P-test #1

1. Simplify the following:

a. $\dfrac{b^{p+3q}}{b^{q}\cdot b^{2q}}$ (Write with a single base of b)

b. $5^{-2} + 7^{-2}$

c. $\sqrt[3]{\sqrt{x}\cdot\sqrt[4]{x}}$ (use rational exponents to simplify)

2. Factor the following completely:

a. $150x^2 + 290x + 120$

b. $12x^2 - 6y - 9x + 8xy$

c. $4(x - b)^4 - 36(x - b)^2$

d. $4a^3x^2 - 9a^3y^2 - 4b^3x^2 + 9b^3y^2$

3. Simplify: $|2x + 3| + |x - 4|$ given that $0 < x < 2$.

4. Rationalize the denominator: $\dfrac{\sqrt{x}-2\sqrt{y}}{\sqrt{x}+2\sqrt{y}}$

5. Solve the following equations for x:

a. $\dfrac{1}{x-3}+\dfrac{x}{x+4}=\dfrac{5x-8}{x^2+x-12}$

b. Solve for x: $y = \dfrac{2x+3}{3x-1}$

c. $\dfrac{x+2p}{2q-x}+\dfrac{x-2p}{2q+x}-\dfrac{4pq}{4q^2-x^2}=0$

6. Simplify: $\dfrac{\dfrac{3xy}{x-y}+\dfrac{2xy}{x+y}}{\dfrac{xy}{x^2-y^2}}$

7. a. Find the distance between the two points: $\left(2\frac{1}{2},3\right)$ and (5, 7)

b. Find the midpoint of (1, 4) and (a, a^2)

8. Find the x and y intercepts for the equation $y = 2x^2 - 5x - 7$

P-test #2

1. Determine the equation of the line with x – intercept (2, 0) and y – intercept $\left(0,\frac{4}{3}\right)$

2. Find the center and radius of the following:
$x^2 + y^2 - 5x + 6y = \dfrac{3}{4}$

3. Solve the following for x and write answer in interval notation: $\left|\dfrac{3x-2}{4}\right| < 3$

4. Find the quadratic of the form $x^2 + bx + c = 0$ given the roots of the quadratic are $\dfrac{-1\pm\sqrt{3}}{2}$

5. Solve for x: a. $(x - 5)(x - 3) = -1$

b. $x=\sqrt{3x+7}-3$

c. $x^{\frac{4}{3}}-5x^{\frac{2}{3}}+4=0$

6. Determine all real values of k such that the equation $2x^2 - 3x + k = 0$ has 2 distinct real solutions. Write the answer in interval notation.

7. a.. Solve for x and write the solutions in interval notation: $y^3 - 3y^2 - 4y + 12 \geq 0$

b. $\dfrac{2x+1}{x-1}-\dfrac{2}{x-3}\leq 1$ (Be careful with the algebra)

P-Test #3

1. Determine the domain for the following: f(x) = $\sqrt{x^2+5x-6}$

_____

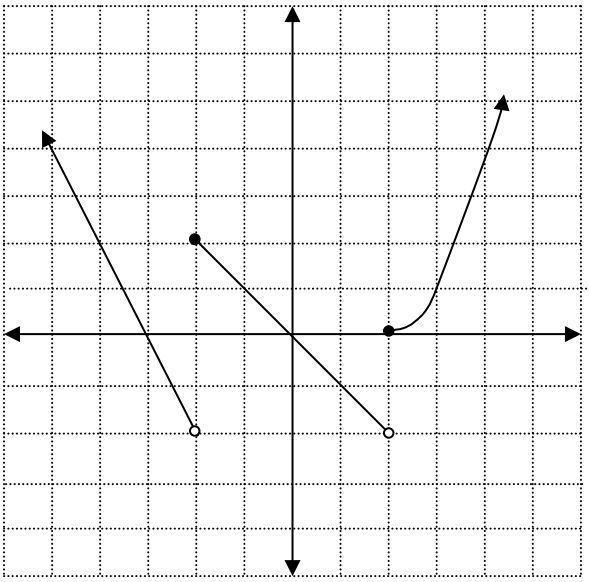
2. If f(x) = $\frac{x+3}{x-2}$, find a) f(x – 3) and b) The value of x which makes f(x) = 6

