

TEST SET 13- ANSWER KEYS AND SCORE CONVERSION TABLE

Module 1	1	2	3	4	5	6	7	8	9	10	11
	C	A	C	C	5	5	C	B	A	B	6
	12	13	14	15	16	17	18	19	20	21	22
	C	50	C	C	B	C	D	A	6	D	D
Module 2	1	2	3	4	5	6	7	8	9	10	11
	B	C	C	36	A	6	B	D	D	A	C
	12	13	14	15	16	17	18	19	20	21	22
	C	D	A	A	D	A	C	D	A	D	4

MATH SCORE COVERSION TABLE (SCALED SCORES: 200-800)

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
44	800	33	680	22	530	11	350
43	800	32	660	21	520	10	320
42	800	31	650	20	500	9	300
41	800	30	630	19	480	8	270
40	790	29	620	18	460	7	260
39	780	28	610	17	450	6	260
38	770	27	600	16	430	5	260
37	750	26	590	15	420	4	250
36	730	25	570	14	410	3	230
35	710	24	560	13	390	2	210
34	690	23	550	12	370	1	200

*RAW SCORE = The total number of problems correct on both module 1 (0-22) and module 2 (0-22).

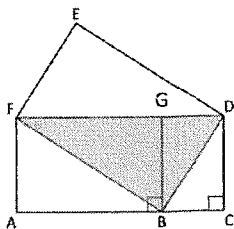
Answers and explanations for Test 13 (Module 1)

1. C)
Rewrite the given equation $y = 144 - 8x$. This shows the amount of money left after buying boba drinks x times in a month budget. Therefore, $(18, 0)$ means the person bought 18 boba drinks and no money left in the budget.
2. A)
Solve for x . $\frac{\sqrt{2x}}{4} = 2\sqrt{2}$. Multiply both sides by 4 and square it. $2x = 128$. So, $x = 64$.
3. C)
Since $xy < 0$, definitely $x \neq 0$ and $y \neq 0$. I is true. $x^2 + y^2 > 0$ is true because x and y are both non-zero numbers. But II is false if $x=2$ and $y=-1$.
4. C)
The graph of a parabola whose vertex is located at the origin $(0, 0)$ and opens downwards will touch x -axis once. So, it means the graph will have one x -intercept.
5. 5
In the given equation $P = 5c - 2i + s$, plug in all values given. $120 = 5(25) - 2(5) + s$. And solve for s . $s = 5$.
6. 5
The discriminant must be zero for a quadratic equation to have one real solution. $D = b^2 - 4ac = (-10)^2 - 4(a)(5) = 0$. So, $a = 5$.
7. C)
Adrian works no more than 30 hours. $x + y \leq 30$. And he will need to earn at least \$1,500. $45x + 25y \geq 1,500$ where x is the number of hours worked as a tutor and y is the number of hours worked as a caterer.
8. B)
All students in the college must take only one art related class. $320 \times 0.4 = 128$ students take fine arts classes. $320 - 128 = 192$ students don't take fine art classes. And 96 students take graphic design classes (a half on 192 students). And 96 students will take other art related classes.
9. A)
For the system of linear equations to have infinitely many solutions, two linear equations must be equivalent. Multiply -3 on both sides of the first equation. $-3ax + 3by = -36$. Compare it with the second equation. $2 = -3a$ and $7 = 3b$. Therefore, $\frac{b}{a} = \frac{7/3}{-2/3} = -\frac{7}{2}$.
10. B)
Let's complete the square. $x^2 + 10x + 25 + y^2 - 8y + 16 = -40 + 25 + 16$. And $(x + 5)^2 + (y - 4)^2 = 1$. So, the center of the circle is $(-5, 4)$ and the radius is 1. If the circle is translated 4 units right, it will be tangent to the y -axis.
11. 6
Plug in the point $(1, 3)$ into the given function. $3 = a \cdot 2^0$. Therefore, $a = 3$. $f(2) = 3 \cdot 2^1 = 6$.

12. C)

Plug 113 into h and solve for t . $113 = -1.75(t - 8)^2 + 120$. *it becomes* $4 = (t - 8)^2$. Square root both sides and add 8. $t = 6$ and 10. So, the riding cart will be 113ft at 6 seconds after the ride starts and will be at the same height at 10 seconds. Thus, the answer is 4 seconds.

