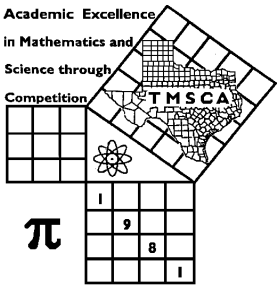


T M S C A H I G H S C H O O L

M A T H E M A T I C S

T E S T # 2 ©

OCTOBER 27, 2012

GENERAL DIRECTIONS

1. About this test:
   A. You will be given 40 minutes to take this test.
   B. There are 60 problems on this test.
2. All answers must be written on the answer sheet/Scantron form/Chatsworth card provided. If you are using an answer sheet, be sure to use **BLOCK CAPITAL LETTERS**. Clean erasures are necessary for accurate grading.
3. If using a scantron answer form, be sure to correctly denote the number of problems not attempted.
4. You may write anywhere on the test itself. You must write only answers on the answer sheet.
5. You may use additional scratch paper provided by the contest director.
6. All problems have **ONE** and **ONLY ONE** correct [BEST] answer. There is a penalty for all incorrect answers.
7. Calculators used on this test must be conform to the UIL standards. Graphing calculators are allowed. Calculators need not be cleared.
8. All problems answered correctly are worth **SIX** points. **TWO** points will be deducted for all problems answered incorrectly. No points will be added or subtracted for problems not answered.
9. In case of ties, percent accuracy will be used as a tie breaker.

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA TMSCA

2012-2013 TMSCA High School Mathematics Test 2

1. What is $\frac{5}{12} \div 0.444... + 0.1875$?

   (A) $\frac{1}{32}$ (B) $1\frac{1}{8}$ (C) $\frac{161}{432}$ (D) $\frac{43}{216}$ (E) $1\frac{5}{16}$

2. Given $P(-2,3)$ and $Q(4,-5)$ find an equation of a line parallel to $\overline{PQ}$ through $(-7,-8)$?

   (A) $3x+4y+53=0$ (B) $4x+3y+52=0$ (C) $3x+4y+29=0$ (D) $4x+3y-36=0$ (E) $4x+3y-1=0$

3. The three_____ of a triangle intersect at the incenter.

   (A) sides (B) medians (C) $\perp$ bisectors (D) altitudes (E) angle bisectors

4. Dallas is 415 miles from Corpus Christi. At 7:15 am, Edith left Dallas and drove towards Corpus Christi at 65 mph. An hour later, Frank left Corpus Christi and drove toward Dallas at 60 mph. What is the positive difference in their driving distances when they pass each other?

   (A) 79 miles (B) 16.6 miles (C) 65 miles (D) 19 miles (E) 60 miles

5. The base of a triangle decreases by 15% and the height increased by 20%. What is the percent change in the area of the triangle?

   (A) 3% (B) -2% (C) 2% (D) -3% (E) 1%

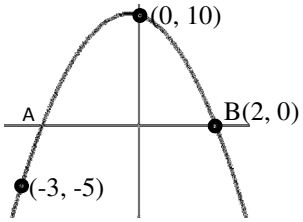
6. The polynomial $f(x) = x^3 + 3x^2 + ax + b$ leaves the same remainder when divided by $(x-2)$ as when divided by $(x+1)$. Find the value of *a*.

   (A) $\frac{1}{32}$ (B) -6 (C) 0 (D) $\frac{43}{216}$ (E) $1\frac{5}{16}$

7. For what value of *k* does $\det\begin{bmatrix} 3 & 2 & -1 \\ k & -2 & 4 \\ -k & 5 & -3 \end{bmatrix} = -47$?

   (A) -5 (B) -89 (C) 5 (D) 1 (E) 17.8

8. What is the area under enclosed by the parabola and *x*-axis from A to B.



   (A) $\frac{29}{24}$ (B) $\frac{63}{8}$ (C) $\frac{425}{24}$ (D) $\frac{256}{3}$ (E) $\frac{243}{8}$

9. Erin is arranging her 10 school books on a shelf. If she keeps her 3 history books together, in how many possible ways can she arrange the books?