a)_____
b)_____

3. For f(x) = $x+\frac{3}{x}$, find $\frac{f(x+h)-f(x)}{h}$ and simplify the expression completely.

_____

4. For h(x) = $\begin{cases} -2x-6 & for \quad x<-2 \\ -x & for \quad -2\le x<2 \\ (x-2)^2 & for \quad x\ge 2 \end{cases}$



a. Give $h(5)$

b. Give $(h\circ h\circ h)\left(-\frac{9}{2}\right)$

c. Give the range of this function

h(5) =_____

h(h(h(9/2))) =_____

Range =_____

5. For f(x) = $\frac{1}{x+2}$ and g(x) = $\frac{1}{2x+3}$, find (g ◦ f)(x) and give (g ◦ f)(x)'s domain.

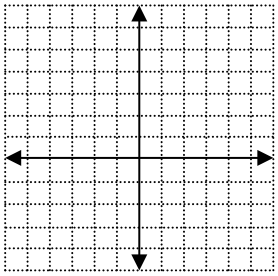
6. Find the slope of the line going through the points (x, x^2 + 3x) and (a, ax + 3a)

7. Find the inverse function for $f(x)=\frac{2x-5}{x+4}$

8. Find the vertex; determine if it is a max. or min. point, find the axis of symmetry and the intercepts of the following equation, then graph:

$y=-2(x-3)^2+3$

You get a bigger one than this →

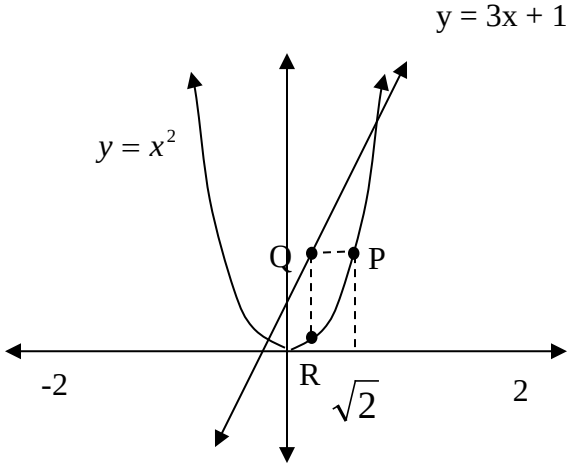


vertex_____
(circle one) Max Min.
axis of symmetry_____
x-intercepts_____
y-intercepts_____

9. Find the vertex, determine if it is a max. or min. point, find the axis of symmetry and the intercepts of the following:

$y = \frac{2}{3}x^2 + 4 \cdot x$

10. Determine the exact coordinates of the points P, Q and R.
Assume each dashed line is parallel to one of the coordinate axes.



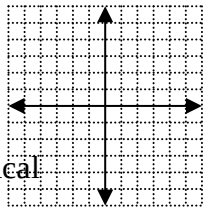
P _____

Q _____

R _____

P-Test #4

1. Graph the following equation:
$y = -x^3(x - 1)(x + 2)^2$ (the graph is from -6 to +6 for both axies)
Be accurate.



2. Sketch the graph of the function: $y = \frac{x^2 - 4}{x^2 - x}$. Be sure to clearly show the following: all vertical asymptotes, horizontal asymptotes, x intercepts, and any point where the graph of the function crosses its horizontal asymptote.