13. 50



The shaded area is a half on area BDEF. So, the area of shaded region is 25. Draw a vertical line BG as shown above. And we see that the area of triangle BGD is congruent to the area of triangle BCD and the area of triangle BGF is congruent to the area of triangle ABF. Therefore, the area of rectangle ABDF is $25 \times 2 = 50$.

14. C)

The percent increase problem. $15,000(1 + .12)^3 = 21,074$. So, the lease amount in the beginning of 2023 will be \$21,074 for the year.

15. C)

Let y is the additional number in the list. Then, the mean will be $2x - 1 = \frac{(7)(x) + y}{8}$. now, solve for y . $16x - 8 = 7x + y$. So, $y = 9x - 8$.

16. B)

Plug in the given equations to the expression. $-4(xy) + 2(x^2 + y^2) = 2(x^2 + y^2 - 2xy) = 2(x - y)^2 = 2(y - x)^2$.

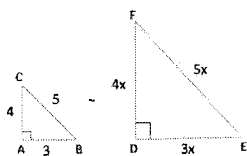
17. C)

Let's make a table for the data.

	S-Deviation	Median	Range
Basalt	Small	0.41	0.03
Sandstone	Large	0.35	0.52

The data in Basalt samples are more clustered to the mean than the data in Sandstone samples. So, the standard deviation of Basalt samples is relatively smaller than that of Sandstone samples. Now, based on the values in the table, I is false. II and III are true.

18. D)



Since two right triangles are similar, all corresponding angles are congruent and all corresponding sides are in proportion. Therefore, $\sin \angle E = \sin \angle B = \frac{4}{5}$

19. A)

The density = $\frac{\text{mass}}{\text{volume}}$. Calculate the volume of the right triangular prism. $V = (\text{base area}) \cdot (\text{height}) = (10)(8) = 80$. Thus, the density = $\frac{146 \text{ g}}{80 \text{ cm}^3} = 1.825 \text{ g/cm}^3$.

20. 6

The number of women for which the line of best fit predicts a value greater than the actual value is the number of dots below the line of best fit. So, it is 6 dots.

21. D)

When a number is added to each of the values in the data set, The standard deviation and the range won't change. However, the value of both mean and the median will be changed.

22. D)

Calculate the percent of participants who know the dancing boys' group. $\frac{234}{360} \times 100 = 65\%$. Since the margin of error of the survey is 5%. It is plausible that between 60% and 70% of the people in the mall know the dancing boys' group.

Answers and explanations for Test 13 (Module 2)

1. B)
Plug the first equation into the second equation. $2x - 4 = x^2 + x - 6$. And solve for x . $x^2 - x - 2 = 0$. And $(x - 2)(x + 1) = 0$. Therefore, $x = 2$ or -1 . So, B) (2, 0) works.
2. C)
 $f(x) = 3x^2 - x + 4$ because f is graphed by translating $h(x)$ 4 units up. So, $f(2) = 3 \cdot 2^2 - 2 + 4 = 12 - 2 + 4 = 14$.
3. C)
The percent of students who planned to travel abroad over the summer $= \frac{66}{110} \times 100 = 60\%$. So, it is plausible that the percent of students who were planning to travel abroad over the summer is 55%-65% considering the margin of error 5%. Therefore, the range would be 341-403.
4. 36
Let x be the number of lamps manufactured on Monday. $0.20 \times x = 6$. Thus, $x = 30$. So, the number of lamps manufactured on Tuesday will be 36.
5. A)
When you sketch (v, e) values in the ve -plane, you will see A) is most agreeable graph shape based on the table.
6. 6
 $\frac{3x-3}{(x-3)^2} - \frac{3}{x-3} = \frac{(3x-3)-3(x-3)}{(x-3)^2} = \frac{6}{(x-3)^2}$. Compare it with the expression $\frac{k}{(x-3)^2}$. Therefore, $k=6$.
7. B)
The mean $= \frac{17 \times 50 + 18 \times 150 + 19 \times 170 + 20 \times 80 + 21 \times 34 + 22 \times 16}{500} = 18.892$. The median is the average of 250th and 251st numbers. So, the median is 19. The difference is $19 - 18.892 = 0.108$.
8. D)
The line l passes through two points (0, 0) and (3, -3). So, the slope is -1 and y -intercept is 0. Therefore, the equation of line l will be $y = -x$.
9. D)
The minimum/maximum value will be shown in the vertex form of the quadratic function. $y = a(x - h)^2 + k$. So, the value of k is the minimum.
10. A)
Let x be the distance of the entire trail. $1.2 = x \left(1 - \frac{k}{100}\right)$. And $1.2 = x \left(\frac{100-k}{100}\right)$. solve for x . then, $x = 1.2 \times \frac{100}{100-k} = \frac{120}{100-k}$.
11. C)
The data will have the least standard deviation if the data is clustered more to the mean. So, the data set C is more clustered to the mean compared to data set A and B.