   (A) 40320 (B) 120 (C) 30240 (D) 120960 (E) 241920

10. A map has a scale of 1 inch = 75 miles. Corpus Christi and Dallas are 415 miles apart. How many inches apart are they on the map?

    (A) $\frac{83}{16}in$ (B) $\frac{11}{2}in$ (C) $\frac{16}{3}in$ (D) $\frac{83}{15}in$ (E) $\frac{67}{15}in$

11. The aces and black kings are removed from a well-shuffled deck of cards. If 2 cards are drawn at random without replacement, what is the probability that both are hearts?

    (A) $\frac{33}{529}$ (B) $\frac{8}{115}$ (C) $\frac{11}{221}$ (D) $\frac{22}{345}$ (E) $\frac{1}{17}$

12. If $h(x)=x+3$, $g(x)=x^2$, and $f(x)=2x$, then $f\left(g\left(h(-4)\right)\right)=$

(A) 2 (B) 128 (C) 67 (D) -61 (E) -2

13. A belt joins two pulleys. The larger pulley has a radius of 24 cm and revolves at a rate of 15 rpm. The smaller has a radius of 9 cm. How fast is the smaller pulley revolving?

(A) 40 rpm (B) $\frac{72}{5}$ rpm (C) $\frac{320}{3}$ rpm (D) $\frac{8}{3}$ rpm (E) $\frac{64}{9}$ rpm

14. $\tan\left(\frac{\pi}{6}\right)\cos\left(\frac{\pi}{6}\right)\div\cot\left(\frac{5\pi}{3}\right)\csc\left(\frac{\pi}{6}\right)\div\cos\left(\frac{5\pi}{3}\right)\csc\left(\frac{5\pi}{3}\right)=$

(A) $\frac{4}{3}$ (B) 2 (C) $\frac{2\sqrt{3}}{3}$ (D) 4 (E) $\frac{1}{2}$

15. What is the acute angle between the vectors $3i+7j$ and $-2i-4j$?

(A) 86.63° (B) 3.37° (C) 2.62° (D) 87.38° (E) 3.08°

16. If $f(x)=\frac{x^2+5}{2x}$, then $f'(3)=$

(A) 3 (B) $-\frac{11}{9}$ (C) $\frac{2}{9}$ (D) $\frac{11}{9}$ (E) $-\frac{2}{9}$

17. Kyle is playing a game with two fair dice. If the sum of the dice is a multiple of three, he earns two points. If the sum is seven, he loses five points. Otherwise, he scores nothing. What is his expected score for a single roll?

(A) $\frac{1}{6}$ (B) $\frac{3}{11}$ (C) $-\frac{1}{6}$ (D) -3 (E) $-\frac{1}{2}$

18. $3+10+21+36+\ldots+300+351+406=$

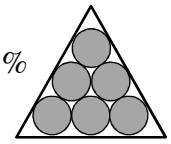
(A) 10920 (B) 1120 (C) 11130 (D) 6544 (E) 2135

19. Kaye bought eight chairs at a garage sale for $8.00 each. She sold three to her neighbor with a 120% mark-up, sold two to her sister for a 25% profit, and gave three away to her daughter. What was her total profit?

(A) -$15.20 (B) $8.80 (C) $23.20 (D) -$16.00 (E) $24.80

20. Six circles are tangent to each other and an equilateral triangle is inscribed around them as shown. What percent of the area of the triangle is shaded?

(A) 78.13% (B) 68.02% (C) 60% (D) 40.31% (E) 80.61%



21. Two chords, $\overline{AC}$ and $\overline{BD}$ intersect inside circle *P* at point *E*. Given $BE=6$, $DE=24$, and $\overline{BD}$ bisects $\overline{AC}$, find the length of $\overline{AC}$.

