1. (5 marks) Factor completely $5 x^{3}+5 x^{2} y-30 x y^{2}$.
2. ( 5 marks) Factor completely $8 x^{2}-14 x+5$.
3. (5 marks) Solve the following system using the method of your choice

$$
\begin{aligned}
& 2 x+3 y=-5 \\
& \frac{3}{2} x+2 y=-4
\end{aligned}
$$

4. (5 marks) Find the equation of the line through ( $10 ; 5$ ) and paralle to the line $4 x-2 y=7$.
5. (5 marks) Graph the line with equation $4 x+y=7$.
6. (5 marks) Rationalize the denominator and simplify. $\frac{\sqrt{\overline{5}}}{2+\sqrt{3}}$
7. ( 5 marks) Simplify. Write the final answer with only positive exponents. Assume that all variables represent nonzero real numbers. $\frac{\left(x^{3}\right)^{2}\left(x^{1} y\right)^{2}}{\left(x y^{2}\right)^{2}}$
8. (5 marks) Subtract the polynomial $-9 x^{2}-8 x^{3} y^{2}+2 x y^{5}$ from the polynomial $12 x^{3} y^{2}-3 x y^{5}+12 x^{2}$
9. ( 5 marks) (a) Find a polynomial representing the area of the following rectangle. Expand and simplify the resulting polynomial.

(b) If $x=5$, what are the dimensions of the rectangle and the corresponding area?
(c) Verify that you get the same area by replacing $x$ by 5 in the answer you obtained in (a).
10. ( 5 marks) Solve by factoring $100 x^{2}-81=0$. No marks will be given if the equation is solved by another method.
11. (5 marks) Perform the operations and write the answer in lowest terms. Assume all numerators and denominators are nonzero. $\frac{(2 m+3)(m-4)}{m^{2}+m-20} \div \frac{4 m^{2}-9}{m^{2}+4 m-5}$
12. ( 5 marks) Perform the operations and write the answer in lowest terms. Assume all denominators are nonzero. $\frac{2 x}{x^{2}-16}-\frac{3}{x^{2}+8 x+16}$
13. (5 marks) Simplify and write the answer in lowest terms. Assume all numerators and denominators are nonzero. $\frac{6+\frac{2}{x}}{\frac{3 x+1}{4}}$
14. (5 marks) Simplify the following expression. Assume that all variables represent nonnegative real numbers. $5 \overline{75 m}-4 \overline{27 m}$
15. (5 marks) Simplify. $\left(3^{\sqrt{ }} \overline{5}-4^{\sqrt{ }} \overline{3}\right)\left(2^{\sqrt{ }} \overline{5}+3^{\sqrt{ }} \overline{3}\right)$
16. (5 marks) Find the exact value of $x$ in the following right-angle triangle.

17. (5 marks) Find the vertex and all intercepts of the parabola $y=4 x^{2}-8 x-5$, then graph it.
18. ( 5 marks) Suppose that nine couples live in a village one couple has no child, two have a singlechild, three have two children, two have three children, and the last couple has five children. Regarding the number of children per couple,
(a) What is the mean?
(b) What is the median?
(c) What is the mode?
(d) What is the standard deviation?
19. ( 5 marks) Suppose that it costs $\$ 5000$ to start up a business selling snow cones. Furthermore, it costs $\$ 0.50$ per cone in labor and materials.
a. Express the cost $y$, in dollars, to make $x$ snow cones.
b. If you spend $\$ 6000$, how many snow cones are made?
20. ( 5 marks) Two houses on the same side of the street have house numbers that are consecutive even integers. The sum of the integers is 58 . What are the two house numbers?

A nswers:

1. $5 x(x+3 y)(2-2 y)$
2. $(4 x-5)(2 x-1)$
3. $\{(-4 ; 1)\}$
4. $y=2 x-15$
5. $2^{\sqrt{ }} \overline{5}-\sqrt{ } \overline{15}$
6. $x^{2} y^{6}$
7. $20 x^{3} y^{2}-5 x y^{5}+21 x^{2}$
8. $2 x^{2}+x-6$, length and width are 7 , area is 49.
9. $-\frac{9}{10} ; \frac{9}{10}$
10. $\frac{m-1}{2 m-3}$
11. $\frac{2 x^{2}+5 x+12}{(x-4)(x+4)^{2}}$
12. $\frac{8}{x} \sqrt{ }$
13. $13 \overline{3 m}$
14. $\overline{15}-6$
15. $\frac{\sqrt{ } \overline{4 \overline{1}}-3}{2}$
16. y-intercept $(0 ;-5)$, $x$-intercepts ( $5=2 ; 0$ ) and
( $-1=2 ; 0$ ), vertex ( $1 ;-9$ ).
17. Mean is $19=9$, Median is 2 , Mode is 2, Standard Deviation is approx. 1.45 .
18. $y=5000+0: 5 x, 2000$ snow cones
19. 28 and 30 .
