Quadratics Problems

Name: _____ **Date:** _____

1. What is the maximum number of real roots the equation $2x^6 + x^4 - 5x^2 + 1 = 0$ can have?

   A. 0 B. 3 C. 4 D. 6

2. If the roots of the quadratic equation $Ax^2 + Bx + C = 0$ are $x = 5$ and $x = -2$, then the values of A, B and C are _____.

   $(x-5)(x+2) = 1x^2 - 3x - 10$

   A. 1, 7, 10 B. 1, −7, −10 C. 1, −3, 10 D. 1, −3, −10

3. What is the extraneous root of $\sqrt{7x-3} = 2x - 3$? square both sides

   $(2x-3)(2x-3)$ $7x - 3 = 4x^2 - 12x + 9$ $0 = 4x^2 - 19 + 12$ $x = 4, \frac{3}{4}$

   A. −4 B. −3 C. $-\frac{3}{4}$ D. $\frac{3}{4}$

   put both solutions back in the equation the one that doesn't work is extraneous

4. In order to complete the square, which of the following is needed to fill in the blank?

   $\left(x^2 + \frac{b}{a}x + \_\_\_\_\right)$ $\left(\frac{\frac{b}{a}}{2}\right)^2$ $\frac{b^2}{a^2} \cdot \frac{1}{4} = \frac{b^2}{4a^2}$

   A. $\frac{b^2}{a^2}$ B. $\frac{b^2}{4a^2}$ C. $\frac{b}{4a^2}$ D. $\frac{b}{2a}$

5. The formula $d = 16t^2$ relates time and distance for a falling object (d is the distance in feet and t is the time in seconds). Calculate the time until a ball hits the ground if dropped from a height of 400 feet. put equation into $y =$

   A. 5 seconds B. 4.2 seconds C. 4 seconds D. 3.5 seconds

   find 400 in y column of table

6. A business can manufacture 50 unicycles a week and sell all of them for $200 each. The owner is considering increasing the price of the unicycles, but she knows that it will decrease sales. She uses this equation to estimate how much in dollars, y, she will make if she raises the price by x dollars:

   $y = 10000 + 50x - x^2$ put this in Y_1

   If she wants to make $10600, what is the least amount she can raise the price of each unicycle? find 10600 in the y column of table

   A. $10.00 B. $20.00 C. $25.00 D. $30.00

7. The cost of a pizza with "the works" is given as a function of its diameter. The relationship is

   $C = d^2 - 2d + 447$

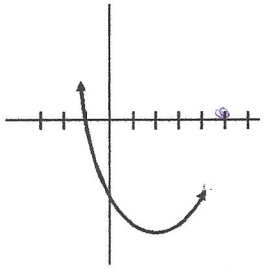
   where C is the cost, in cents, and d is the diameter of the pizza, in centimeters. If the pizza costs $16.00, then what is a reasonable estimate for the diameter of the pizza?

   find 1600 in the Y column of the table. It's somewhere btw $X = 34$ & 35. Closer to 35

   A. 20 cm B. 25 cm C. 30 cm D. 35 cm

8. The graph of $y = x^2 - 4x - 5$ is a parabola. (A portion of the graph is shown.) The x-intercepts of this parabola are -1 and _____.

A. 4 B. $4\frac{1}{2}$ C. 5 D. $5\frac{1}{2}$



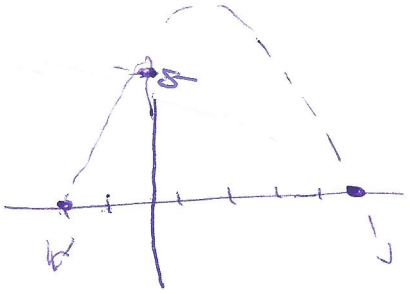
9. Use the given table of values to factor $f(x) = ax^2 + bx + c$.

x	$f(x)$
−2	0
0	8
4	0

x int

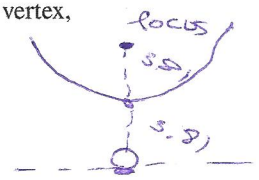
x int

→ this point tells me the parabola opens down



A. $f(x) = -(x-2)(x+4)$ B. $f(x) = (x+2)(x-4)$ C. $f(x) = (x-2)(x+4)$ D. $f(x) = -(x+2)(x-4)$

10. Automobile headlights have a parabolic shape. If the focus of a parabolic headlight is 3.81 cm from the vertex, how far from the vertex should the bulb be placed for optimal efficiency?



A. 0 cm B. 0.3 cm C. 1.9 cm D. 3.81 cm

11. Write the equation of the parabola that opens up, has a vertex $V(2, -3)$, and is congruent to $y = x^2$. Answer in the form $y = a(x-h)^2 + k$. use process of elimination $y = \square(x-2) - 3$

