Honors Math II review final part 2 Name Key

1) The company Sea Esta has ten members on its board of directors. In how many different ways can it elect a president, vice president, secretary and treasurer? order matters - permutation

$_{10}P_4 = 5040$

2) In the Long Beach Air Race six planes are entered and there are no ties, in how many ways can the first three finishers come in? order matters

$_6P_3 = 120$ or $\underset{1st}{6} \cdot \underset{2nd}{5} \cdot \underset{3rd}{4} = 120$

3) A four person committee is to be elected from an organization's membership of 11 people. How many different committees are possible? order doesn't matter

$_{11}C_4 = 330$

4) There are 12 standbys who hope to get on your flight to Hawaii, but only 6 seats are available on the plane. How many different ways can the 6 people be selected?

order doesn't matter ← if it had said seated then order would matter

$_{12}C_6 = 924$

5) The model car you are thinking of buying is available in nine different colors and three different styles. In how many ways can you order the car?

$\underset{color}{9} \cdot \underset{style}{3} = 27$

6) A book club offers a choice of 8 books from a list of 40. In how many ways can a member make a collection? order doesn't matter

$_{40}C_8 = 76{,}904{,}685$

7) Suppose you find seven articles related to the topic of your research paper. In how many ways can you choose 5 articles to read? order doesn't matter

$_7C_5 = 21$

Convert each radian measure into degrees.

8) $-\frac{7\pi}{6}\left(\frac{180^\circ}{\pi}\right) = -210^\circ$ 9) $\frac{5\pi}{4}\left(\frac{180^\circ}{\pi}\right) = 225^\circ$ 10) $\frac{4\pi}{3}\left(\frac{180^\circ}{\pi}\right) = 240^\circ$ 11) $-\frac{11\pi}{6}\left(\frac{180^\circ}{\pi}\right) = -330^\circ$

Convert each degree measure into radians.

12) $-210^\circ\left(\frac{\pi}{180^\circ}\right) = \frac{-7\pi}{6}$ 13) $205^\circ\left(\frac{\pi}{180^\circ}\right) = \frac{41\pi}{36}$ 14) $-180^\circ\left(\frac{\pi}{180^\circ}\right) = -\pi$ 15) $40^\circ\left(\frac{\pi}{180^\circ}\right) = \frac{2\pi}{9}$

Find a positive and a negative coterminal angle for each given angle.

16) 120° $+360^\circ$ -360°

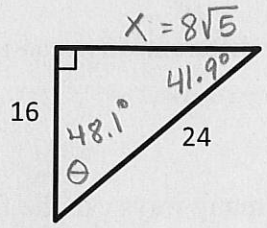
$480^\circ, -240^\circ$

17) $\frac{17\pi}{9}\left(\frac{180^\circ}{\pi}\right) = 340^\circ$

$700^\circ, -20^\circ$

Solve the given triangles for all sides and all angles.

18)



$\cos\theta = \frac{16}{24}$

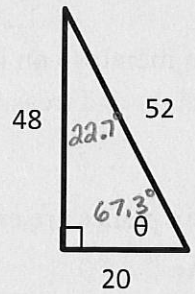
$\cos^{-1}\left(\frac{16}{24}\right) = \theta$

$\theta = 48.1°$

$x^2 + 16^2 = 24^2$

$x = \sqrt{320} = 8\sqrt{5}$

19)



$\sin\theta = \frac{48}{52}$

$\sin^{-1}\left(\frac{48}{52}\right) = \theta$

$\theta = 67.3°$

Find the zeros and vertical asymptotes.