(A) 16 (B) 30 (C) 24 (D) 9 (E) 18

22. $\left[1-\left(2\sin 2\theta\cos 2\theta\right)^2\right]\sec^2 4\theta=$

(A) $\sin^2 4\theta$ (B) $\cos^2 4\theta$ (C) $\sec 4\theta$ (D) $\sec^2 4\theta$ (E) $\tan 4\theta\cot 4\theta$

23. What is the constant term in the binomial expansion of $\left(5x^3-\frac{2}{x}\right)^8$?

(A) 28 (B) 44800 (C) -280 (D) -56000 (E) -256

24. What is the slope of the tangent to $x^2 + y^2 = 36$ at the point $\left(5, \sqrt{11}\right)$.

(A) $\frac{5\sqrt{11}}{11}$ (B) $\sqrt{11}$ (C) $-\frac{5\sqrt{11}}{11}$ (D) $\frac{23\sqrt{11}}{11}$ (E) $\frac{13\sqrt{11}}{11}$

25. The ratio of length to width of a rectangle is 13:3 and the perimeter is 768 in. What is the area of the rectangle?

(A) 156 ft^2 (B) 22464 ft^2 (C) 1872 ft^2 (D) 208 ft^2 (E) 3 ft^2

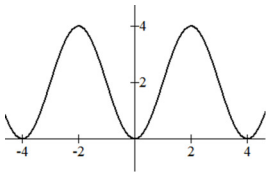
26. Which of the following is a triangular number?

(A) 842 (B) 841 (C) 961 (D) 1036 (E) 861

27. The ratio of sides of triangle is 2:4:5. What is the measure of the smallest angle to the nearest hundredth of a degree?

(A) 23.58° (B) 22.33° (C) 71.03° (D) 71.79° (E) 49.46°

28. The graph of $f(x)$ is shown right. $f(x) =$



(A) $-4\cos\left(\frac{\pi}{2}x\right)$ (B) $2\sin(2\pi x)+2$ (C) $-2\cos\left(\frac{\pi}{2}x\right)+2$ (D) $-2\cos(2\pi x)+2$ (E) $2\sin\left(\frac{\pi}{2}x\right)+2$

29. $3^3 + 4^3 + 5^3 + \ldots + 12^3 + 13^3 + 14^3 =$

(A) 11017 (B) 289570 (C) 11016 (D) 11025 (E) 2744

30. Which of the following is not a solution to $|2x+3| \geq 7x-5$?

(A) 2 (B) $-\frac{7}{3}$ (C) $-\frac{8}{3}$ (D) $\frac{8}{5}$ (E) 0

31. What is the area of the circle with the equation $x^2 + y^2 - 4x + 6y + 6.75 = 0$?

(A) $\frac{25\pi}{4}$ (B) $\frac{5\pi}{2}$ (C) $\frac{25\pi}{2}$ (D) 9π (E) 4π

32. Meredith set out to row on a lake. She rowed 500 m on a bearing of 75°, then 200 m on a bearing of 25°, then 350 m on a bearing of 52°. How far is she from her original starting point?

(A) 1050 m (B) 615 m (C) 775 m (D) 526 m (E) 994 m

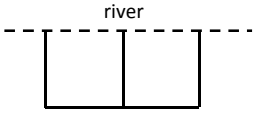
33. $\left(-3+2\sqrt{-6}\right)\left(7-12\sqrt{-27}\right) = a+bi$. Find the value of a.

(A) $108\sqrt{3}+14\sqrt{6}$ (B) $-21+216\sqrt{2}$ (C) $51\sqrt{2}$ (D) $-21-216\sqrt{2}$ (E) $108\sqrt{3}-14\sqrt{6}$

34. Which of the following is the x-coordinate of a point of inflection on $f(x) = x^4 + 2x^3 - 12x^2 - 36x - 23$?

(A) 1 (B) -1.5 (C) 2.45 (D) -1 (E) 3.8

35. Jonah has 250 m of fencing. He wants to build a rectangular enclosure with one central division and one side bounded by a river as shown. What is the maximum possible area for the enclosure?