A. $y = (x-2)^4 + 3$ B. $y = (x+2)^2 + 3$ C. $y = (x-2)^2 - 3$ D. $y = 2x^2 - 3$

12. If the roots of the equation $x^2 + x + 1 = 0$ are expressed in the form $a + bi$, then b is equal to:

$$\frac{-1 \pm \sqrt{1-4(1)(1)}}{2(1)}$$

$$\frac{-1 \pm i\sqrt{3}}{2}$$

A. $\pm\frac{1}{2}$ B. $\pm\frac{3}{2}$ C. $\pm\frac{\sqrt{3}}{2}$ D. $\pm\frac{\sqrt{3}}{4}$

13. An example of an equation which has *no* real root is:

A. $3x^2 - 7x + 9 = 0$ B. $3x^2 = 7x$ C. $3x^2 + 7x - 9 = 0$ D. $3x^2 - 7x - 9 = 0$

graph each answer. The one with no x intercepts has no real roots

$3x^2+5x-2$

$(x-\frac{1}{3})(x+\frac{6}{3})$

$(3x-1)(x+2)$

Rationals Practice Problems

Name: _____ **Date:** _____

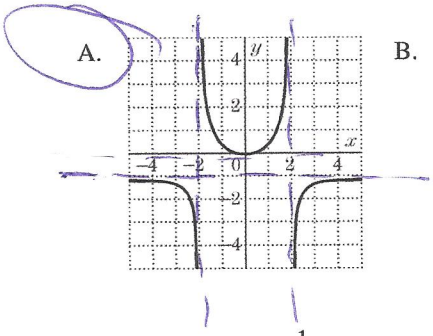
1. Simplify: $\frac{3x^2-6x}{4-x^2}\cdot\frac{3x^2+5x-2}{27x^2-3}$ $= \frac{3x(x-2)}{(2-x)(2+x)}\cdot\frac{(3x-1)(x+2)}{3(3x+1)(3x-1)}$ $-1(x-2)$

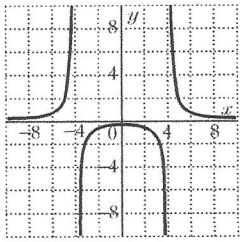
A. $\frac{-x}{3x+1}$ B. $\frac{-x(x-2)}{(3x-1)(x+2)}$ C. $\frac{x(x-2)}{(3x-1)(x+2)}$ D. $\frac{-x(x+2)}{(3x-1)(x+2)}$

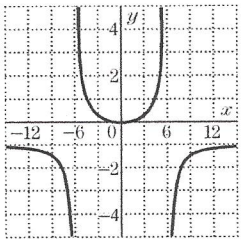
2. Simplify: $\frac{\left(\frac{7x^2y}{21x^2-6x}\right)}{\left(\frac{14x}{49x^2-4}\right)}$ $= \frac{7x^2y}{21x^2-6x}\cdot\frac{49x^2-4}{14x} = \frac{7xy}{3x(7x-2)}\cdot\frac{(7x-2)(7x+2)}{2\cdot7\cdot x}$

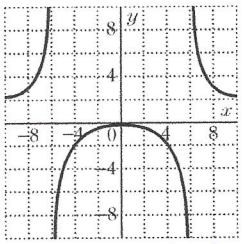
A. $\frac{6}{7xy+2y}$ B. $\frac{7xy+2xy}{6}$ C. $\frac{6}{7xy+2x}$ D. $\frac{7xy+2y}{6}$

3. Which of the following represents the graph of $y=-\frac{x^2}{x^2-4}$? $= -\frac{x^2}{(x-2)(x+2)}$ vertical asymptotes @ $x=2$ & -2

A. 

B. 

C. 

D. 

Horizontal asymptote @ -1

4. The expression $\frac{2+\frac{1}{n}}{\frac{1}{n^2}}$ is equivalent to: $\frac{\frac{2n}{n}+\frac{1}{n}}{\frac{1}{n^2}} = \frac{\frac{2n+1}{n}}{\frac{1}{n^2}} = \frac{2n+1}{n}\cdot\frac{n^2}{1}$

A. $\frac{2n+1}{n}$ B. $\frac{n}{2n+1}$ C. $2n+1$ D. $n(2n+1)$

5. Simplify: $\frac{2x+5}{3}-\frac{5}{x}$ $\frac{x(2x+5)}{3x}-\frac{15}{3x} = \frac{2x^2+5x-15}{3x}$

A. $\frac{2x^2+5x-15}{3x}$ B. $\frac{2}{3}$ C. $\frac{7x-15}{3x}$ D. $\frac{2x}{3-x}$

6. Add: $\frac{5}{2x-8}+\frac{3x}{x^2-16}$ $= \frac{5}{2(x-4)}+\frac{3x}{(x+4)(x-4)} = \frac{5(x+4)}{2(x-4)(x+4)}+\frac{6x}{2(x-4)(x+4)}$

A. $\frac{11x}{2(x-4)^2}$ B. $\frac{11x}{2(x+4)(x-4)}$ C. $\frac{11x+20}{2(x+4)(x-4)}$ D. $11x+20$

7. Combine into a single fraction: $\frac{2}{x-2}+\frac{1}{2-x}$

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

8. Maria can paint a room twice as fast as her daughter Rosaria. Together, they painted a room that measures 200 square feet in 17 hours. How long would it have taken Rosaria to paint the same room if she worked alone?

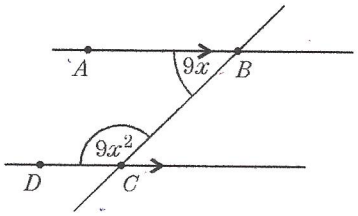
A. 11 hours B. 25.5 hours C. 51 hours D. 102 hours

$\frac{1}{x}+\frac{1}{2x}=\frac{1}{17} \Rightarrow \frac{2}{2x}+\frac{1}{2x}=\frac{1}{17} \rightarrow \frac{3}{2x}=\frac{1}{17} \rightarrow 3(17)=2x$

$25.5 = x$ ← mark 9

9. A boat travels downstream at a rate of 24 km in 4 hours. Traveling upstream, the same boat travels only two-thirds of this distance in twice the time. Find the speed of the boat (in still water) and the speed of the current.

