Review 3A

Math 110 The learning center is open for help.

1. Use long division to write $\dfrac{6x^3 - x^2 - 3x + 6}{2x - 1}$ as $Q(x) + \dfrac{R}{D(x)}$.
2. Use the remainder theorem and synthetic division to find $P(2)$ when $P(x) = 3x^5 - 6x^4 + 10x^3 - 16x^2 - 10x + 5$.
3. Use the factor theorem to determine if $x + 8$ is a factor of $P(x) = x^6 + 8x^5 - 6x^4 - 48x^3 + x^2 + 2x - 40$.
4. Find and expand a polynomial of lowest degree with real coefficients and zeros $x = -1$, $x = \sqrt{2}$ and $x = -\sqrt{2}$.
5. Find a polynomial $P(x)$ with zeros $x = 1 \pm \sqrt{2}$ and with $P(1) = 6$.
6. Use the rational zero theorem and synthetic division to find all roots of the equation $x^3 + 3x^2 + 3x + 1 = 0$.
7. Use the rational zero theorem, factor theorem and synthetic division to completely factor $P(x) = x^4 - 2x^3 - 3x^2 + 8x - 4$.
8. Use the factor theorem to factor $3x^2 - x - 5$ into linear factors.
9. What is the equation of the circle with radius 5 whose center is $(3, -4)$?
10. What is the center and radius for the circle with equation $x^2 + y^2 - 2x + 10y + 18 = 0$?
11. Find the x- and y-intercepts for the functions $f(x) = \dfrac{2x^2 - 2}{x^2 + 4x + 4}$ and $g(x) = \dfrac{2x^2 - x - 1}{x^2 + 3x + 2}$.
12. Find the vertical and horizontal asymptotes for the functions $f(x) = \dfrac{2x^2 - 2}{x^2 + 4x + 4}$ and $g(x) = \dfrac{2x^2 - x - 1}{x^2 + 3x + 2}$.
13. Use the information from the last two problems to graph the functions $f(x) = \dfrac{2x^2 - 2}{x^2 + 4x + 4}$ and $g(x) = \dfrac{2x^2 - x - 1}{x^2 + 3x + 2}$.

Answers to problems above: 1. $3x^2 + x - 1 + \frac{5}{2x-1}$ 2. $P(2) = 1$ 3. $x + 8$ is not a factor of $P(x)$ since the remainder is 8. 4. $x^3 + x^2 - 2x - 2$ 5. $P(x) = -3x^2 + 6x - 3$ 6. $x = -1$ with multiplicity 3 7. $P(x) = (x-1)^2(x-2)(x+2)$ 8. $3\left(x - \frac{1-\sqrt{61}}{6}\right)\left(x - \frac{1+\sqrt{61}}{6}\right)$ 9. $(x-3)^2 + (y+4)^2 = 25$ 10. center: $(1, -5)$, radius: $2\sqrt{2}$ 11. for f: x-intercepts are $(-1, 0)$ and $(1, 0)$ and the y-intercept is $(0, -\frac{1}{2})$, for g: x-intercepts are $(1, 0)$ and $(-\frac{1}{2}, 0)$ and the y-intercept is $(0, -\frac{1}{2})$ 12. for f: the vertical asymptote is $x = -2$ and the horizontal asymptote is $y = 2$, for g: the vertical asymptotes are $x = -1$ and $x = -2$ and the horizontal asymptote is $y = 2$ 13. (I can do the graphs in class –pv)

Review 3B

Math 110 The learning center is open for help.

1. Use long division to write $\dfrac{5x^3+4x^2-2}{x+1}$ as $Q(x)+\dfrac{R}{D(x)}$.
2. Use the remainder theorem and synthetic division to find $P(-3)$ when $P(x)=4x^5+10x^4-8x^3+20x+8$.
3. Use the factor theorem to determine if $x-5$ is a factor of $P(x)=4x^5-20x^4-3x^3+16x^2-13x+40$.
4. Find and expand a polynomial of lowest degree with real coefficients and zeros $x=1+2i$ and $x=7$.
5. Find a polynomial $P(x)$ with zeros $x=3\pm 5i$ and with $P(0)=17$.
6. Use the rational zero theorem and synthetic division to find all roots of the equation $2x^3-5x^2+22x-10=0$.
7. Use the rational zero theorem, factor theorem and synthetic division to completely factor $P(x)=x^4+x^3-9x^2+11x-4$.
8. Use the factor theorem to factor $2x^2-x+3$ into linear factors.
9. What is the equation of the circle with radius 1 whose center is $(4,1)$?
10. What is the center and radius for the circle with equation $x^2+y^2+4x-4y=1$?
11. Find the x- and y-intercepts for the functions $f(x)=\dfrac{x^2-2x-3}{2x-1}$ and $g(x)=\dfrac{x-1}{x^2-x-2}$.
12. Find the vertical and horizontal asymptotes for the functions $f(x)=\dfrac{x^2-2x-3}{2x-1}$ and $g(x)=\dfrac{x-1}{x^2-x-2}$.
13. Use the information from the last two problems to graph the functions $f(x)=\dfrac{x^2-2x-3}{2x-1}$ and $g(x)=\dfrac{x-1}{x^2-x-2}$.

Answers to problems above: 1. $5x^2-x+1-\frac{3}{x+1}$ 2. $P(-3)=2$ 3. $x-5$ is a factor of $P(x)$ since the remainder is 0. 4. $x^3+5x^2-9x+35$ 5. $P(x)=\frac{1}{2}x^2-3x+17$ 6. $x=\frac{1}{2}$, $x=1\pm 3i$ 7. $P(x)=(x-1)^3(x+4)$ 8. $2\left(x-\frac{1-i\sqrt{23}}{4}\right)\left(x-\frac{1+i\sqrt{23}}{4}\right)$ 9. $(x-4)^2+(y-1)^2=1$ 10. center: $(-2,2)$, radius: 3 11. for f: x-intercepts are $(-1,0)$ and $(3,0)$ and the y-intercept is $(0,3)$, for g: x-intercept is $(1,0)$ and the y-intercept is $(0,\frac{1}{2})$ 12. for f: the vertical asymptote is $x=\frac{1}{2}$ and there is no horizontal asymptote, for g: the vertical asymptotes are $x=-1$ and $x=2$ and the horizontal asymptote is $y=0$ 13. (I can do the graphs in class –pv)