(A) 7813 m^2 (B) 3906 m^2 (C) 2604 m^2 (D) 2500 m^2 (E) 5208 m^2

36. The points $P(3,9)$, $Q(-3,5)$ and $R(7,y)$ are collinear. Find the value of y.

(A) $\frac{19}{3}$ (B) $\frac{35}{3}$ (C) 15 (D) $\frac{5}{3}$ (E) 3

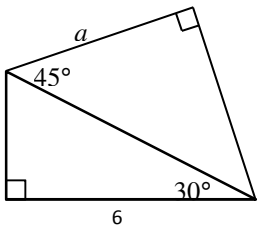
37. A pizza shop has 8 choices of toppings and two types of crust. They run a fall special offering a large, 3-topping pizza for $12.00. How many possible pizza orders are there if a topping can be repeated?

(A) 165 (B) 240 (C) 112 (D) 120 (E) 330

38. If $\log 9 = P$, and $\log 5 = Q$, then $\log 0.6 =$

(A) $\frac{PQ}{2}$ (B) $2PQ$ (C) $\log\left(\frac{\sqrt{P}}{Q}\right)$ (D) $\frac{P-2Q}{2}$ (E) $\frac{\sqrt{P}}{Q}$

39. What is the length of side *a* on the diagram shown right?



(A) 12 (B) $2\sqrt{6}$ (C) $4\sqrt{6}$ (D) $6\sqrt{2}$ (E) $6\sqrt{6}$

40. If $\frac{x-1}{x^2-4} - \frac{x}{x^2-x-2} = \frac{ax+b}{x^3+x^2-4x-4}$, then $a+b =$

(A) 3 (B) 1 (C) -3 (D) -1 (E) -2

41. Mr. Smith has six A-students, nine B-students, five C-students and three D-students in his geometry class. The counselor needs eight students, two from each grade category to take a career assessment test. How many possible groups could Mr. Smith send?
(A) 490314 (B) 16200 (C) 64 (D) 259200 (E) 128

42. A circle is inscribed in a triangle with side lengths of 5 cm, 6 cm, and 7 cm. What is the area of the circle to the nearest tenth of a square centimeter?
(A) 2.0 cm^2 (B) 18.1 cm^2 (C) 32.2 cm^2 (D) 8.4 cm^2 (E) 40.7 cm^2

43. The scores of a test given to students are normally distributed with a mean of 21. 80% of the students have scores less than 23.7. Find the standard deviation of the scores.
(A) 3.38 (B) 3.21 (C) 0.30 (D) 2.70 (E) -3.38

44. The probability of obtaining heads on a biased coin is 0.18. The coin is tossed seven times. What is the probability of obtaining at least two heads?
(A) 0.632 (B) 0.304 (C) 0.696 (D) 0.368 (E) 0.063

45. Farmer Brown has chickens and pigs in his barnyard. There are a total of 25 heads and 66 feet. How many chickens are in the yard?
(A) 8 (B) 23 (C) 17 (D) 16 (E) 9

46. The base of a triangle is 3 cm longer than the altitude. The area of the triangle is 35 cm^2. The length of the altitude is
(A) 10 cm (B) 4.6 cm (C) 7 cm (D) 7.6 cm (E) 8.2 cm

47. The second term of an arithmetic sequence is 7, and the sum of the first 4 terms is 12. What is the common difference of the sequence?
(A) -8 (B) 15 (C) 5 (D) 3 (E) -5

48. Three bakers can ice ten cakes in two hours. If they work at the same rate, how many cakes can four bakers ice in six hours?
(A) 40 (B) 30 (C) 36 (D) 24 (E) 42

49. The nightly number of hours of sleep of 21 students are shown in the frequency table below. Find the interquartile range.