10. In the diagram, line AB is parallel to line CD. If the measure of $m\angle ABC = (9x)°$ and the measure of $m\angle DCB = (9x^2)°$, then what is the measure of $\angle ABC$?



$9x^2+9x=180$

$9x^2+9x-180=0$

$9(x^2+x-20)=0$

$9(x+5)(x-4)$

$x = -5, +4$

$9(4) = 36$

11. Solve for x: $\frac{2}{x-2}+\frac{5}{x^2-4x+4}=3$

$\frac{2}{x-2}+\frac{5}{(x-2)(x-2)}=3$

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

$2x+1=3(x-2)(x-2)$

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

$2x+1=3x^2-12x+12$

$0=3x^2-14x+11$

A. $\{\frac{11}{3},1\}$ B. $\{\frac{3}{11},-1\}$ C. $\{\frac{4}{3},1\}$ D. $\{\frac{8}{3},1\}$

12. Solve: $\frac{3x-2}{2x-3}=\frac{3x+5}{2x+3}$

A. $-\frac{9}{4}$ B. 1 C. $\frac{9}{4}$ D. $\pm\frac{9}{4}$

or graph to find zeros

$(3x-2)(2x+3)=(2x-3)(3x+5)$

$6x^2+9x-4x-6=6x^2+10x-9x-15$

$5x-6=x-15$

$4x=-9$

$x=\frac{-9}{4}$

Complex Number Problems

Name: _____ **Date:** _____

1. Express $3\sqrt{-27}$ in terms of i.

$3\sqrt{-1\cdot 3\cdot 9} = 3\cdot 3\cdot i\sqrt{3} = 9i\sqrt{3}$

A. $9i\sqrt{3}$ B. $6i\sqrt{3}$ C. $-9i$ D. $27i$

2. Simplify: $i^4 + i^2$

$i^4 = (i^2)^2 = (-1)^2 = 1$

$1 + (-1) = 0$

A. 0 B. 1+i C. 1-i D. 2i

3. Add: $\sqrt{-9} + \sqrt{-16}$ $= 3i + 4i = 7i$

A. $7i$ B. $-7i$ C. $5 + i$ D. $5 - i$

4. If $(a + bi) + (2 + i) = 5 - i$, find the value of b.

$a + bi + 2 + i = 2 + a + bi + i = 5 - i$

set real parts equal to each other

A. $\frac{1}{2}$ B. 1 C. 0 D. -2

& imaginary parts equal to each other then solve

$bi + i = -i$

$i(b+1) = -i(i)$

$b + 1 = -1$

$b = -2$

5. Express the product in standard form.

$(3 - \sqrt{-49})(2 + \sqrt{-9}) = (3 - 7i)(2 + 3i) = 6 + 9i - 14i - 21i^2$

$= 6 - 5i + 21$

$= 27 - 5i$

A. $27 - 5i$ B. $-15 - 5i$ C. $-15 + 5i$ D. $27 + 5i$

6. Solve for x given $x^2 + 18 = 8x$

$x^2 - 8x + 18 = 0$ $x = \frac{8 \pm \sqrt{64 - 4(1)(18}}{2(1)} = \frac{8 \pm \sqrt{-8}}{2}$

A. $4 \pm i$ B. $4 \pm 2\sqrt{2}$ C. $-4 \pm i\sqrt{2}$ D. $4 \pm i\sqrt{2}$ $= 4 \pm i\sqrt{2}$

7. Find the roots of the equation $3x^2 + 5x + 4 = 0$

$x = \frac{5 \pm \sqrt{25 - 4(3)(4)}}{2(3)} = \frac{5 \pm i\sqrt{23}}{6}$

A. $\frac{-5 \pm i\sqrt{23}}{6}$ B. $\frac{-5 \pm \sqrt{13}}{2}$ C. $\frac{5 \pm 4i\sqrt{3}}{12}$ D. $-5 \pm \frac{i\sqrt{23}}{2}$

8. An example of an equation which has *no* real root is:

graph each option and look for the one w/no x intercepts

A. $2x^2 - 5x - 8 = 0$ B. $2x^2 = 5x$ C. $2x^2 + 5x - 8 = 0$ D. $2x^2 - 5x + 8 = 0$

$2x^2 - 5x = 0$

$25 - 4(3)(8) = 89$ $25 - 4(2)(0) = 17$ $25 - 4(2)(-8) = 39$ $25 - 4(2)(8) = -39$

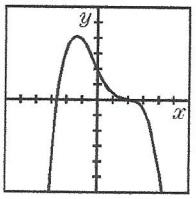
oc

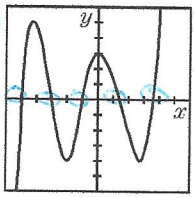
$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ → if this is negative you have imaginary (or complex) roots

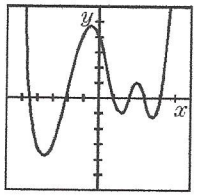
Polynomial Problems

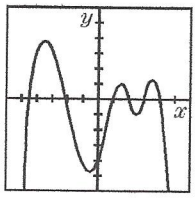
Name: _____ **Date:** _____

1. Which of the following graphs best illustrates the graph of $y = a(x-b)(x-c)(x-d)(x-e)(x-f)$ where $a > 0$ and $b \neq c \neq d \neq e \neq f$?

