Answer Key

SAT Practice Test 2 – No Calculator

1. C	2. B	3. C	4. A	5. D
6. B	7. D	8. A	9. C	10. B
11. D	12. B	13. C	14. D	15. B
16. 4	17. 8	18. 10	19. 6	20. 6.5

Answers and Explanations

SAT Practice Test 2 – No Calculator

1. C

   Pick two points from the table to find the slope of f. Let's use $(-1,9)$ and $(1,3)$.

   Slope $= \dfrac{3-9}{1-(-1)} = -3$

   Only choice C has a line with slope -3.

2. B

   Check each answer choice to find if the ordered pairs satisfy the given inequalities, $y > x-4$ and $x+y<5$.

   A) $(0,-5)$ If $x=0$ and $y=-5$,
   $-5 > 0-4$ is not true
   Discard choice A.

   B) $(0,2)$ If $x=0$ and $y=2$,
   $2 > 0-4$ is true
   $0+2<5$ is also true.

   Since $(0,2)$ satisfy both inequalities, choice B is correct.

3. C

The slope of the line $y = \frac{2}{3}x + 2$ is $\frac{2}{3}$.

The equation in each answer choice is written in standard form. Change the equations in each answer choice to slope-intercept form.

A) $2x + 3y = 5 \Rightarrow y = -\frac{2}{3}x + \frac{5}{3}$

B) $3x + 2y = 9 \Rightarrow y = -\frac{3}{2}x + \frac{9}{2}$

C) $4x - 6y = 3 \Rightarrow y = \frac{2}{3}x - \frac{1}{2}$

The equation in choice C has slope $\frac{2}{3}$.

4. A

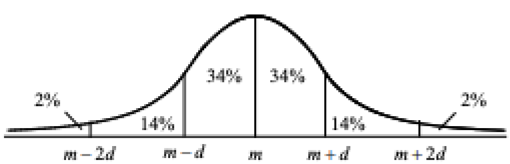
$$\frac{3^{(a+b)^2}}{3^{(a-b)^2}}$$

$= 3^{(a+b)^2 - (a-b)^2}$	$\frac{a^m}{a^n} = a^{m-n}$
$= 3^{(a^2+2ab+b^2) - (a^2-2ab+b^2)}$	FOIL
$= 3^{4ab}$	Simplify.

Therefore, $\frac{3^{(a+b)^2}}{3^{(a-b)^2}} = 3^{4ab} = 243$. Since $243 = 3^5$,

we can conclude $4ab = 5$, so $ab = \frac{5}{4}$.

5. D



The mean value of 500 homes in a county is $225,000 and the standard deviation is $25,000.

Since $m = \$225,000$ and $d = 25,000$,
$m - d = \$225,000 - \$25,000 = \$200,000$,
$m - 2d = \$225,000 - 2 \times \$25,000 = \$175,000$,
and $m + d = \$225,000 + \$25,000 = \$250,000$.

Reading the graph, $14\% + 34\% + 34\%$, or 82%, of the 500 homes are priced between $\$175,000 (= m - 2d)$ and $\$225,000 (= m + d)$. Therefore, there are 0.82×500, or 410 homes.

6. B

A number p increased by 120 percent is $p+1.2p=2.2p$.
A number q decreased by 20 percent is $q-0.2q=0.8q$.
Therefore, $2.2p=0.8q$. Solving the equation for q yields, $q=\frac{2.2}{0.8}p=\frac{22}{8}p=\frac{11}{4}p$.

7. D

Since the total number of bags is 8, $c+r=8$. Each bag of Columbia Coffee costs \$25. So $25\times c$ is the total cost for Columbia Coffee. Each bag of Roast Espresso costs \$35. So $35\times r$ is the total cost for Roast Espresso. If Kay paid \$230 for the coffee and espresso, the equation $25\times c+35\times r=230$ is true.

Choice D is correct.

8. A

$h(x)=-px^2+1$

$h(2)=-p(2)^2+1=-1$ $h(2)=-1$

$-4p+1=-1$ Simplify.

$-4p=-2 \Rightarrow p=\frac{1}{2}$

Therefore, $h(x)=-\frac{1}{2}x^2+1$.

Since $p=\frac{1}{2}$, $h(p)=h(\frac{1}{2})=-\frac{1}{2}(\frac{1}{2})^2+1=\frac{7}{8}$.

9. C

The mean of the prices of the 670 automobiles sold in April and May is

$$\frac{275\times \$19,500+395\times \$20,000}{275+395}$$

$$=\frac{\$13,262,500}{670}\approx \$19,794.78\,.$$

The average is closest to \$19,800.
Choice C is correct.

10. B

Percent increase of the mean price of automobiles sold from May to June is

$$\frac{\text{amount of increase}}{\text{price in May}}=\frac{21,500-20,000}{20,000}$$

$$=\frac{1500}{20,000}=0.075=7.5\%$$

11. D

Total amount collected from the automobile sales in August is $262\times \$21,000=\$5,502,000$.

The tax is 8 percent of \$5,502,000, which is $0.08\times \$5,502,000$, or \$440,160.
Choice D is correct.

12. B

$$\frac{3-i\sqrt{3}}{1-i\sqrt{3}}$$

$$=\frac{(3-i\sqrt{3})(1+i\sqrt{3})}{(1-i\sqrt{3})(1+i\sqrt{3})}$$ Rationalize the denominator.

$$=\frac{3+3\sqrt{3}i-\sqrt{3}i-3i^2}{1-3i^2}$$ FOIL

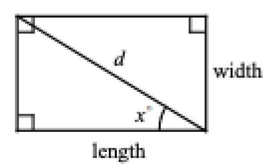
$$=\frac{3+2\sqrt{3}i+3}{1+3}$$ Simplify. $i^2=-1$

$$=\frac{6+2\sqrt{3}i}{4}$$ Simplify.

$$=\frac{3}{2}+\frac{\sqrt{3}}{2}i$$

Therefore, $b=\frac{\sqrt{3}}{2}$.