Hours of Sleep	4	5	6	7	8	10	12
Number of Students	2	5	4	3	4	2	1

(A) 5 (B) 8 (C) 6 (D) 3 (E) 7

50. When $x = \frac{\pi}{3}$, the slope of $y = k\sin x + 3x$ is 8. Find the value of *k*.

(A) -10 (B) $-5\sqrt{3}$ (C) 10 (D) $\frac{10\sqrt{3}}{3}$ (E) $-\frac{10\sqrt{3}}{3}$

51. *ABCD* is a rectangle and *O* is the midpoint of $\overline{AB}$. Express the vector $\overrightarrow{OA}$ in terms of the vectors $\overrightarrow{OC}$ and $\overrightarrow{OD}$.

(A) $\overrightarrow{OD} - \overrightarrow{OC}$ (B) $0.5\overrightarrow{OD} + 0.5\overrightarrow{OC}$ (C) $0.5\overrightarrow{OD} - 0.5\overrightarrow{OC}$ (D) $0.5\overrightarrow{OC} - 0.5\overrightarrow{OD}$ (E) $\overrightarrow{OD} + \overrightarrow{OC}$

52. Find the units digit of 17^{2012}.

(A) 3 (B) 1 (C) 7 (D) 0 (E) 9

53. Two fair 8-sided dice are rolled. What are the odds that the dice will have a sum of 8?

(A) 7:64 (B) 5:31 (C) 7:57 (D) 5:36 (E) 1:7

54. Simplify to the nearest ten-thousandth place: $1 + (1.3) + \frac{(1.3)^2}{2!} + \frac{(1.3)^3}{3!} + \frac{(1.3)^4}{4!} + \ldots$.

(A) 3.6693 (B) 0.2624 (C) 0.2675 (D) 3.6302 (E) 0.9636

55. What is the area of a regular hexagon in terms of the length, *a*, of the apothem?

(A) $6a^2\sqrt{3}$ (B) $2a^2\sqrt{3}$ (C) $2a^2$ (D) $6a^2$ (E) $\frac{2a^2\sqrt{3}}{3}$

56. The matrix $A = \begin{pmatrix} 2 & 7 \\ 4 & k \end{pmatrix}$ has no inverse. Find the value of *k*.

(A) -7 (B) -14 (C) -2 (D) 14 (E) 7

57. The operation € is defined as A€B = $A^3 + B^3$. Compute 3€(1€2).

(A) 756 (B) 27 (C) 1008 (D) 42876 (E) 36

58. How many solutions are there to $5x + 6y = 216$ such that $x, y \in \mathbb{Z}^+$.

(A) 8 (B) 43 (C) 7 (D) 36 (E) 20

59. Barry has a chord that is 2 yd. 9 in. long. He cuts it into four pieces in a ratio of 2:3:5:8. What is the sum of the lengths of the shortest and longest pieces?

(A) 1 yd (B) 1 ft 8 in (C) 1 yd 1 ft 4 in (D) 2 ft 6 in (E) 1 yd 9 in

60. A pigeon in a tree looks down at a worm on the ground that is 15 m from the base of the tree with an angle of depression of 42°. How high is the pigeon off the ground?

(A) 16.66m (B) 13.51 m (C) 18.00 m (D) 34.37 m (E) 11.15 m

2012-2013 TMSCA High School Mathematics Test 2 Key

1. B	21. C	41. B
2. B	22. E	42. D
3. E	23. B	43. B
4. A	24. C	44. D
5. C	25. A	45. C
6. B	26. E	46. C
7. D	27. B	47. A
8. E	28. C	48. A
9. E	29. C	49. D
10. D	30. D	50. C
11. D	31. A	51. C
12. A	32. E	52. B
13. A	33. B	53. C
14. D	34. D	54. A
15. B	35. C	55. B
16. C	36. B	56. D
17. C	37. B	57. A
18. E	38. D	58. A
19. B	39. C	59. E
20. A	40. C	60. B

2012 – 2013 TMSCA Solutions Mathematics Test Two

1. $\frac{5}{12}\div\frac{4}{9}+\frac{3}{16}=\frac{5}{12}\cdot\frac{9}{4}+\frac{3}{16}=1\frac{1}{8}$