A. 

B. 

C. 

D. 

5 roots so crosses x axis max of 5 times

2. The width of a rectangular bin is twice the height and the length is 3 m more than the width. The polynomial function $f(x) = 4x^3 + 6x^2 - 56$ models the volume of the rectangular bin, where x = height.

Graph the function to determine the value of x and then find the dimensions of the container.

A. 1, 2, and 5 B. 2, 4, and 7

C. 3, 6, and 9 D. 4, 8, and 11

$w = 2h$

$l = 3 + w$

graph and look for x intercepts. These are solutions to the function.

$h = 2$

$w = 4$

$l = 7$

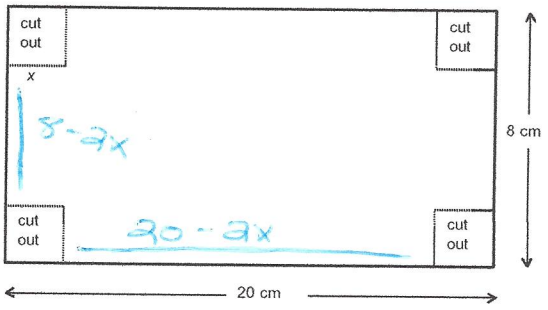
3. Simplify: $(y\sqrt{2} - \sqrt{7})(y\sqrt{2} + \sqrt{7})$

A. $2y^2 - 7$ B. $2y^2 + 7$

C. $2y^2 + 2y\sqrt{14} - 7$ D. $2y^2 - 2y\sqrt{14} - 7$

$2y^2 + y\sqrt{14} - y\sqrt{14} - 7$

4. A package designer wants to make an open box from a rectangular piece of cardboard. She will cut square corners out of the piece as indicated in the picture.



$8 - 2x$

$20 - 2x$

The length of the side of one of these cut-out squares is x. The cardboard is to be folded up at the corners to create the box. Which of the following expressions gives the volume of the box?

A. $x(20-2x)(8-2x)$ B. $x(10-x)(4-x)$

C. $x(x-8)(x-20)$ D. $160x$

5. When the polynomial $P(x)$ is divided by $x-3$, the quotient is x^2-x+3 and the remainder is -2. Find $P(x)$.

A. $P(x)=x^3-4x^2+6x-11$ P(3) = -2

B. $P(x)=3x^3+x^2+6x-1$ P(3) = 107

C. $P(x)=x^3+4x^2-6x-11$ P(3) = . . .

D. $P(x)=3x^3+5x^2+6x$ P(3) = . . .

Use remainder thm & evaluate each answer choice at x = 3

6. Find the roots of the equation $(x-1)(x+3)=5(x-1)$.

A. {1, 2}

B. {1, 3, −3}

C. {0, 1, 5, −3}

D. no real roots

$(x-1)(x+3)-5(x-1)=0$

$x^2+3x-3-5x+5$

$x^2-3x+2=0$

$(x-1)(x-2)=0$

7. What is the fourth term of $(x-2y)^8$?

A. $560x^5y^3$

B. $448x^5y^3$

C. $-448x^5y^3$

D. $448x^4y^4$

$x^5(-2y)^0 + x^4(-2y)^1 + x^3(-2y)^2 + x^2(-2y)^3$

because I will end up with a negative when I cube -2y I can eliminate choices A & B

8. What is the term with y^{18} in the expansion of $(x^2+y^3)^9$? 10 terms

A. $84x^6y^{18}$

B. $168x^3y^{18}$

C. $210x^6y^{18}$

D. $36x^3y^{18}$

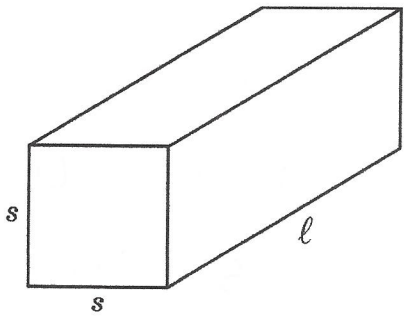
Use pascal's triangle to find 84

$x^{13} + x^{16} + x^{14} + \ldots$

$x^{12} + x^{10} + x^8$

$84x^6y^{18} + y^{21} + x^2y^{24} + y^{27}$

9. A rectangular prism has a square side, as shown.



If the volume of the prism is $2x^3+24x^2+72x$ and the length ℓ is $2x$, what is the side s?

