Name: Key

Advanced Functions
Pre-Calculus (Honors)

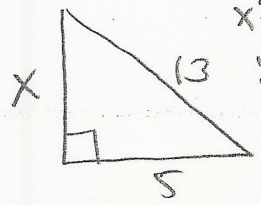
Review of Practice Math Placement Test

Multiple Choice: Identify the choice that best completes the statement or answers the question.

A

1. A 13 foot wire stretches from the top of a pole to a point on the ground 5 feet from the base of the pole. If the ground is level and forms a right angle with the pole, what is the height, in feet, of the pole?

   A. 12
   B. 30
   C. 8
   D. 18
   E. 16



$x^2+5^2=13^2$
$x^2=144$
$x=12$

B

2. Which of the following is an equivalent form of $\frac{4}{x}+\frac{3}{y}$?

   A. $\frac{4x+3y}{xy}$
   B. $\frac{4y+3x}{xy}$
   C. $3x+4y$
   D. $\frac{12}{xy}$
   E. $\frac{7}{xy}$

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

$= \boxed{\frac{4y+3x}{xy}}$

E

3. Which of the following statement is true?

   A. $\frac{2}{3}=0.667$ F → $.\overline{6}$
   B. $-53>-7$ F → $-53<-7$
   C. $\frac{6}{5}>\frac{21}{10}$ F → $1.2<2.1$
   D. $4.5\%=0.0045$ F → $4.5\% = .045$
   E. $\frac{1}{3}=0.\overline{3}$ T

A

4. Simplify: $\left(3+\sqrt{5}\right)^2$

   A. $14+6\sqrt{5}$
   B. 14
   C. 30
   D. $14+2\sqrt{5}$
   E. $9+2\sqrt{5}$

$= (3+\sqrt{5})(3+\sqrt{5})$

$= 9+3\sqrt{5}+3\sqrt{5}+5$

$= \boxed{14+6\sqrt{5}}$

E

5. The quadratic equation $2x^2 - 3x = 20$ has two solutions. Find the large of the two solutions.

   A. $x=\frac{5}{2}$
   B. $x=-\frac{5}{2}$
   C. $x=-4$
   D. $x=-\frac{1}{2}$
   E. $x=4$

$2x^2-3x-20=0$
$(2x+5)(x-4)=0$
$2x+5=0$ $\quad x-4=0$
$x=-\frac{5}{2}$ $\quad \boxed{x=4}$
small $\quad$ large

E

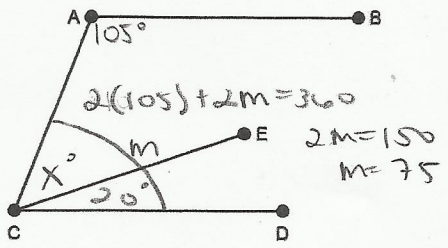
6. If the graph of $y = x^2$ is translated 4 units to the left and 1 unit up in the standard coordinate system, then the translated graph has which of the following equations?

   A. $y=(x+4)^2-1$
   B. $y=(x+1)^2+4$
   C. $y=(x-4)^2-1$
   D. $y=(x-4)^2+1$
   E. $y=(x+4)^2+1$

$y=(\underbrace{x+4}_{\text{left 4}})^2+\underbrace{1}_{\text{up 1}}$

A

7. In the figure, $\overline{AB}$ is parallel to $\overline{CD}$, $m\angle BAC = 105°$, $m\angle ECD = 20°$, and $m\angle ACE = x°$.



$2(105)+2m=360$
$2m=150$
$m=75$

$x=75-20$
$\boxed{x=55°}$

Find x°.

   A. 55°
   B. 85°
   C. 65°
   D. 45°
   E. 75°

B

8. The graphs of the lines $y = 4 - x$ and $x = 6$ intercect at a point. What is the y–coordinate of that point?

substitute

$y = 4 - 6$

$y = -2$

A. 3
B. –2
C. 0
D. 1
E. 5

C

9. When buying airline tickets on the web, there is an added fee of 1.15% on the price of each ticket purchased. If a ticket from Boston to Raleigh costs $180, what is the addtional fee of the nearest cent?