2. $m=-\frac{8}{6}=-\frac{4}{3}$, $y+8=-\frac{4}{3}(x+7)$

3. definition of angle bisector

4. $65t+60(t-1)=415$, $t=3.8$

   $65(3.8)-60(2.8)=79$ miles

5. $(0.85)(1.20)=1.02$, 2% change

6. $f(2)=2a+b+20$, $f(-1)=-a+b+2$

   $2a+b+20=-a+b+2$, $a=6$

7. $3(6-20)-2(-3k+4k)-1(5k-2k)=-47$

   solve. $k=1$

8. quad reg: $f(x)=-2x^2-x+10$

   zeros: $x=-2.5,2$, $\int_{-2.5}^{2}f(x)\,dx=\frac{243}{8}$

9. $8!\div3!=241920$

10. $\frac{1}{75}=\frac{d}{415}$, $d=\frac{83}{15}$

11. $\frac{12}{46}\cdot\frac{11}{45}=\frac{22}{345}$

12. $h(-4)=-1$, $g(-1)=1$, $f(1)=2$

13. $24\cdot15=9\theta$, $\theta=40$ revolutions

14. let $x=\frac{\pi}{6}$, and $y=\frac{5\pi}{3}$

    $\frac{\sin x}{\cos x}\cos x\frac{1}{\sin x}\frac{\sin y}{\cos y}\frac{1}{\cos y}\frac{1}{\sin y}$

    $\frac{1}{\cos^2 y}=\frac{1}{0.5^2}=4$

15. $-6-28=\sqrt{58}\cdot\sqrt{20}\cos\theta$,

    $\cos\theta=\frac{-34}{\sqrt{58\cdot20}}$, $\theta\approx176.634$

    $180-\theta\approx3.37^\circ$

16. $f'(3)=\frac{(2\cdot3)(2\cdot3)-(3^2+5)\cdot2}{(2\cdot3)^2}=\frac{2}{9}$

17. $\frac{1}{3}(2)+\frac{1}{6}(-5)+\frac{1}{2}(0)=-\frac{1}{6}$

18. $\sum_{k=1}^{14}(2k^2+k)$

    $=2\cdot\frac{14}{6}(29)(15)+\frac{1}{2}(14)(15)=2135$

19. $24(2.2)+16(1.25)-8(8)=8.8$

20. $\frac{6\pi}{\frac{(4+2\sqrt{3})^2\sqrt{3}}{4}}\approx.7813\approx78.13\%$

21. $AE=EC$, $6\cdot24=144=AE^2$, $AC=24$

22. $\left[1-\sin^2 4\theta\right]\sec^2 4\theta=\cos^2 4\theta\sec^2 4\theta=1$

    $1=\tan4\theta\cot4\theta$

23. $\binom{8}{2}(5x^3)^2\left(-\frac{2}{x}\right)^6=44800$

24. $\frac{dy}{dx}=-\frac{x}{y}=-\frac{5}{\sqrt{11}}=-\frac{5\sqrt{11}}{11}$

25. $32x=768$, $x=24$, sides = 72, 312

    $A=22464$ in^2 $=156$ ft^2

26. (861) definition of triangular number

27. $\frac{(4^2+5^2-2^2)}{(2\cdot4\cdot5)}=\cos\theta$, $\theta\approx22.33^\circ$

28. cosine, amplitude = 2, vertical shift = 2
    vertical reflection, period = 4, so coefficient
    of x is $\frac{\pi}{2}$ $\therefore y=-2\cos\left(\frac{\pi x}{2}\right)+2$

29. $\sum_{k=3}^{14}(k^3)=\sum_{k=1}^{14}(k^3)-9=\left(\frac{14\cdot15}{2}\right)^2-9=11016$

30. $\frac{2}{9}\le\frac{8}{5}\le\frac{8}{5}$

$2x+3\ge7x-5$	$-(2x+3)\le7x-5$
$-5x\ge-8$	$-9x\le-2$
$x\le\frac{8}{5}$	$x\ge\frac{2}{9}$