A. $2x^2+3x$

B. $2x+12$

C. $2x+3$

D. $x+6$

factor out 2x

$2x(x^2+12x+36)$

factor this quadratic

$(x+6)(x+6)$

10. How many rational roots does the equation $x^3+10x+2=0$ have?

1 root @ -0.1992094

11. Select the possible root combinations of $27x^5+81x^4-15x^3-45x^2-28x=84$.

I. 5 real roots

II. 2 real, 4 complex roots

III. 1 real, 4 complex roots

max roots 5

A. I only

B. I and II

C. I and III

D. I, II and III

remember complex roots come in pairs

Logs and Exponents Practice Problems

Name: _____ **Date:** _____

1. Which pair of equations are inverses of each other?

   A. $f(x) = \sqrt{x+1} - 5,\ g(x) = (x+5)^2 - 1$

   B. $f(x) = \sqrt{1-x} + 5,\ g(x) = (x-5)^2 + 1$

   C. $f(x) = \sqrt{4-x} - 6,\ g(x) = -(4-x)^2 + 6$

   D. $f(x) = \sqrt{x-7} - 8,\ g(x) = -(x+8)^2 + 7$

$x = \sqrt{y+1} - 5$

$x + 5 = \sqrt{y+1}$

$(x+5)^2 = y+1$

$(x+5)^2 - 1 = y$

2. Solve for the positive value of x: $25^{2x} = 5^{x^2-12}$

   A. 6 B. 4 C. 8 D. 2

$(5^2)^{2x} = 5^{x^2-12}$

$5^{4x} = 5^{x^2-12}$

$x^2 - 4x - 12 = 0$ $\quad x = +6, -2$

3. Solve:

   $\log_5 (2x+1) + \log_5 x = \log_5 10$

   A. −2.5 B. −1 C. 2 D. 5

$\log_5 x(2x+1) = \log_5 10$

$2x^2 + x = 10$

$2x^2 + x - 10 = 0$

$x = -\frac{5}{2}, 2$

4. What is the equation of the inverse of the logarithmic function $y = 2\log_x$?

   BAD QUESTION

   A. $y = x^2$ $\quad \log_x y = 2$ B. $y = -\sqrt{x}$ $\quad = -x^{1/2}$

   C. $y = 2^x$ $\quad \log_2 y = x$ D. $y = (2x)^2$ $\quad \log_{2x} y = 2$

5. If $y = \log_{10} 3$, find the value of 10^{2y}.

   A. 9 B. 10 C. 12 D. 8

$10^{2(\log_{10} 3)} = 10^{\log_{10} 3^2}$

$= 3^2$

$= 9$

6. If $\log_5 x = 4.26$, what is the value of $\log_5 \frac{25}{x^2}$?

   A. −6.52 B. 0.000000302

   C. 0.20 D. 0.23

$\log_5 25 - \log_5 x^2$

$\log_5 25 - 2\log_5 x$

$2 - 2(4.26) = -6.52$

7. Evaluate: $2\log_5 10 - \log_5 4$

   A. 1 B. 2 C. 14 D. 5

$\log_5 10^2 - \log_5 4$

$\log_5 \frac{100}{4} = \log_5 25 = 2$

8. Which of the following is equal to $\log_9 27 + \log_3 243$?

   A. $6\frac{1}{2}$ B. 8 C. 11 D. $12\frac{1}{2}$

$\frac{\log 27}{\log 9} + \frac{\log 243}{\log 3} =$

$1.5 + 5 = 6.5$

9. If $a = x^3y^{-2}z^{-1}$, then $\log a$ is equal to:

A. $\dfrac{3\log x}{2\log y \log z}$

B. $3\log x - 2\log y - \log z$

C. $\dfrac{1}{3}\log x - 2\log y - \log z$

D. $3\log x - \dfrac{1}{2\log y} - \dfrac{1}{\log z}$

$\log x^3 + \log y^{-2} + \log z^{-1} =$

$3\log x - 2\log y - \log z$

10. Which of the following is equal to $\log_{\frac{1}{2}} 5$?

A. $-\log_2 5$

B. $\dfrac{\log 5}{\log 2}$

C. $-\dfrac{\log 2}{\log 5}$

D. $-\log\sqrt{5}$

evaluate on your calculator

$\dfrac{\log 5}{\log \frac{1}{2}}$

$\left(\frac{1}{2}\right)^{\wedge} = 5$

11. $\log \dfrac{10}{x}$ is equal to:

A. $\dfrac{1}{\log x}$

B. $1 - \log x$

C. $\dfrac{1}{x}$

D. $1 - x$

$\log 10 - \log x$

$= 1$

12. $\log 3x^2$ is equal to:

A. $6\log x$

B. $2\log 3x$

C. $\log 3 + 2\log x$

D. $2\log 9x$

$\log 3 + 2\log x$

Stats Practice Problems

Name: _____ **Date:** _____

1. In a normal distribution with mean 30 and variance 25, at what percentile rank does a score of 42 fall?

   2nd vars normalcdf lower -1E99 upper 42 μ 30 σ 5

   A. 0.82% B. 50.82% C. 99.55% D. 0.45%

2. If X is normally distributed with $\mu = 155$ and $\sigma = 11$, find $P(145 < X < 159)$.

   lower 145 upper 159 μ 155 σ 11

   A. 0.3133 B. 0.5255 C. 0.4144 D. 0.4592

3. Given that X is normally distributed, $\sigma = 7$, and $P(X \geq 65) = 0.1953$, find the mean, μ, to the nearest whole number.

   A. 68 B. 60 C. 59 D. 58

4. In a normal distribution with mean 45 and variance 49, at what percentile rank does a score of 53 fall?

   lower -1E99 upper 53 μ 45 σ 7

   A. 95.64% B. 87.29% C. 71.57% D. 12.51%

5. Three students took 3 different kinds of aptitude tests with the following results:

Ted scored 74	Christina scored 192	Steph scored 324
$\bar{x} = 61$	$\bar{x} = 170$	$\bar{x} = 285$
σ=9	σ=17	σ=26

   74 − 61 / 9 = 1.44 192 − 170 / 17 = 1.29 324 − 285 / 26 = 1.5

   Who has the highest relative score?