Zeros are found by setting numerator $= 0$
vertical asymptotes are found by setting denominator $= 0$

20) $g(x) = \frac{x^2-1}{x+4}$

$x^2 - 1 = 0$

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

$x = -1, 1$

Zeros $(-1,0)$ $(1,0)$

V.A. $x = -4$

$x + 4 = 0$

$x = -4$

21) $g(x) = \frac{x^2-3x-10}{3x^2-10x-8}$

$x^2 - 3x - 10 = 0$

$(x-5)(x+2) = 0$

$x = 5, -2$

$3x^2 - 10x - 8$

$(3x+2)(x-4) = 0$

$x = -\frac{2}{3}$ $x = 4$

Zeros

$(5,0)$

$(-2,0)$

VA

$x = -\frac{2}{3}, 4$

Simplify

21) $\frac{\cancel{80x^4}^{\,16x^2}}{\cancel{y^3}\,y^2} \cdot \frac{xy}{\cancel{5x^2}} = \frac{16x^2 \cdot x}{y^2} = \frac{16x^3}{y^2}$

22) $\frac{x-3}{2x-8} \div \frac{x^2-9}{6x^2-96}$

$\frac{(x-3)}{2(x-4)} \cdot \frac{6(x^2-16)}{(x^2-9)} = \frac{(x-3)}{\cancel{2}(x-4)} \cdot \frac{\cancel{6}^{\,3}(x+4)(x-4)}{(x+3)(x-3)}$

$\frac{3(x+4)}{x+3}$

23) $\frac{5x}{x+8} + \frac{4x-9}{x^2+5x-24}$

$(x-3)$ $(x-3)$ $(x+8)(x-3)$

$5x^2 - 15x + 4x - 9$

$\frac{5x^2 - 15x + 4x - 9}{(x+8)(x-3)} = \frac{5x^2 - 11x - 9}{(x+8)(x-3)}$

24) $\frac{2x-3}{(x+3)^2} \cdot \frac{x^2+4x+3}{4x^2-9} = \frac{(2x-3)}{(x+3)(x+3)} \cdot \frac{(x+3)(x+1)}{(2x-3)(2x+3)}$

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

25) $\frac{3x+4}{x^2-16} + \frac{-2(x+4)}{x-4(x+4)}$

$(x+4)(x-4)$

$\frac{3x+4-2x-8}{(x+4)(x-4)} = \frac{(x-4)}{(x+4)(x-4)}$

$\boxed{\frac{1}{x+4}}$

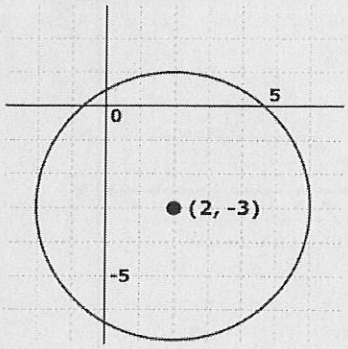
26) $\frac{(x+6)(2x+1)}{(x+6)\,6} + \frac{-4\,(6)}{(x+6)(6)} = \frac{2x^2 + x + 12x + 6 - 24}{6(x+6)}$

$\frac{2x^2 + 13x - 18}{6(x+6)}$

Tell whether the relation is a function and name it.

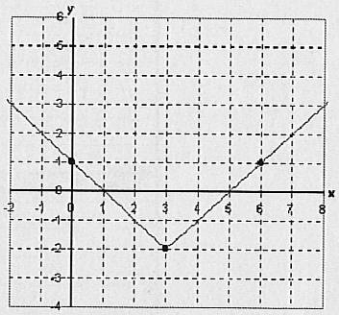
* If it is a function it will pass the vertical line test
* x-values can't repeat

27)



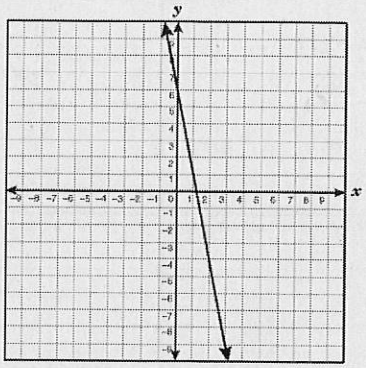
NO; circle

28)



yes; absolute value

29)



yes; line

State whether the following relations are a function.

