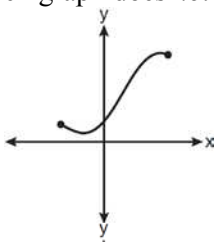
MR22 - MS.SHIN NAME:_____

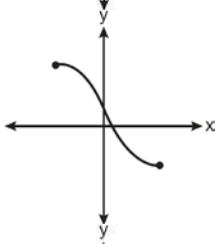
REGENTS REVIEW WORKSHEET #1

1 Which graph does *not* represent a function?

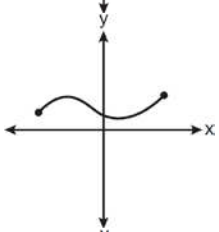
1)



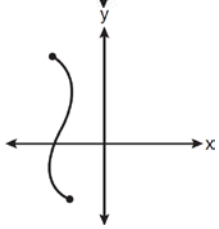
2)



3)



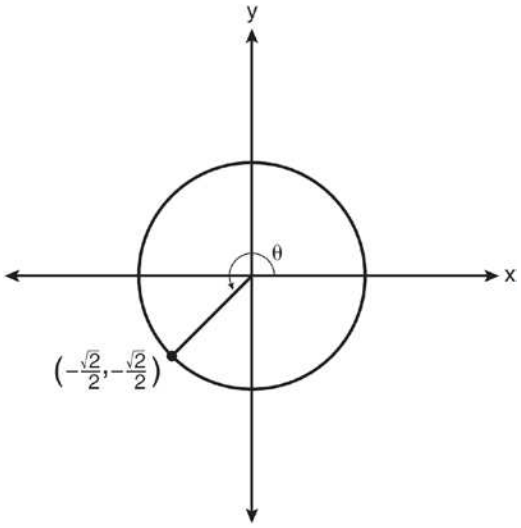
4)



2 The roots of the equation $x^2 - 10x + 25 = 0$ are
1) imaginary
2) real and irrational
3) real, rational, and equal
4) real, rational, and unequal

3 Which values of x are solutions of the equation $x^3 + x^2 - 2x = 0$?
1) $0, 1, 2$
2) $0, 1, -2$
3) $0, -1, 2$
4) $0, -1, -2$

4. In the diagram below of a unit circle, the ordered pair $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ represents the point where the terminal side of θ intersects the unit circle.



What is $m\angle\theta$?
1) 45
2) 135
3) 225
4) 240

5 What is the fifteenth term of the sequence $5, -10, 20, -40, 80, \ldots$?
1) $-163,840$
2) $-81,920$
3) 81,920
4) 327,680

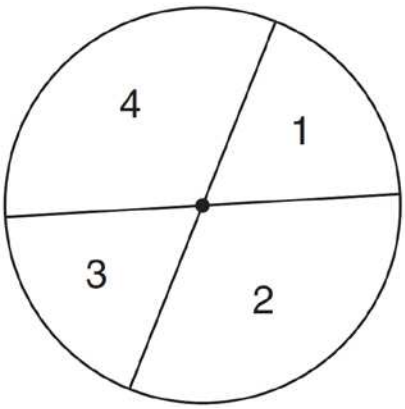
6 What is the solution set of the equation $|4a + 6| - 4a = -10$?
1) $\varnothing$
2) $\{0\}$
3) $\left\{\frac{1}{2}\right\}$
4) $\left\{0, \frac{1}{2}\right\}$

MR22 - MS.SHIN NAME:_____

7 If $\sin A = \frac{2}{3}$ where $0° < A < 90°$, what is the value of $\sin 2A$?

1) $\frac{2\sqrt{5}}{3}$
2) $\frac{2\sqrt{5}}{9}$
3) $\frac{4\sqrt{5}}{9}$
4) $-\frac{4\sqrt{5}}{9}$

8 A dartboard is shown in the diagram below. The two lines intersect at the center of the circle, and the central angle in sector 2 measures $\frac{2\pi}{3}$.



If darts thrown at this board are equally likely to land anywhere on the board, what is the probability that a dart that hits the board will land in either sector 1 or sector 3?

