NC Early Math Placement Test - Review

Select the one best answer to each question. Place each answer on your bubble sheet.

1. Find the reciprocal of $\sqrt[3]{216}$.

C

A. 6 B. 3 C. $\frac{1}{6}$ D. 72 E. $\frac{1}{2}$

2. If $2^x = 32$, then what is the value of 6^{x-3}?

C

A. 6 B. 216 C. 36 D. 1296 E. 64

3. Simplify $\dfrac{\frac{p^2q}{mn}}{\frac{pq^2}{m^2n^2}}$.

E

A. $\frac{pn}{mq}$ B. $\frac{pq}{mn}$ C. $\frac{pqm}{n}$ D. 1 E. $\frac{pnm}{q}$

4. A data set includes these numbers: 73, 99, 92, 78, 84, 47, 61, 81. If the smallest and largest numbers are removed from this set, what is the median of the remaining data?

A

A. 79.5 B. 52 C. 78.2 D. 79 E. 67.8

5. Find the slope of the graph of the equation $5x + 4y - 12 = 0$.

C

A. $\frac{4}{5}$ B. $\frac{5}{4}$ C. $-\frac{5}{4}$ D. 5 E. $-\frac{4}{5}$

6. A farm equipment dealership bought 12 tractors of the same model. If the tractors had a combined weight of 46.2 tons, how much, in pounds, did one of the tractors weight? (1 ton = 2000 pounds)

C

A. 6160 B. 519 C. 7700 D. 7100 E. 6500

7. If $7 - 5(6x - 4) = -153$, then x =

D

A. 5 B. 7 C. 3 D. 6 E. 4

8. If $f(x) = 2x + \frac{1}{4}x$, find $f\left(\frac{12}{5}\right)$.

C

A. $\frac{4}{5}$ B. $\frac{3}{5}$ C. $\frac{27}{5}$ D. $\frac{6}{5}$ E. 5

9. Which numbers are written from least to greatest: $0.75, \frac{5}{7}, \frac{1}{6}, 0.4$.

C

A. $\frac{5}{7}, 0.75, \frac{1}{6}, 0.4$ C. $\frac{1}{6}, 0.4, \frac{5}{7}, 0.75$ E. $0.75, \frac{5}{7}, 0.4, \frac{1}{6}$

B. $\frac{5}{7}, 0.75, 0.4, \frac{1}{6}$ D. $\frac{5}{7}, \frac{1}{6}, 0.75, 0.4$

10. Friends Jill and Samantha leave the library at the same time. Jill walks north at a rate of 5 feet per second and Samantha walks south at a rate of 3 feet per second. What is the distance, in feet, between them 8 seconds later?

A

(A.) 64 B. 16 C. 120 D. 48 E. 8

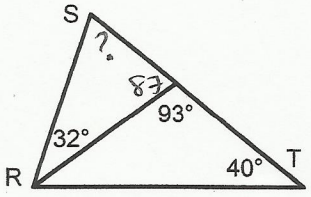
Jill
5 ft/sec
$d = 5 \cdot 8 = 40$ ft

3 ft/sec +
$d = 3 \cdot 8 = 24$ ft
Samantha

$= 64$ ft

11. $d = r \cdot t$

In $\triangle RST$, to the right, find the measure of $m\angle RST$ in degrees.



D

$\angle RST = 180 - 32 - 87$

$\angle RST = 61°$

A. 74° B. 63° C. 47° (D.) 61° E. 52°

12. Which of the following is an equivalent form of $\frac{4}{x} - \frac{5}{7}$?

$\frac{28}{7x} - \frac{5x}{7x} = \frac{28-5x}{7x}$

A

(A.) $\frac{28-5x}{7x}$ B. $-\frac{1}{x-7}$ C. $\frac{28-5x}{x-7}$ D. $-\frac{1}{7x}$ E. $\frac{28+5x}{7x}$

13. In the city swimming pool, 52 laps equal 0.6 miles. If Rebecca swims 32 laps, what fraction of a mile does she swim?

A

(A.) $\frac{24}{65}$ B. $\frac{2}{3}$ C. $\frac{2}{5}$ D. $\frac{39}{40}$ E. $\frac{8}{13}$

$\frac{52}{.6} = \frac{32}{x}$

$\frac{52x}{52} = \frac{19.2}{52}$

$\frac{24}{65}$

14. If the graph of the parabola $y = x^2$ is translated 5 units down and 3 units to the right in the coordinate plane, then the translated graph has which of the following equations?