   A. Ted B. Christina C. Steph D. Ted and Steph

6. A physical education instructor told his class that they could earn an A for the triple-jump if they could jump further than 24 feet. If the distances jumped by students are normally distributed with a mean of 22 feet and a standard deviation of 3 feet, what proportion of his students will earn an A?

   lower 24 upper 1E99 μ 22 σ 3

   A. 0.0228 B. 0.2486 C. 0.2514 D. 0.3272

7. The number of candies in a bag is normally distributed with a mean of 200 and a standard deviation of 3. Which bag could be expected to occur less than 5% of the time?

   A. a bag with 205 candies 1.67 pick this because it's furthest from mean B. a bag with 204 candies 1.33

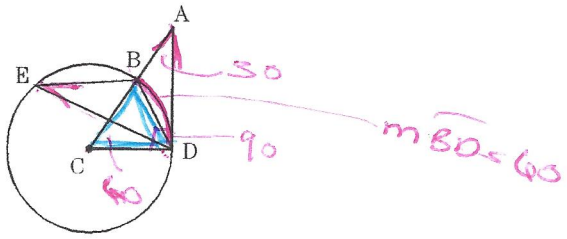
   C. a bag with 203 candies 1 D. a bag with 198 candies −.67

Geometry Practice Problems

Name: _____ **Date:** _____

1. Given: $\overline{AD}$ is tangent to the circle at D
   $\triangle BCD$ is an equilateral triangle

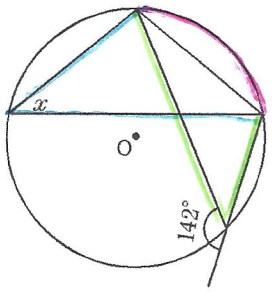
   Prove: $m\angle BED = m\angle CAD$



statement	reason
1. $\triangle BCD$ is EQUILATERAL	Given
2. $\angle C$ = 60°	Each angle of an equilateral triangle is 60°
3. $\overset{\frown}{BD}$ = 30°	measure of arc of central angle is equal to measure of angle
4. $\overline{AD}$ IS TANGENT TO CIRCLE	Given
5. $\overline{AD} \perp \overline{CD}$	DEFINITION OF TANGENT LINE
6. $m\angle ADC = 90°$	DEFINITION OF PERPENDICULAR LINE
7. $\angle A$ = 30	SUM OF TRIANGLE ANGLES = 180
8. $m\angle BED = m\angle CAD$	$\angle BED = \frac{1}{2}\overset{\frown}{BD}$ = 30

2. Find the value of x.

A. 38° B. 42° C. 71° D. 142°

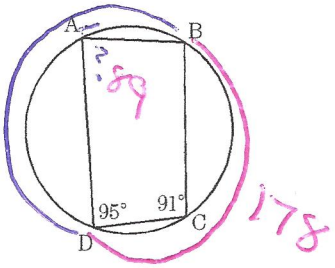


180 - 42 = 38

since x subtends the same arc, both angles are equal

3. What is the measure, in degrees, of $\angle A$?

A. 85 B. 89 C. 95 D. 99



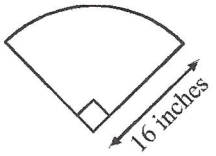
arc $\overset{\frown}{DAB}$ = 2∠C

360 - 182 = 178

4. A decorative window is in the shape of a quarter circle. What is the approximate area of the pane of glass in the window? [$\pi \approx 3.14$]

A. 75 in^2 B. 100 in^2 C. 200 in^2 D. 250 in^2

$\frac{90}{360}\pi(16)^2 = 200.96$



5. In the diagram, $m\angle C = 55$, $m\overset{\frown}{BD} = 70$, $\overline{DE} \cong \overline{BA}$ and the radius of the circle is 12 cm. What is the arc length of $\overset{\frown}{DE}$ to the nearest hundredth of a centimeter?

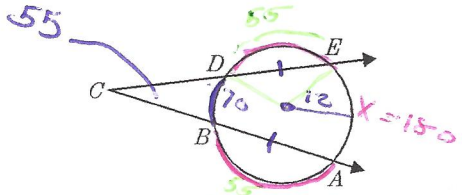
A. 11.42 cm B. 11.52 cm C. 12.64 cm D. 13.12 cm

$55 = \frac{1}{2}(x - 70)$

$110 = x - 70$

$180 = x$

$\frac{55}{360}\pi 24 = 11.52$



$180 + 70 = 250$

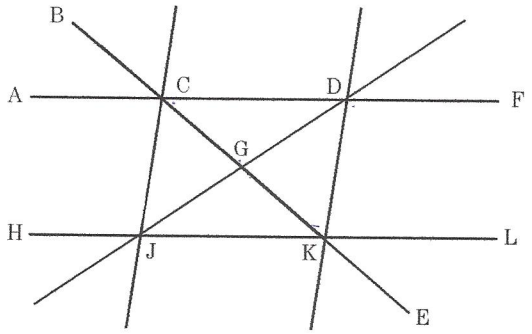
$360 - 250 = \frac{110}{2} = 55$

6. Which of the following statements is *not* true?

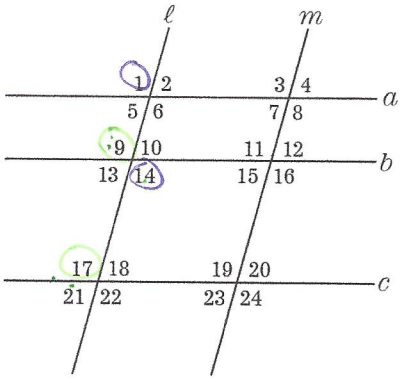
A. $m\angle DGC \cong m\angle JGK$ B. $m\angle BCA \cong m\angle DCG$

C. $m\angle CGJ \cong m\angle DGK$ D. $m\angle CJG \cong m\angle GJK$

A, B & C are all vertical angles



7.