1) $\frac{1}{6}$
2) $\frac{1}{3}$
3) $\frac{1}{2}$
4) $\frac{2}{3}$

9 If $f(x) = x^2 - 5$ and $g(x) = 6x$, then $g(f(x))$ is equal to

1) $6x^3 - 30x$
2) $6x^2 - 30$
3) $36x^2 - 5$
4) $x^2 + 6x - 5$

10 Which arithmetic sequence has a common difference of 4?

1) $\{0, 4n, 8n, 12n, \ldots\}$
2) $\{n, 4n, 16n, 64n, \ldots\}$
3) $\{n+1, n+5, n+9, n+13, \ldots\}$
4) $\{n+4, n+16, n+64, n+256, \ldots\}$

11 The conjugate of $7 - 5i$ is

1) $-7 - 5i$
2) $-7 + 5i$
3) $7 - 5i$
4) $7 + 5i$

12 If $\sin^{-1}\left(\frac{5}{8}\right) = A$, then

1) $\sin A = \frac{5}{8}$
2) $\sin A = \frac{8}{5}$
3) $\cos A = \frac{5}{8}$
4) $\cos A = \frac{8}{5}$

13 How many distinct triangles can be formed if $m\angle A = 35$, $a = 10$, and $b = 13$?

1) 1
2) 2
3) 3
4) 0

14 When $\frac{3}{2}x^2 - \frac{1}{4}x - 4$ is subtracted from $\frac{5}{2}x^2 - \frac{3}{4}x + 1$, the difference is

1) $-x^2 + \frac{1}{2}x - 5$
2) $x^2 - \frac{1}{2}x + 5$
3) $-x^2 - x - 3$
4) $x^2 - x - 3$

15 The solution set of the inequality $x^2 - 3x > 10$ is

1) $\{x | -2 < x < 5\}$
2) $\{x | 0 < x < 3\}$
3) $\{x | x < -2 \text{ or } x > 5\}$
4) $\{x | x < -5 \text{ or } x > 2\}$

MR22 - MS.SHIN NAME:_____

16 If $x^2 + 2 = 6x$ is solved by completing the square, an intermediate step would be

1) $(x+3)^2 = 7$
2) $(x-3)^2 = 7$
3) $(x-3)^2 = 11$
4) $(x-6)^2 = 34$

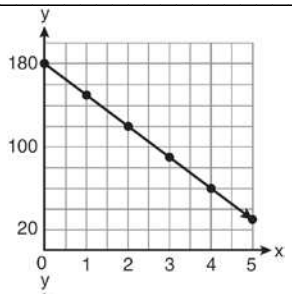
17 Three marbles are to be drawn at random, without replacement, from a bag containing 15 red marbles, 10 blue marbles, and 5 white marbles. Which expression can be used to calculate the probability of drawing 2 red marbles and 1 white marble from the bag?

1) $\frac{{}_{15}C_2 \cdot {}_5C_1}{{}_{30}C_3}$
2) $\frac{{}_{15}P_2 \cdot {}_5P_1}{{}_{30}C_3}$
3) $\frac{{}_{15}C_2 \cdot {}_5C_1}{{}_{30}P_3}$
4) $\frac{{}_{15}P_2 \cdot {}_5P_1}{{}_{30}P_3}$

18 The expression $x^{-\frac{2}{5}}$ is equivalent to

1) $-\sqrt[2]{x^5}$
2) $-\sqrt[5]{x^2}$
3) $\frac{1}{\sqrt[2]{x^5}}$
4) $\frac{1}{\sqrt[5]{x^2}}$

19 On January 1, a share of a certain stock cost \$180. Each month thereafter, the cost of a share of this stock decreased by one-third. If x represents the time, in months, and y represents the cost of the stock, in dollars, which graph best represents the cost of a share over the following 5 months?