$180 \times .0115$

$= 2.07$

A. $200.07
B. $207.00
C. $2.07
D. $20.07
E. $2.00

A

10. Tammy bought s shirts at d dollars per shirt, and p pants at 2d – 1 dollars per pair. Which of the following is equivalent to the total amount Tammy spend in dollars (before taxes)?

shirts: sd + pants: $p(2d-1)$

$= sd + 2pd - p$

A. sd + 2pd – p
B. sd + 2pd – 1
C. sd • p(2d – 1)
D. (s + p)(3d – 1)
E. s + 3d + p – 1

E

11. The intervals of weights of a groups of elementary school children are recorded in the table below. What percent of the group is found in the mode?

mode = most often

WEIGHTS OF STUDENTS	
Weight in lbs.	Frequency
51 – 60	3
61 – 70	16
71 – 80	24
81 – 90	22
91 – 100	18
101 – 110	12
111 – 120	3
121 – 130	2
TOTAL	100

$\frac{24}{100} = 24\%$

A. 28%
B. 13%
C. 14%
D. 12.5%
E. 24%

A

12. Which of the following is equal to $\left(\frac{1}{3}x^2\right)^{-2}$

A. $\frac{9}{x^4}$
B. $9x^4$
C. $6x^4$
D. $\frac{6}{x^4}$
E. $\frac{1}{9x^4}$

$\frac{1^{-2}}{3^{-2}} \frac{x^{-4}}{1}$

$= \frac{3^2}{1^2 x^4} = \frac{9}{x^4}$

13. Which equation represents a line that contains the points (–2, –7) and (4, 5)?

A. $2x - y = 3$
B. $2x + y = 3$
C. $y = 2x + 3$
D. $y = 3x - 2$
E. $y = \frac{1}{2}x - 3$

$m = \frac{5-(-7)}{4-(-2)} = \frac{12}{6} = 2$

$y = 2x + 3$

$y - 5 = 2(x - 4)$

$y - 5 = 2x - 8$

$y = 2x - 3$

D

14. The greatest common factor of $8x^3y^2z + 12x^2y^3z^2 - 4x^4yz^4$

A. $16x^5y^5z^3 - 4x^4yz^4$
B. $16xy^4z^{-1}$
C. $4x^4y^3z^4$
D. $4x^2yz$
E. $4x^2y$

$= 4x^2yz$

A

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

x	–3	–2	–1	0	1	2	3
y	128	33.2	8.1	1.9	0.6	0.13	0.03

Closest to 1 or –1 / look at Scatter plot

A. exponential $r = -.999665$
B. cubic $r = .9925504$
C. quadratic $r = .943\,0068$
D. linear $r = -.7488096$
E. rational $r = N/A$

E

16. The domain of the function defined by the equation $f(x) = \sqrt{x-3}$ is

$x - 3 \geq 0$

$+3 \quad +3$

$x \geq 3$

A. All real numbers.
B. $\{x \mid x < -3\}$
C. $\{x \mid x \geq 0\}$
D. $\{x \mid x \geq -3\}$
E. $\{x \mid x \geq 3\}$

17. Which expression below is an equivalent form of $\frac{8m^3-4m^2}{2m^2}$ (where $m \neq 0$)?

C

A. $4m^2-2m$
B. $2m+4$
C. $4m-2$
D. $2m-1$
E. $4m-1$

$\frac{4m^2(2m-1)}{2m^2}$

$2(2m-1)$

$4m-2$

18. The area formula for a trapezoid is $A=\frac{1}{2}h(b_1+b_2)$. If $A = 18$, $h = 5$, and $b_2 = 2$, find b_1.

D

A. $\frac{63}{2}$
B. $\frac{36}{5}$
C. $\frac{36}{7}$
D. $\frac{26}{5}$
E. 63

$2 \cdot 18 = \frac{1}{2} \cdot 5(b_1+2) \cdot 2$

$36 = 5(b_1+2)$

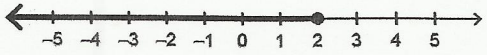
$36 = 5b_1 + 10$

$26 = 5b_1$

$b_1 = \frac{26}{5}$

19. Given:

C



$x \leq 2$

This is an illustration of the solution set for which inequality below?

A. $4x < 2 \rightarrow x < \frac{1}{2}$
B. $6x \geq 3 \rightarrow x \geq \frac{1}{2}$
C. $-3x \geq -6 \rightarrow x \leq 2$
D. $2x \geq -18 \rightarrow x \geq -2$
E. $2x > 4 \rightarrow x > 2$

20. Simplify: $5(3+4x)-6+7(x+6)$

C

A. $51x+27$
B. $21x-21$
C. $27x+51$
D. $21x+21$
E. $27x-51$

$15+20x-6+7x+42$

$27x+51$

21. If the ratio of boys to girls on a high school yearbook committee of 15 members is 3 to 2, how many members of the committee are girls?