D

~~A.~~ $y = (x-5)^2 + 3$ ~~C.~~ $y = (x-5)^2 - 3$ E. $y = (x+3)^2 - 5$

~~B.~~ $y = (x+3)^2 + 5$ (D.) $y = (x-3)^2 - 5$

15. In expanded form, $(2x - 5y)^2 = ?$ $(2x-5y)(2x-5y)$

D

A. $4x^2 - 10y^2$ C. $2x^2 - 10xy + 5y^2$ E. $4x^2 + 25y^2$

B. $4x^2 - 25y^2$ (D.) $4x^2 - 20xy + 25y^2$

	$2x$	$-5y$
$2x$	$4x^2$	$-10xy$
$-5y$	$-10xy$	$25y^2$

$= 4x^2 - 20xy + 25y^2$

16. Which is a factor of the polynomial $2x^3 + x^2 - 15x$? $= x(2x^2 + x - 15)$

E

A. $x + 2$ B. $2x + 5$ C. x^2 D. $x - 3$ (E.) $x + 3$

	$-x$	3
$2x$	$2x^2$	$6x$
-5	$-5x$	-15

-30

$6 \quad -5$

$x(2x-5)(x+3)$

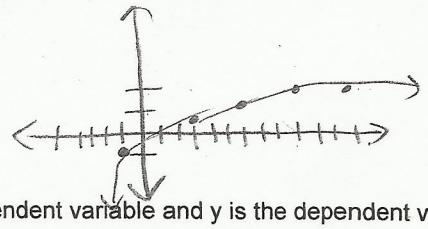
17. Given the relation $\{(3,5),(5,6),(6,7)\}$, what is the inverse of this relation?

B

A. $\left\{\left(\frac{1}{3},\frac{1}{5}\right),\left(\frac{1}{5},\frac{1}{6}\right)\left(\frac{1}{6},\frac{1}{7}\right)\right\}$ D. $\{(-3,-5),(-5,-6)(-6,-7)\}$

(B.) $\{(5,3),(6,5)(7,6)\}$ E. $\left\{\left(3,\frac{3}{5}\right),\left(5,\frac{6}{5}\right)\left(6,\frac{7}{6}\right)\right\}$

C. $\{(6,7),(5,6)(3,5)\}$



18. What kind of function would best model the data below, where x is the independent variable and y is the dependent variable?

C

x	–5	–2	–1	3	6	9	12
y	undefined	undefined	–1	0.6	1.1	1.4	1.6

A. linear
B. exponential
C. logarithmic
D. absolute value
E. quadratic

19. If F is the temperature in degrees Fahrenheit and C is the temperature in degrees Celsius, then $F = \frac{9}{5}C + 32$. If the temperature is 95 degrees Fahrenheit, then which of the following is the temperature in degrees Celsius?

E

A. 24 B. 30 C. 27 D. 38 E. 35

$95 = \frac{9}{5}C + 32$
$63 = \frac{9}{5}C$
$\frac{315}{9} = \frac{9C}{9} \rightarrow C = 35$

20. Solve the quadratic equation $4x^2 - 9x - 9 = 0$. Name the larger of the two solutions.

E

A. $x = 4$ B. $x = -\frac{3}{4}$ C. $x = \frac{1}{4}$ D. $x = -3$ E. $x = 3$

$-12, 3$; $-3+4$; -9

	x	-3
$4x$	$4x^2$	$-12x$
3	$+3x$	-9

$(x-3)(4x+3)=0$
$x=3$ $x=-\frac{3}{4}$
bigger

21. The equation of the line determined by the points (4, 0) and (0, –5) is:

E

A. $y = \frac{4}{5}x + 4$ C. $y = \frac{5}{4}x + 4$ E. $y = \frac{5}{4}x - 5$
B. $y = -\frac{5}{4}x - 5$ D. $y = \frac{4}{5}x - 5$

$x_1 y_1$ $x_2 y_2$ y int

$m = \frac{-5-0}{0-4} = \frac{-5}{-4} = \frac{5}{4}$

$y = \frac{5}{4}x - 5$

22. The function $P(x) = -500x^2 + 12{,}000x$ models the profit, P, in dollars for a company that manufactures large computers, where x is the number of computers produced. For which value of x will the company make a maximum profit?

B

A. 72000 B. 12 C. 24 D. 6 E. 2.4

$x = \frac{-b}{2a}$
$x = \frac{-12000}{2(-500)} = 12$

23. Simplify: $\left(3a^{-4}b^{-5}\right)\left(-4a^{-2}b^{8}\right)$

E

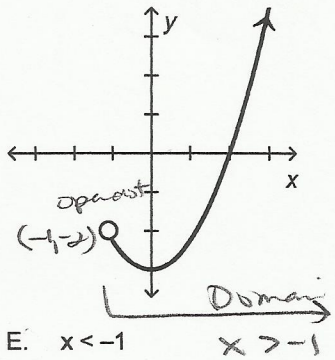
$= -12a^{-6}b^{3} = \frac{-12b^3}{a^6}$

A. $\frac{b^3}{a^6}$ C. $-\frac{b^3}{a^6}$ E. $-\frac{12b^3}{a^6}$
B. $-\frac{a^4}{b^3}$ D. $-\frac{12a^6}{b^3}$

24.

