В								
30	С			30	А								
31	А			31	С								

READING AND WRITING SECTION RAW SCORE

32

33

(Total # of Correct Answers)

Module 1

32

33

С

В



В

В



Module 1

Module 2

PSAT/NMSQT Practice Test Worksheet: Section and Total Scores

Conversion: Calculate Your Section and Total Scores

Enter the number of correct answers (raw scores from the previous page) for each of the modules in the boxes below and add them together to get your section raw score. Find that section raw score in the first column of the table below and then enter the corresponding lower and upper values in the two-column boxes. Add each of your lower and upper values for the test sections separately to calculate your total PSAT/NMSQT score range.



Raw Score Conversion Table: Section Scores

Reading and Writing RAW SCORE Section Score Range		Ma Section So	ath core Range	RAW SCORE	Reading a Section So	nd Writing core Range	Math Section Score Range		
(# OF CORRECT ANSWERS)	LOWER	UPPER	LOWER	UPPER	(# OF CORRECT ANSWERS)	LOWER	UPPER	LOWER	UPPER
0	160	160	160	160	34	400	440	460	500
1	160	180	160	170	35	400	440	470	510
2	160	190	160	180	36	410	450	480	520
3	160	190	170	200	37	420	460	490	530
4	170	200	170	210	38	420	460	500	540
5	170	210	170	230	39	430	470	500	560
6	170	210	190	250	40	440	480	510	570
7	170	220	210	270	41	450	490	520	580
8	170	230	220	290	42	450	510	540	600
9	180	240	230	300	43	450	510	550	610
10	180	250	250	310	44	460	520	560	620
11	180	260	270	330	45	470	530	580	640
12	180	270	290	330	46	480	540	590	650
13	190	280	300	340	47	490	550	610	670
14	190	290	310	350	48	500	560	620	680
15	200	310	320	360	49	510	570	640	700
16	200	320	330	370	50	520	580	650	730
17	230	350	340	380	51	530	590	680	740
18	270	350	340	380	52	540	600	720	760
19	290	350	350	390	53	550	610	730	760
20	310	350	360	400	54	560	620	760	760
21	320	360	360	400	55	580	640		
22	330	370	370	410	56	590	650		
23	330	370	370	410	57	600	660		
24	340	380	380	420	58	620	680		
25	340	380	390	430	59	630	690		
26	350	390	390	430	60	650	710		
27	350	390	400	440	61	670	730		
28	360	400	410	450	62	690	750		
29	360	400	410	450	63	700	760		
30	370	410	420	460	64	720	760		
31	380	420	430	470	65	730	760		
32	380	420	440	480	66	760	760		
33	390	430	450	490					