30) $y = 2|x-3| + 6$ yes

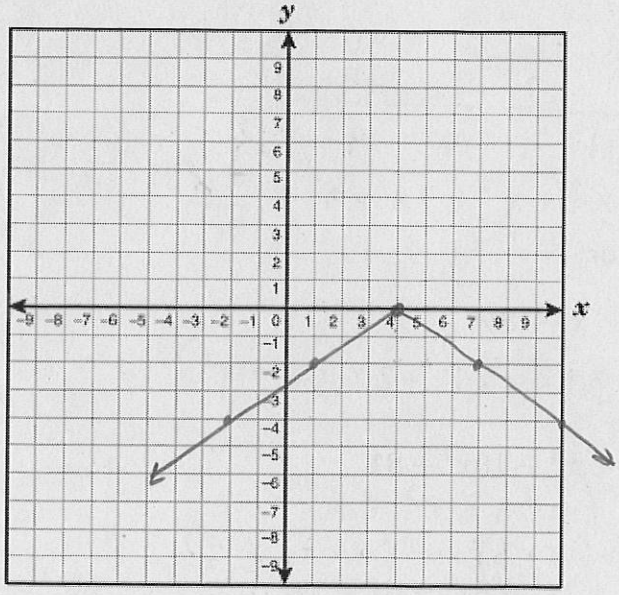
31) $2x - 4y = 16$ yes

32) $x = -3(y+2)^2 - 4$ NO

33) $(x-2)^2 + (y+2)^2 = 25$ NO

Graph the following equations and state the domain and range.

34) $y = -\frac{2}{3}|x-4|$ V: (4, 0)



D: all Reals $(-\infty, \infty)$

R: $y \le 0$ $(-\infty, 0]$

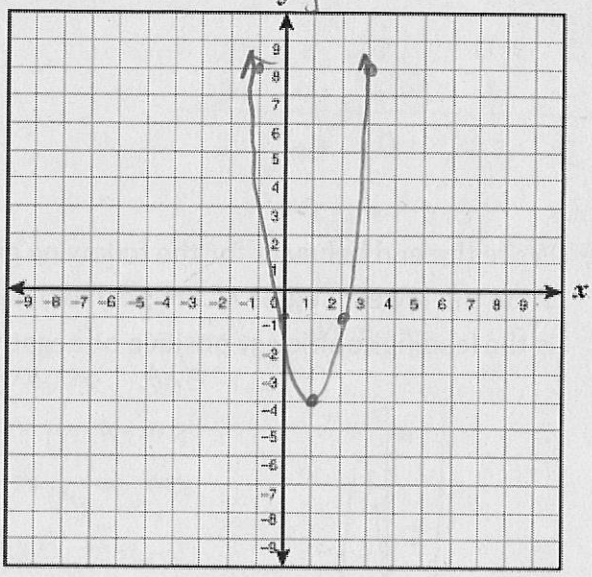
35) $y = 3x^2 - 6x - 1$

$x = \frac{6}{2(3)} = 1$

$y = 3(1)^2 - 6(1) - 1$

$y = 3 - 6 - 1 = -4$

V: (1, -4)