13. C



$$\cos x^\circ=\frac{\text{adjacent}}{\text{hypotenuse}}=\frac{\text{length}}{d}$$

$\Rightarrow$ length $=d\cos x^\circ$

$$\sin x^\circ=\frac{\text{opposite}}{\text{hypotenuse}}=\frac{\text{width}}{d}$$

$\Rightarrow$ width $=d\sin x^\circ$

Area of rectangle
$=$ length $\times$ width
$=d\cos x^\circ\times d\sin x^\circ=d^2\cos x^\circ\sin x^\circ$

14. D

$$\frac{7^x\cdot x^7}{7^7\cdot x^x}=\frac{7^x}{7^7}\cdot\frac{x^7}{x^x}$$ Rearrange.

$= 7^{(x-7)} \cdot x^{(7-x)}$ $\qquad \frac{a^m}{a^n} = a^{m-n}$

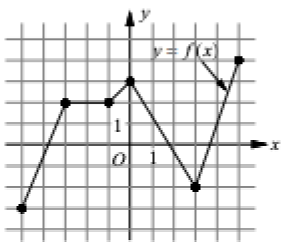
$= 7^{(x-7)} \cdot x^{-(x-7)}$ $\qquad 7 - x = -(x-7)$

$= 7^{(x-7)} \cdot \frac{1}{x^{(x-7)}}$ $\qquad a^{-m} = \frac{1}{a^m}$

$= \frac{7^{(x-7)}}{x^{(x-7)}}$ $\qquad$ Simplify.

$= (\frac{7}{x})^{(x-7)}$

15. B



I. A function f is increasing on an interval if the value of f increases as x increases on the interval. A function f is decreasing on an interval if the value of f increases as x decreases on the interval. A function f is not increasing or decreasing on an interval if the graph of f is a horizontal line. For $-1 < x < 0$, f is strictly increasing and for $0 < x < 3$, f is strictly decreasing. Therefore, f is strictly increasing then strictly decreasing for $-1 < x < 3$.

Statement I is true.

II. The value of f is 2 when the x-coordinate on the graph is $-\frac{3}{2}$. Therefore, $f(-\frac{3}{2}) = 2$.

Statement II is true.

III. The value of f at $x = 0$ is 3.
The value of f at $x = 5$ is 5.
Therefore, f is maximum at $x = 5$.

Statement III is not true.

16. 4

$n - 9 = -n + 16 - 3n$

$n - 9 = -4n + 16$	Simplify.
$5n - 9 = 16$	Add $4n$ to each side.
$5n = 25$	Add 9 to each side.
$n = 5$	Divide each side by 5.

Therefore, $9 - n = 9 - 5 = 4$.

17. 8

$\frac{(3ab^2)(2a^2b)^3}{8a^2b^2}$

$= \frac{(3ab^2)(8a^6b^3)}{8a^2b^2}$ $\qquad (a^m)^n = a^{m \cdot n}$

$= \frac{24a^7b^5}{8a^2b^2}$ $\qquad a^m \cdot a^n = a^{m+n}$

$= 3a^5b^3$ $\qquad \frac{a^m}{a^n} = a^{m-n}$

If $3a^5b^3 = 3a^mb^n$, the $m = 5$ and $n = 3$.
Therefore, $m + n = 5 + 3 = 8$.

18. 10

$3x + 2y = 24$	1st equation
$-2x + 3y = 10$	2nd equation

Multiply each side of the first equation by 2 and multiply each side of the second equation by 3. Then add the two equations.

$2(3x + 2y = 24) \Rightarrow \quad 6x + 4y = 48$

$3(-2x + 3y = 10) \Rightarrow + \underline{|-6x + 9y = 30}$

$13y = 78$

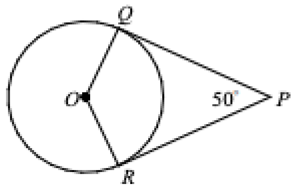
Solving $13y = 78$ yields $y = 6$.
Substituting 6 for y in the equation $3x + 2y = 24$ yields $3x + 2(6) = 24$.
Solving the equation for x gives $x = 4$.
So, $x + y = 4 + 6 = 10$.

19. 6

x	$f(x)$	$g(x)$
-1	-3	-2
2	3	1
3	5	6

Reading the table, when $x = 2$, $f(x) = 3$.
So, $f(2) = 3$.
$g(f(2)) = g(3)$
When $x = 3$, $g(x) = 6$
Therefore, $g(f(2)) = g(3) = 6$.

20. 6.5



If a line is tangent to a circle, then the line is perpendicular to the radius at the point of tangency.
Thus, $\overline{PQ} \perp \overline{OQ}$ and $\overline{PR} \perp \overline{OR}$, or $m\angle PQO = 90$ and $m\angle PRO = 90$.
Since the sum of the measures of the interior angles of quadrilateral is 360,
$m\angle P + m\angle PQO + m\angle QOR + m\angle PRO = 360$.

$50 + 90 + m\angle QOR + 90 = 360$	Substitution
$230 + m\angle QOR = 360$	Simplify.
$m\angle QOR = 130$	

Length of the minor arc $\overset{\frown}{QR}$

$= 2\pi r \times \dfrac{m\angle QOR}{360}$

$= 2\pi(\dfrac{9}{\pi}) \times \dfrac{130}{360}$ $\qquad r = \dfrac{9}{\pi},\ m\angle QOR = 130$

$= 6.5$