A

Find the domain of the function in the graph to the right.



A. $x > -1$
B. $x \geq -3$
C. $-1 \leq x \leq 3$
D. all real numbers
E. $x < -1$

25. On the first day of the semester, Shay scored a 75 on a math pre-test. On the last day of the same semester, Shay scored a 84 on the post-test. By what percent did Shay's score improve?

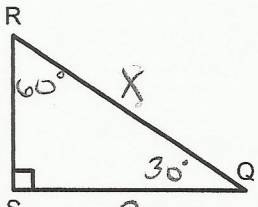
C

A. 15% $75 \times .15 = 11.25$; $+11.25$; 86.25
B. 25% $75 \times .25 = 18.75$; $+18.75$; 93.75
C. 12% $75 \times .12 = 9$; $+9$; 84 ✓
D. 18% $75 \times .18 = 13.5$; $+13.5$; 88.5
E. 20% $75 \times .20 = 15$; $+15$; 90

26.

In the right triangle QRS, $m\angle Q = 30$, $m\angle R = 60$, and $QS = 9$.

What is the measure of $\overline{QR}$?



$\cos 30 = \frac{9}{x}$

$x = \frac{9}{\cos 30}$

$x = 10.4$

E

A. $3\sqrt{6}$ B. 18 C. $3\sqrt{3}$ D. $4\sqrt{3}$ E. $6\sqrt{3}$

27. Circle X has a radius of 3. Circle Y has a radius of 6. What is the difference between the areas of the two circles?

A

A. 27π B. 18π C. 45π D. 36π E. 9π

$A_1 = \pi(3)^2$ $A_2 = \pi(6)^2$

$A_1 = 9\pi$ $A_2 = 36\pi$

$36\pi - 9\pi = 27\pi$

28. The graphs of $x = 3y$ and $5x - 6y = 36$ meet at a point. What is the y–coordinate of the point?

D

A. 18 B. $\frac{5}{6}$ C. 12 D. 4 E. $-\frac{1}{3}$

$5(3y) - 6y = 36$

$15y - 6y = 36$

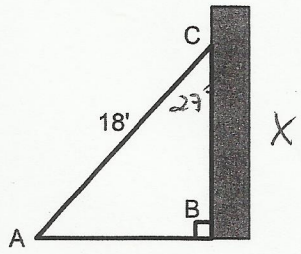
$\frac{9y}{9} = \frac{36}{9}$

$y = 4$

29.

B

A pole 18 feet long leans against a building. The measure of the angle the pole makes with the building is 27°. Which of the following represents the distance BC from the base of the building to the top of the pole?



$\cos 27 = \frac{x}{18}$

$x = 18\cos 27$

A. 18 tan 27°
B. 18 cos 27°
C. 9 sin 27°
D. 9 cos 27°
E. 18 sin 27°

30. If the area of one face of a large cube of ice is 25 square units, what is the volume of the cube in cubic units?

B

A. 625 B. 125 C. 10 D. 75 E. 100

$A = 25$ units^2

5

5

volume $= 5^3$

$= 125$

31. Find the solution set of $2 - |x - 5| = -4$.

C

A. {11} B. {} C. {–1, 11} D. {1, 11} E. {–11, 1}

$2 - |x-5| = -4$

$-|x-5| = -6$

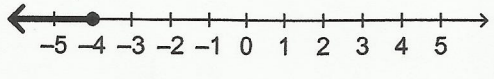
$|x-5| = 6$

$x - 5 = 6$ $x - 5 = -6$

$x = 11$ $x = -1$

32. If $2x + 4 - 7x \geq 24$, then which graph below best illustrates the solution?

A

A.


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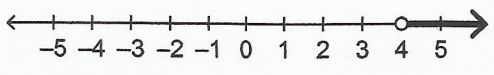
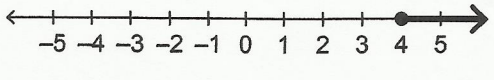
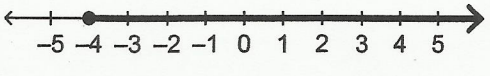
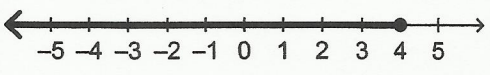


C.


D.


E.


$2x + 4 - 7x \geq 24$

$-5x + 4 \geq 24$

$\frac{-5x}{-5} \geq \frac{20}{-5}$

$x \leq -4$