1)


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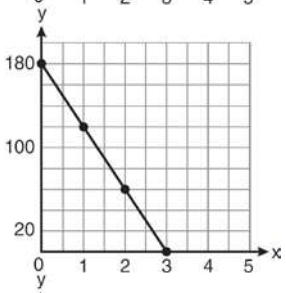
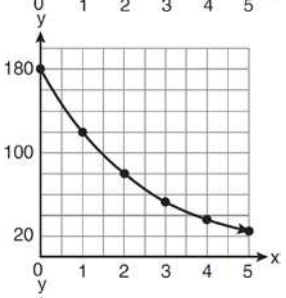


3)


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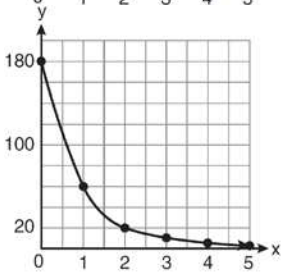
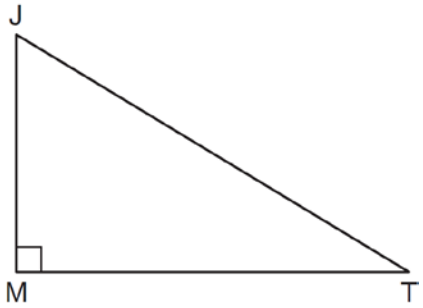


20 In the diagram below of right triangle JTM, $JT = 12$, $JM = 6$, and $m\angle JMT = 90$.

MR22 - MS.SHIN NAME:_____



What is the value of $\cot J$?

1) $\frac{\sqrt{3}}{3}$
2) 2
3) $\sqrt{3}$
4) $\frac{2\sqrt{3}}{3}$

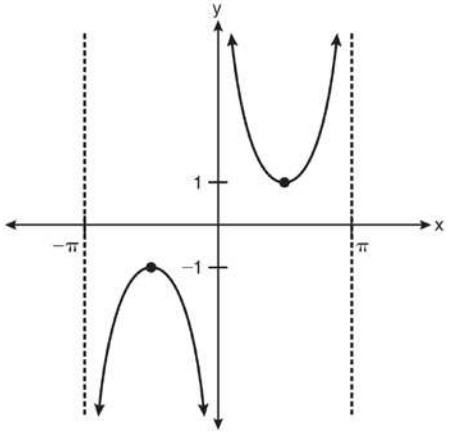
21 For which equation does the sum of the roots equal -3 and the product of the roots equal 2?

1) $x^2 + 2x - 3 = 0$
2) $x^2 - 3x + 2 = 0$
3) $2x^2 + 6x + 4 = 0$
4) $2x^2 - 6x + 4 = 0$

22 The expression $\frac{2x+4}{\sqrt{x+2}}$ is equivalent to

1) $\frac{(2x+4)\sqrt{x-2}}{x-2}$
2) $\frac{(2x+4)\sqrt{x-2}}{x-4}$
3) $2\sqrt{x-2}$
4) $2\sqrt{x+2}$

23 Which equation is sketched in the diagram below?



1) $y = \csc x$
2) $y = \sec x$
3) $y = \cot x$
4) $y = \tan x$

24 The expression $\log_5\left(\frac{1}{25}\right)$ is equivalent to

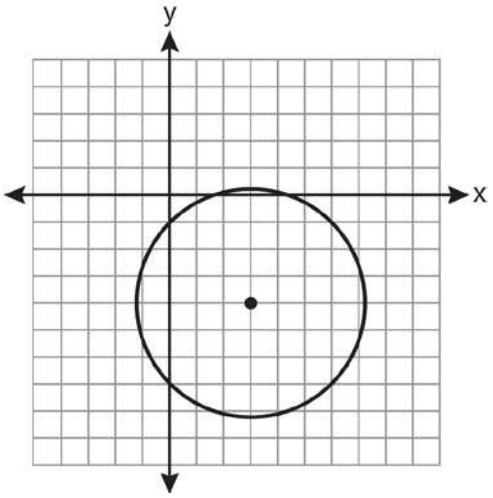
1) $\frac{1}{2}$
2) 2
3) $-\frac{1}{2}$
4) -2

25 A four-digit serial number is to be created from the digits 0 through 9. How many of these serial numbers can be created if 0 can *not* be the first digit, no digit may be repeated, and the last digit must be 5?