Given the diagram above, if $m\angle 1 = m\angle 14$ and $m\angle 9 = m\angle 17$, which of the following is true?

A. line l and line m are parallel

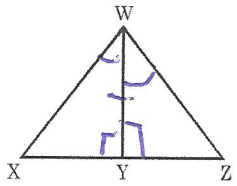
B. line l and line a are perpendicular

C. line l and line b are perpendicular

D. line a, line b, and line c are parallel

8. Given: $\overline{WY}$ is the angle bisector of $\angle XWZ$
$m\angle XYW = m\angle ZYW$

Prove: $\triangle WXY \cong \triangle WZY$



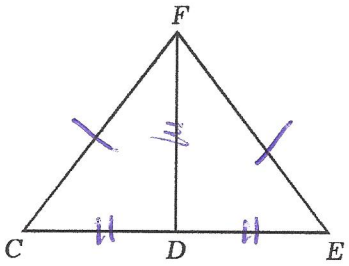
Statement	Reason
$\overline{WY}$ is the bisector of $\angle XWZ$	(1)
$m\angle XWY = m\angle ZWY$	(2)
$WY = WY$	(3)
$m\angle XYW = m\angle ZYW$	(4)
$\triangle WXY \cong \triangle WZY$	(5)

In the above proof, what is reason (5)?

A. AAS B. ASA C. SAS D. SSS

9. Given: $CF = EF$
$\overline{FD}$ is a median of $\triangle CFE$

Prove: $\overline{FD}$ bisects $\angle CFE$



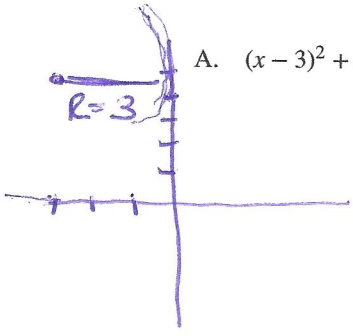
statement	reason
$\overline{FD}$ is a median of $\triangle CFE$	(1)
$CD = ED$	(2)
(3)	given
(4)	(5)
$\triangle CFD \cong \triangle EFD$	(6)
(7)	(8)
$\overline{FD}$ bisects $\angle CFE$	(9)

In the above proof, what is reason (6)?

A. CPCTC B. SAS

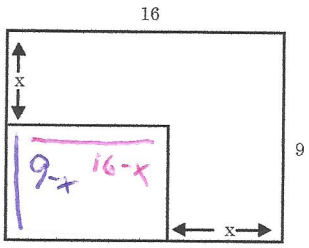
C. SSS D. angles opposite equal sides are congruent

10. Write the equation of the circle that is tangent to the y-axis. Its center is at $(-3, 5)$.



A. $(x-3)^2 + (y+5)^2 = 9$ B. $(x+3)^2 + (y-5)^2 = 9$ C. $(x+3)^2 + (y-5)^2 = 3$ D. $(x-3)^2 + (y-5)^2 = 9$

11. Given the information in the diagram, do the rectangles have to be similar?



$\frac{9-x}{9} = \frac{16-x}{16}$

$16(9-x) = 9(16-x)$

$144 - 16x = 144 - 9x$

$-16x = -9x$

never true

A. Yes. The length and width of the outer rectangle is x times the size of the inner rectangle.

B. Yes. All rectangles are similar.

C. No. $\frac{9}{16}$ does not necessarily equal x.

D. No. There is no value for x that would make the rectangles similar.

12. If two right triangles each have a 30° angle, then the triangles must be—

A. similar

B. congruent

C. obtuse

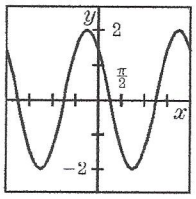
D. equilateral

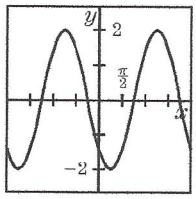
Trigonometry Practice Problems

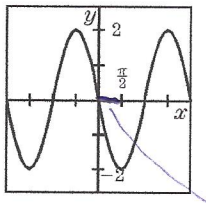
Name: _____ **Date:** _____

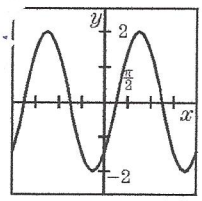
1. Which of the graphs shown is the graph of $y = -2\cos\left(x - \frac{\pi}{2}\right)$?

cos usually stats at a max but this function has been flipped

A. 

B. 

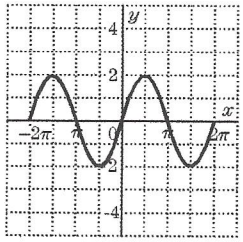
C. 

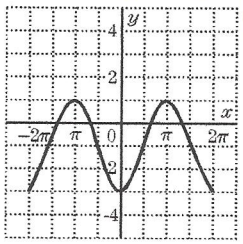
D. 