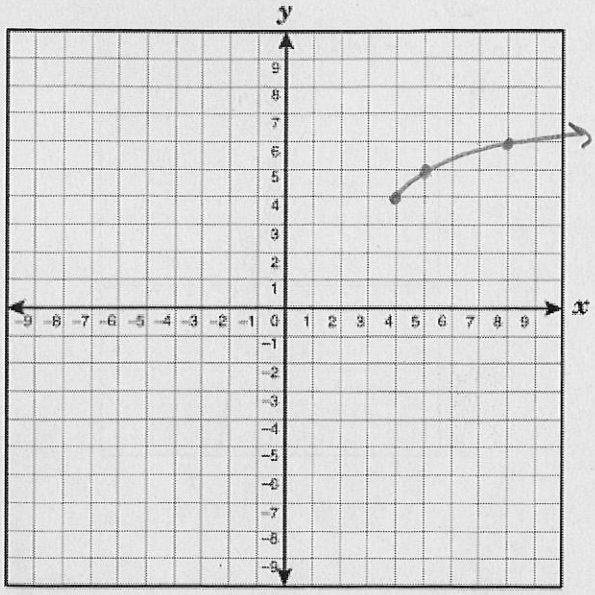


Domain: $\mathbb{R}$ $(-\infty, \infty)$

Range: $y \ge -4$ $[-4, \infty)$

36) $y = \sqrt{x-4} + 4$

Start $(4,4)$

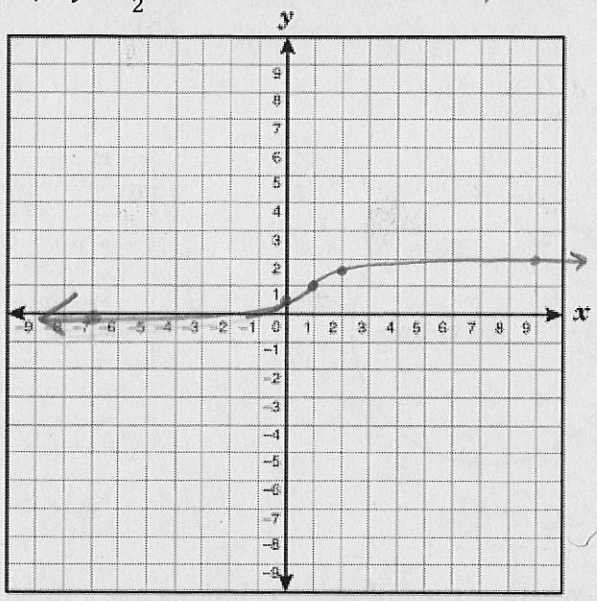


Domain: $x \geq 4$ $[4, \infty)$

Range: $y \geq 4$ $[4, \infty)$

37) $y = \frac{1}{2}\sqrt[3]{x-1} + 1$

center $(1,1)$



D: $\mathbb{R}$ $(-\infty, \infty)$

R: $\mathbb{R}$ $(-\infty, \infty)$

Given: $z = 4 - i$ $w = 1 - 6i$

Find:

38) $-z$

$-4+i$

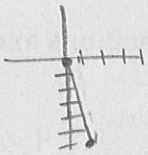
39) $\overline{z}$

conjugate

$4+i$

40) $|w|$

absolute value is distance from origin



$\sqrt{1^2+6^2} = |w|$

$\sqrt{37} = |w|$

Divide using synthetic division.

41) $2x^4 - 11x^3 + 15x^2 + 6x - 18 \div x - 3$

3	2	-11	15	6	-18
		6	-15	0	18
	2	-5	0	6	0

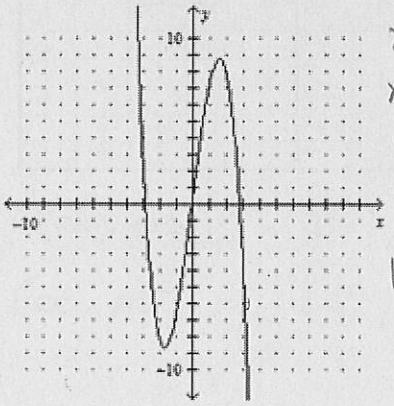
$2x^3 - 5x^2 + 6x$

42) $x^4 - 6x^3 - 40x + 33 \div x - 7$

7	1	-6	0	-40	33
		7	7	49	63
	1	1	7	9	96

$x^3 + x^2 + 7x + 9 + \frac{96}{x-7}$

43) Write the end behavior for the following graph?
State the lowest degree of the polynomial.
Is the leading coefficient positive or negative.



End behavior

$x \to -\infty$ $y \to \infty$

$x \to \infty$ $y \to -\infty$

lowest degree is 3

leading coefficient is negative

Factor

44) $x^3 + 8y^3$

$(x+2y)(x^2 - 2xy + 4y^2)$

45) $x^4 - 18x^2 + 81$

$(x^2-9)(x^2-9)$

$(x+3)(x-3)(x+3)(x-3)$

46) $2x^3 - 5x^2 + 6x - 15$

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

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

47) $10x^2 - 3x - 27$

$(5x - 9)(2x + 3)$