31. $x^2-4x+4+y^2+6y+9=-6.75+4+9$

    $(x-2)^2+(y+3)^2=6.25$, $\pi r^2=6.25\pi$

32. $500\cos75+200\cos25+350\cos52\approx526.15$
    $500\sin75+200\sin25+350\sin52\approx843.29$
    $d\approx\sqrt{526.15^2+843.29^2}\approx994$ m

33. $(-3+2i\sqrt{6})(7-12i\sqrt{27})=(-3+2i\sqrt{6})(7-36i\sqrt{3})$

    $-21+108i\sqrt{3}+14i\sqrt{6}-72i^2\sqrt{18}$

    $a=-21+72\sqrt{18}=-21+216\sqrt{2}$

34. $f'(x)=4x^3+6x^2-24x-36$

    $f''(x)=12x^2+12x-24$

    $f''(x)=0$ @ $x=-1,2$

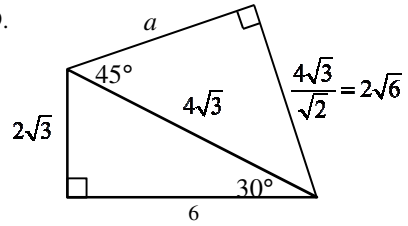
35. $A=w\left(\frac{250-3w}{2}\right)$, graph, max = 2604

36. $m=\frac{2}{3}$, $\frac{y-5}{7+3}=\frac{2}{3}$, $y=\frac{35}{3}$

37. $2\binom{8+3-1}{3}=240$

38. $\log0.6=\log\left(\frac{\sqrt{9}}{5}\right)=\frac{1}{2}\log9-\log5$

    $=\frac{1}{2}P-Q=\frac{P-2Q}{2}$

39. 

40. $\frac{x-1}{(x-2)(x+2)}-\frac{x}{(x+1)(x-2)}$

    $=\frac{(x-1)(x-1)}{(x-1)(x+2)(x-2)}-\frac{x(x+2)}{(x-1)(x+2)(x-2)}$

    $=\frac{-1-2x}{x^3+x^2-4x-4}$, $a+b=-3$

41. $\binom{6}{2}\binom{9}{2}\binom{5}{2}\binom{3}{2}=16200$

42. $s=0.5(5+6+7)=9$

    $A=\frac{\pi(9-5)(9-6)(9-7)}{9}\approx8.4$ cm^2

43. inv norm $(0.8)=0.8416$

    $0.8416=\frac{23.7-21}{\sigma}$, $\sigma\approx3.21$

44. $p=1-\left(0.82^7+7\left(0.82^6\right)(0.18)\right)\approx0.368$

45. $p+c=25$, $4p+2c=66$, $p=8$, $c=17$

46. $35=0.5(a)(a+3)$, $a^2+3a-70=0$

    $(a+10)(a-7)=0, a=7$

47. $a+d=7$, $4a+6d=12$, $d=-8$

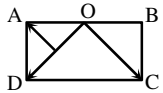
48. $3r(2)=10$, $4r(6)=4(10)=40$

49. statistics function on calculator

50. $y'=k\cos x+3$, $8=k\cos\frac{\pi}{3}+3$

    $5=0.5k$, $k=10$

51. $\overrightarrow{OA}=0.5\overrightarrow{OD}-0.5\overrightarrow{OC}$



52. $2012 \bmod 4=0$, rem = 1

53. 64 possible rolls, 7 of them are 8's, 7:57

54. $e^{1.3}\approx3.6693$

55. $A=6\left(\frac{a^2\sqrt{3}}{3}\right)=2a^2\sqrt{3}$

56. $\det A=2k-28=0$, $k=14$

57. $1€2=1^3+2^3=9$, $3€9=3^3+9^3=756$

58. $y=\frac{(216-5x)}{6}$ use table. 7 solutions.

59. $\frac{81in}{2+3+5+8}=4.5in$, $4.5(2+8)=45$ in
    45 in = 1 yd 9 in

60. $\tan42^\circ=\frac{d}{15}$, $d\approx13.51$ m