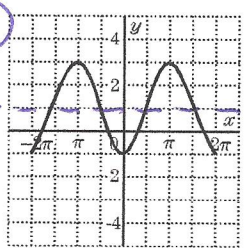
phase shift right $\frac{\pi}{2}$

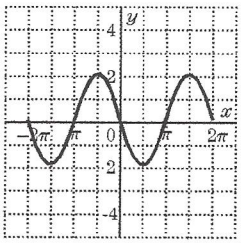
2. The graph of the function $y = -2\cos x + 1$ where $-2\pi \le x \le 2\pi$ is best pictured as:

midline

A. 

B. 

C. 

D. 

3. The maximum value of $3\cos 2x$ is:

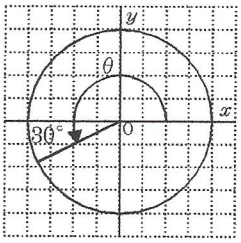
↳ amplitude ± vertical shift tells you max/min

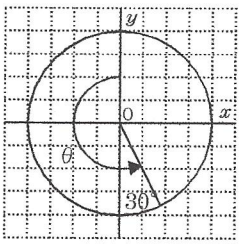
A. 1 B. 2π C. 3 D. 6

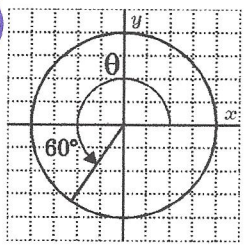
4. Express in degrees an angle of $\frac{2\pi}{15}$ radians. $\frac{2\pi}{15} \cdot \frac{180}{\pi} = 24$

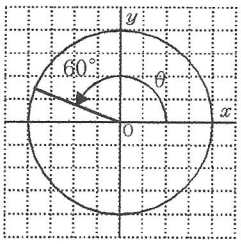
A. 24° B. 12° C. 18° D. 30°

5. Which graph shows the angle $\theta = 240°$ in standard position?

A. 

B. 

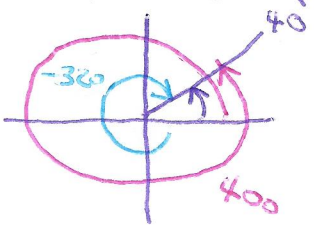
C. 

D. 

180+60=
240

6. Which of the following are coterminal with 40°?

−40°, 140°, −320°, 300°, 400°, 760°



2 rotations + another 40

7. What is the period of the graph which represents the function $y = 3\cos\frac{1}{2}x$?

$P = \frac{2\pi}{b} \Rightarrow \frac{2\pi}{\frac{1}{2}} = 4\pi$

A. π B. 2π C. $\frac{\pi}{2}$ D. 4π

8. Find the phase shift and period for the function $y = 2\sin 3\left(x - \frac{\pi}{2}\right) + 1$.

$PS = +\frac{\pi}{2}$ $P = \frac{2\pi}{3}$

A. phase shift: $\frac{\pi}{2}$; period: $\frac{2\pi}{3}$ B. phase shift: $-\frac{\pi}{2}$; period: $\frac{2\pi}{3}$

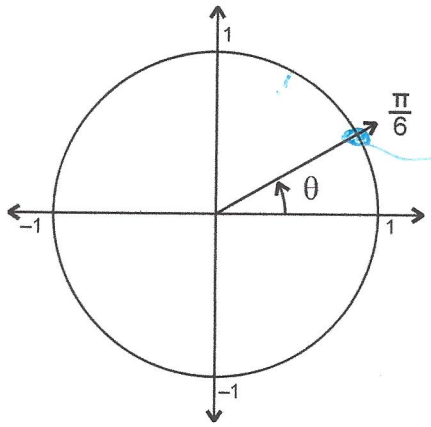
C. phase shift: $-\frac{\pi}{2}$; period: $-\frac{2\pi}{3}$ D. phase shift: $\frac{\pi}{3}$; period: 3

9. Simplify: $\frac{\sqrt{\sec^2 x - 1}}{\sqrt{\csc^2 x - 1}}$ $= \frac{\tan^2\theta}{\cot^2} = \frac{\frac{\sin^2\theta}{\cos^2\theta}}{\frac{\cos^2\theta}{\sin^2\theta}} = \frac{\sin^2\theta}{\cos^2\theta} \cdot \frac{\sin^2\theta}{\cos^2\theta} = \frac{\sin^4\theta}{\cos^4\theta} = \tan^4\theta$

A. $\sin^2 x$ B. $\tan^2 x$ C. $\tan^4 x$ D. $\cot^4 x$

$\tan^2\theta + 1 = \sec^2\theta$ & $1 + \cot^2\theta = \csc^2\theta$

10. In the diagram of the unit circle, what is $\cos\theta$?



$(\frac{\sqrt{3}}{2}, \frac{1}{2})$ $\cos\theta = x$

A. $\frac{\sqrt{2}}{2}$ B. $\frac{1}{2}$ C. $\frac{\sqrt{3}}{3}$ D. $\frac{\sqrt{3}}{2}$

11. Find the numerical value of $\tan\frac{\pi}{3}$.

$\frac{\pi}{3}$ coordinates are $(\frac{1}{2}, \frac{\sqrt{3}}{2})$ so $\tan = \frac{y}{x} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$

12. Determine the period of the function:

$y = \frac{1}{2}\sin\left(\frac{x}{3} - \pi\right)$ ← b

A. $\frac{2\pi}{3}$ B. π C. 6π D. 9π

$b = 1$ $P = \frac{2\pi}{1} = 2\pi$