12. C)

Let's plug in $x = t + 1$ into $f(x - 1) = x^2 - 3x - 2$. Then, $f(t + 1 - 1) = (t + 1)^2 - 3(t + 1) - 2 = t^2 + 2t + 1 - 3t - 3 - 2 = t^2 - t - 4$. So, $f(t) = t^2 - t - 4$.
Now, replace t into x .

13. D)

If the number of populations is reduced by one-fifth every year, then the equation would be $k\left(1 - \frac{1}{5}\right)^t = k\left(\frac{4}{5}\right)^t$.

14. A)

To find x -intercept of the function, plug $f(x) = 0$ and solve for x . $0 = 2\left(\frac{1}{4}\right)^x - 2$. And it becomes $\left(\frac{1}{4}\right)^x = 1$. So, $x = 0$. The coordinate of x intercept is $(0, 0)$.

15. A)

If two triangles are similar, the ratio of areas is square of the scale factor. The scale factor is $\frac{4}{8} = \frac{1}{2}$. So, the ratio of areas $= \left(\frac{1}{2}\right)^2 = \frac{1}{4}$. So, $\frac{1}{4} = \frac{46}{\text{the area of } \triangle KML}$.
So, the area of $\triangle KML = 184$.

16. D)

The center of circle A is $(1, 0)$. So, the equation of the circle B is will be $(x - 1)^2 + y^2 = 16$ with the same center and 4 as its radius. Now, expand the equation. Then, $x^2 - 2x + y^2 - 15 = 0$. Compare it with the given equation of circle B. you get $c = 15$.

17. A)

Let's x be the length of the base of the triangle. The height of the triangle is $1.25x$. now, set up an equation $\frac{\text{base}}{\text{height}} = \frac{x+m}{1.25x+2} = \frac{1}{1.25}$. now, cross-multiply and solve for m . $1.25x + 1.25m = 1.25x + 2$. So, $m = 1.6$.

18. C)

Use the axis of symmetry. One of the x -intercept is 2 and x coordinate of the vertex is 4. So, the distance between x intercepts and the vertex must be same either side. Therefore, the coordinate of the other x intercept is 6.

19. D)

$\sqrt[7]{x^5} = x^{\frac{5}{7}}$. I is true. $\frac{x}{x^{\frac{2}{7}}} = x^{1-\frac{2}{7}} = x^{\frac{5}{7}}$. II is true. $x \cdot \left(x^{\frac{1}{7}}\right)^{-2} = x \cdot x^{-\frac{2}{7}} = x^{1-\frac{2}{7}} = x^{\frac{5}{7}}$. III is true.

20. A)

The scatter plot with negative association has a negative slope. Eliminate C) and D). choice B) shows a weak association because the data are spread widely.

21. D)

Note: The quotient of A and B $= \frac{A}{B}$. The square of $x = x^2$. The square root of $x = \sqrt{x}$. And the cube root of the sum of 5 and $y = \sqrt[3]{(5+y)}$ or $\sqrt[3]{(y+5)}$.

22. 4

The Pythagorean triple for $45^\circ - 45^\circ - 90^\circ$ is $x - x - \sqrt{2}x$. Set up an equation $\sqrt{2}x = 4$. therefore, the length of a leg is $2\sqrt{2}$. The area of the right triangle is $\frac{1}{2}(2\sqrt{2})(2\sqrt{2}) = 4$.