1) 448
2) 504
3) 2,240
4) 2,520

26 Which equation represents the circle shown in the graph below that passes through the point $(0, -1)$?

MR22 - MS.SHIN NAME:_____



1) $(x-3)^2+(y+4)^2=16$
2) $(x-3)^2+(y+4)^2=18$
3) $(x+3)^2+(y-4)^2=16$
4) $(x+3)^2+(y-4)^2=18$

27 Which task is *not* a component of an observational study?
1) The researcher decides who will make up the sample.
2) The researcher analyzes the data received from the sample.
3) The researcher gathers data from the sample, using surveys or taking measurements.
4) The researcher divides the sample into two groups, with one group acting as a control group.

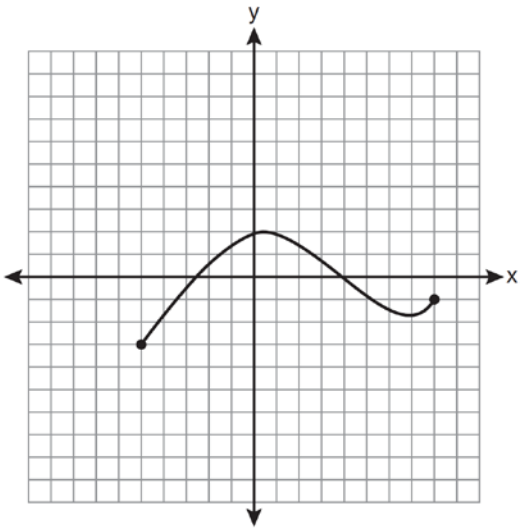
28 Solve algebraically for x: $16^{2x+3}=64^{x+2}$

29 Find, to the *nearest tenth of a degree*, the angle whose measure is 2.5 radians.

30 For a given set of rectangles, the length is inversely proportional to the width. In one of these rectangles, the length is 12 and the width is 6. For this set of rectangles, calculate the width of a rectangle whose length is 9.

31 Evaluate: $10+\sum_{n=1}^{5}(n^3-1)$

32 The graph below represents the function $y=f(x)$.



State the domain and range of this function.

33 Express $\frac{\sqrt{108x^5y^8}}{\sqrt{6xy^5}}$ in simplest radical form.

34 Assume that the ages of first-year college students are normally distributed with a mean of 19 years and standard deviation of 1 year. To the *nearest integer*, find the percentage of first-year college students who are between the ages of 18 years and 20 years, inclusive. To the *nearest integer*, find the percentage of first-year college students who are 20 years old or older.

35 Starting with $\sin^2 A+\cos^2 A=1$, derive the formula $\tan^2 A+1=\sec^2 A$.

36 Write the binomial expansion of $(2x-1)^5$ as a polynomial in simplest form.

37 In $\triangle ABC$, $m\angle A=32$, $a=12$, and $b=10$. Find the measures of the missing angles and side of $\triangle ABC$. Round each measure to the *nearest tenth*.

38 The probability that the Stormville Sluggers will win a baseball game is $\frac{2}{3}$. Determine the probability, to the *nearest thousandth*, that the Stormville Sluggers will win *at least* 6 of their next 8 games.

39 The temperature, *T*, of a given cup of hot chocolate after it has been cooling for *t* minutes can best be modeled by the function below, where T_0 is the temperature of the room and *k* is a constant.

$$\ln(T - T_0) = -kt + 4.718$$

A cup of hot chocolate is placed in a room that has a temperature of 68°. After 3 minutes, the temperature of the hot chocolate is 150°. Compute the value of *k* to the nearest thousandth. [Only an algebraic solution can receive full credit.] Using this value of *k*, find the temperature, *T*, of this cup of hot chocolate if it has been sitting in this room for a total of 10 minutes. Express your answer to the *nearest degree*. [Only an algebraic solution can receive full credit.]