D

A. 9
B. 12
C. More information needed.
D. 6
E. 3

$\frac{66}{99} = .66\ldots$ $\frac{36}{24} = 1.5$

$\frac{36}{100} = .25$

$\frac{96}{64} = 1.5$

$\frac{96}{32} = 3$

22. If $9r - 2s = 45 - 3r$, what is s in terms of r?

C

A. $\frac{c}{2}$
B. r
C. 2r
D. 4r
E. $\frac{r}{4}$

$9r - 2s = 45 - 3r$

$+9r \quad -45 \quad -45 \quad +9r$

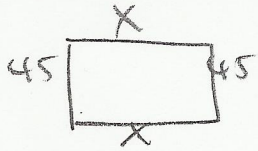
$\frac{-2s}{-2} = \frac{12r}{-2}$

$s = 2r$

23. A rectangular field is 45 feet wide and is enclosed by 166 feet of fencing. What is the area of the field in square feet?

A

A. 1,710
B. 1,722.25
C. 1867.5
D. 7,470
E. 38



$2x + 2(45) = 166$

$2x + 90 = 166$

$2x = 76$

$x = 38$

$A = 45 \cdot 38$

$= 1710$

24. The endpoints of the diameter of a circle have coordinates (2, –3) and (–4, 5). Find the length of the radius of the circle.

C

A. 5π
B. 10
C. 5
D. 4π
E. 4

$C = \left(\frac{2-4}{2}, \frac{-3+5}{2}\right)$

$= \left(\frac{-2}{2}, \frac{2}{2}\right) = (-1, 1)$

$r = \sqrt{(2-(-1))^2 + (-3-1)^2}$

$= \sqrt{9+16} = \sqrt{25} = 5$

25. Find the solution of the equation $16^{3-6x} = 8$.

A

A. $x = \frac{3}{8}$
B. $x = -\frac{7}{4}$
C. $x = \frac{5}{8}$
D. $x = -\frac{1}{2}$
E. $x = \frac{12}{5}$

$(2^4)^{3-6x} = 2^3$

$4(3-6x) = 3$

$12 - 24x = 3$

$-24x = -9$

$-24 \quad -24$

$x = \frac{3}{8}$

26. A rescue helicopter is hovering 144 feet above a sailboat in distress. The helicopter drops a life raft. The height in feet, h, of the raft above the water can be modeled by $h(t) = -16t^2 + 144$, where t is the time in seconds after it is dropped. How many seconds after the raft is dropped will it hit the water?

B

A. 2
B. 3
C. 9
D. 3.5
E. 2.5

$-16t^2+144=0$
$-16t^2=-144$
$t^2=9$
$t=3$

27. Find the slope of a line with equation $5x - 3y - 6 = 0$.

E

A. $-\frac{5}{3}$
B. $\frac{3}{5}$
C. -2
D. $-\frac{3}{5}$
E. $\frac{5}{3}$

$5x-3y=6$
$\frac{-3y}{-3}=\frac{-5x}{-3}+\frac{6}{-3}$
$y=\frac{5}{3}x-2$
Slope

28. The complex fraction $\dfrac{4-\frac{3}{4}}{\frac{9}{4}-1.75}$ is equivalent to

C

A. $\frac{2}{13}$
B. None of these.
C. $\frac{13}{2}$
D. $\frac{13}{4}$
E. $\frac{4}{13}$

$\frac{4\left(4-\frac{3}{4}\right)\cdot 4}{4\left(\frac{9}{4}-\frac{7}{4}\right)\cdot 4}$
$=\frac{16-3}{9-7}=\frac{13}{2}$

29. If an athlete's weight decreases from 180 pounds to 168 pounds, what is the percent decrease?

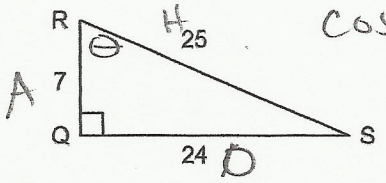
A

A. 6.7%
B. 0.93%
C. 7.1%
D. 0.06%
E. 6%

$\frac{180-168}{180}$
$\frac{12}{180}=6.7\%$

30. In the given right triangle, $\triangle QRS$, find the value of cos R.

D



$\cos R=\frac{A}{H}$

A. $\frac{7}{24}$
B. $\frac{25}{24}$
C. $\frac{24}{25}$
D. $\frac{7}{25}$
E. $\frac{24}{7}$

$\cos R=\frac{7}{25}$

31. Simplify $\left(3\times10^{-3}\right)^4$. Write the answer is scientific notation.

D

Calc!

A. 81×10^{-12}
B. 12×10^{-12}
C. 3×10^{-1}
D. 8.1×10^{-11}
E. 30×10^{-7}

32. If $f(x) = |3x - 5|$, then find $f(-2)$.

D

A. -11
B. 13
C. 1
D. 11
E. -1

$f(-2)=|3(-2)-5|$
$=|-6-5|$
$=|-11|$
$=11$