4. For $y = 3^{x+1} + 1$, Give the Domain, Range, intercepts, asymptotes.

5. Solve: $3^{1-2y} = \sqrt{3}$

6. For $y = \log_3(x - 2) + 1$, Give the Domain, Range, intercepts, asymptotes.

7. Solve for t: $e^{2t+3} = 10$

8. Rewrite: $\ln\frac{(x+2)^2}{\sqrt[4]{x}(x-2)^3}$ as the sum of logarithms with no products, quotients of powers.

9. Solve: $\log_3 108 + \log_3(3/4)$

10. Evaluate the expressions in terms of A, B, and C given that:

$\log_b 2 = A$ **$\log_b 3 = B$** **$\log_b 5 = C$**

a. $\log_b\left(\frac{15}{8}\right)$

b. $\log_{2b} 10$ (Hint: use the change of base formula: $\log_a x = \frac{\log_c x}{\log_c a}$)

11. Solve for x:

a. $e^{2x} - 2e^x - 3 = 0$

b. $\log(x + 3) + \log(x - 6) = 1$

c. $2^{5x} = 3^x (5^{x+3})$

P-Test #5

1. Compute the following:

a. $(3 + 4i)(5 - 3i)$

b. $\dfrac{2+3i}{3-4i}$

c. $(4 - i)(4 + i)$

d. i^{51}

2. Determine the multiplicity of the polynomial $f(x) = x^4 - x^3 - 9x^2 + 16x - 4$ given that $(x - 2)$ is a factor of f(x).

3. Find the polynomial with the following characteristics:

a. Degree 3: roots $3 + 4i, -2$

b. Degree 3: roots: 2, –2, 3, then find a_n for that polynomial given the graph passes through the point (1, 3).
General polynomial: _____ a_n = _____

4. Find all the roots of $x^3 - 8x^2 + 6x + 52$ given that $5 + i$ is a root.

5. Find the cubic polynomial with integer coefficients and roots $-2, \frac{1}{3}, -\frac{4}{3}$. The leading coefficient should be as small as possible.

6. Find all solutions for the system of equations:

a. $\dfrac{2}{x^2} + \dfrac{3}{y^2} = 11 \qquad \dfrac{-4}{x^2} + \dfrac{1}{y^2} = -15$

b. $y = -\sqrt{x}$
$(x - 3)^2 + y^2 = 4$

7. Give the first 4 terms of: $a_n = (-1)^n(2n - 1)$

8. Give the first 5 terms of: $b_1 = 2, \quad b_n = \sqrt{b^2{}_{n-1} + 3}$

9. Find the sum: $\sum_{k=1}^{4} k(k + 2)$

10. Find the common difference in an arithmetic sequence in which $a_{15} - a_7 = -1$

11. Find the sum for: $\sum_{n=1}^{100}(2n - 1)$

12. Determine the sum of the infinite geometric series: $\sum_{1}^{\infty} \frac{9}{10}$

P-Test #6

Section	Problems
11.1	see Homework
11.2	see Homework
13.6	see Homework

Check answers in the back of the book.

Answers: **P-test #1**

1a. b^p

1b. $\frac{74}{1225}$

1c. $x^{1/4}$

2a. $10(3x + 4)(5x + 3)$

2b. $(4x – 3)(3x + 2y)$

2c. $4(x – b)^2(x – b + 3)(x – b – 3)$

2d. $(2x + 3y)(2x – 3y)(a – b)(a^2 + ab + b^2)$

3. $x + 7$

4. $\frac{x-4\sqrt{xy}+4y}{x-4y}$

5a. 4

5b. $x = \frac{y+3}{3y-2}$

5c. $\frac{pq}{p+q}$

6. $5x+y$

7a. $\frac{\sqrt{89}}{2}$

7b. $\left(\frac{a-1}{2}, \frac{a^2-4}{2}\right)$

8. y-intercept: (0, -7)
x-intercepts: (1, 0), (7/3, 0)

Answers P-test #2

1. $y = -\frac{2}{3}x + \frac{4}{5}$

2. Center: $\left(\frac{5}{2}, -3\right)$

Radius: 4

3. $\left(-\frac{10}{3}, \frac{5}{3}\right)$

4. $x^2 + x – 1/2 = 0$

5. a. 4

b. – 2 , – 1

c. ±1, ±8

6. $\left(-\infty, \frac{9}{8}\right)$

7. a. [- 2, 2] U [3, ∞)

b. [-1, 1) U (3, 4]

Answers: P-test #3

1. (-∞, -6] U [1, ∞)

2a. $\frac{x}{x-5}$

2b. 3

3. $\frac{x(x+h)+3}{x(x+h)}$ *or* $\frac{x^2+xh+3}{x(x+h)}$ *or* $1+\frac{3}{x(x+h)}$

4a. 9

4b. – 1

4c. $(-2, \infty)$

5. $(g \circ f)(x) = \frac{x+2}{3x+8}$

Domain of $(g \circ f)(x)$: $\mathbb{R}$, $x \neq -\frac{8}{3}$ or –2

6. x + 3

7. $f^{-1}(x) = \frac{-4x-5}{x-2}$

8. vertex: (3, 3) (circle one) (Max) Min. axis of symmetry: x = 3

x-intercepts: $\left\{-3 \pm \frac{\sqrt{6}}{2}\right\}$ y-intercept: -15

(Graph using all these points)(Hint: it looks like a parabola)

9. vertex: (–3, –6) (circle one) Max (Min.) axis of symmetry: x = –3

x-intercepts: {0, –6} y-intercepts: (0, 0)

10. P = $(\sqrt{2}, 2)$

Q = $\left(\frac{1}{3}, 2\right)$

R = $\left(\frac{1}{3}, \frac{1}{9}\right)$

Answers: P-test #4

1. **Will graph in class**

2. vertical asymptotes: x = 0 and x = 1 horizontal asymptote: y = 1 x-intercepts: (0 , 0)

point where the graph of the function crosses its horizontal asymptote x = 4

Will graph in class

3. $f(x) = \frac{2x^2-6x}{(x-2)(x+3)}$

4. Domain: $\mathbb{R}$ Range: $(1, \infty)$ y – intercept: (0, 4) x – intercept: $\emptyset$ Asymptote(s): y = 1

Will graph in class

5. 1/4

6. Domain: $(2, \infty)$ Range; $\mathbb{R}$ y – intercept: $\emptyset$ x – intercept: $\left(\frac{7}{3}, 0\right)$ Asymptote(s): x = 2

Will graph in class

7. $\frac{\ln 10-3}{2}$

8. $2\ln(x+2) - \frac{1}{4}\ln(x-3) - 3\ln(x-2)$

9. 4

10a. B + C – 3A

10b. $\frac{A+C}{A+1}$

11a. ln3

11b. 7

11c. $\frac{3ln5}{5ln2-ln3+ln5}$

Answers: P-test #5

1a. $27+11i$

1b. $-\frac{6}{25}+\frac{17}{25}i$

1c. 17

1d. $-i$

2. 2

3a. $x^3 - 4x^2 + 13x + 50$

3b. $\frac{1}{2}x^3 - \frac{3}{2}x^2 - 2x + 12$

$a_n = \frac{1}{2}$

4. $5 \pm 1, -2$

5. $9x^3 - 9x^2 - 22x + 8$

6a. $\left(\frac{1}{2}, 1\right)\ \left(\frac{1}{2}, -1\right)\ \left(-\frac{1}{2}, 1\right)\ \left(-\frac{1}{2}, -1\right)$

6b. $\left(\frac{5+\sqrt{5}}{2}, -\sqrt{\frac{5+\sqrt{5}}{2}}\right)\ \left(\frac{5-\sqrt{5}}{2}, -\sqrt{\frac{5-\sqrt{5}}{2}}\right)$

7. –1, 3, –5, 7

8. $2, \sqrt{7}, \sqrt{10}, \sqrt{13}, \sqrt{16}$

9. 50

10. $-\frac{1}{8}$

11. 10,000

12. 10