

Name _____

January 2018 Regents

Review # 5

Due: Wed. 6/3/19

Work must be shown for each question in order to receive credit.

$$\begin{array}{r}
 5x^2 + x - 3 \\
 9. \ 2x-1 \overline{) 10x^3 - 3x^2 - 7x + 3} \\
 \underline{-(10x^3 - 5x^2)} \\
 2x^2 - 7x \\
 \underline{-(2x^2 - x)} \\
 -6x + 3 \\
 \underline{-(-6x + 3)} \\
 0
 \end{array}$$

4 1

$$\begin{aligned}
 10. \quad A &= Pe^{rt} \\
 9110 &= 5000e^{30r} \\
 \frac{911}{500} &= e^{30r} \\
 \ln \frac{911}{500} &= \ln e^{30r} \\
 \ln \frac{911}{500} &= 30r \cdot \frac{1}{30}
 \end{aligned}$$

$$\begin{aligned}
 r &= \frac{\ln \frac{911}{500}}{30} \\
 r &\approx .019 \\
 2\%
 \end{aligned}$$

11.

$$\frac{n}{m} = \frac{\sqrt{a^5}}{a} = \frac{a^{\frac{5}{2}}}{a^1} = a^{\frac{5}{2}-1} = \sqrt{a^3}$$

4 1

$$\begin{aligned}
 12. \quad (x+3 - \frac{4}{x-1}) &= 5 \quad \frac{x-1}{1} \\
 x(x-1) + 3(x-1) - 4 &= 5(x-1) \\
 x^2 - x + 3x - 3 - 4 &= 5x - 5 \\
 x^2 - 3x - 2 &= 0 \\
 a=1 \quad b=-3 \quad c=-2 \\
 x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\
 &= \frac{3 \pm \sqrt{17}}{2} \\
 x &= \frac{3 + \sqrt{17}}{2} \quad x = \frac{3 - \sqrt{17}}{2}
 \end{aligned}$$

13.

$$\begin{aligned}
 ae^{bt} &= c \\
 e^{bt} &= \frac{c}{a} \\
 \ln e^{bt} &= \ln \frac{c}{a} \\
 b + \ln e &= \ln \frac{c}{a} \\
 t &= \frac{\ln(\frac{c}{a})}{b}
 \end{aligned}$$

3 1

14. Enter $|x^2 - 9| - 3$ into Y_1
and $\log_3 x$ into Y_2

Use CALCULATE > 5: intersect
 $x = 2.2903455$ $x = 3.6295163$
 Between 2.29 and 3.63

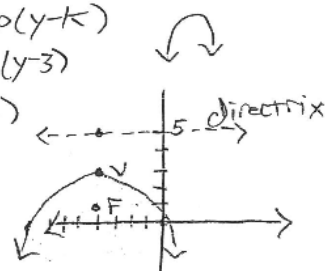
15. Unit Circle

$$\begin{aligned}
 \sin \theta &= y \\
 \cos \theta &= x \rightarrow \sec \theta = \frac{1}{x} = \frac{1}{-\frac{1}{3}} \\
 \tan \theta &= \frac{y}{x} \\
 P(-\frac{1}{3}, -\frac{\sqrt{8}}{3}) \\
 x \quad y \\
 \sec \theta &= -3
 \end{aligned}$$

1 1

$$\begin{aligned}
 16. \quad (x-h)^2 &= 4p(y-k) \\
 (x+4)^2 &= -8(y-3)
 \end{aligned}$$

Vertex: $(-4, 3)$
 $|4p| = 8, p = 2$

Directrix: $y = 5$ 

28. Rearrange poly so grouping works

$$\begin{aligned}
 & x^2 + 3xy + 3x^2 + y \\
 & = \underbrace{3x^3 + x^2} + \underbrace{3xy + y} \\
 & = x^2(3x+1) + y(3x+1) \\
 & = (3x+1)x^2(x+y)
 \end{aligned}$$

29. $R(t) = 20e^{.05t}$ $F(t) = 30e^{.03t}$

$$\begin{aligned}
 \frac{20e^{.05t}}{30} &= \frac{30e^{.03t}}{20} \\
 \frac{2}{3}e^{.05t} &= \frac{3}{2}e^{.03t} \\
 \frac{2}{3} &= e^{-.02t}
 \end{aligned}$$

$\ln \frac{2}{3} = \ln e^{-.02t}$
 $\ln \frac{2}{3} = -.02t + \ln e$
 $\frac{\ln \frac{2}{3}}{-.02} = \frac{-.02t}{-.02}$
 $20.3 \approx t$
 20.3 months

30. $h(x) = 2\sin(3x) + 1$
 minimum = $-2 + 1 = -1$
 $g(x)$ minimum = -8
 $g(x)$ has a smaller min.

35.

a) $\bar{x} = 138.905$, $\sigma = 7.950$
 middle 95% $\rightarrow$ within 2 σ 's
 $\bar{x} - 2\sigma = 138.905 - 2(7.950)$
 ≈ 123
 $\bar{x} + 2\sigma = 138.905 + 2(7.950)$
 ≈ 155
 123 to 155

b) Results do not contradict
 because 50% of 250 is 125
 Result is between
 123 to 155

36. Zeros are -4 , 0 , 3
 (crosses) (tangent) (crosses)
 odd exp. even exp. odd exp.

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

Translate 2 to left:

$$\begin{aligned}
 g(x) &= f(x+2) \\
 &= (x+4+2)(x+2)^2(x-3+2) \\
 &= (x+6)(x+2)^2(x-1)
 \end{aligned}$$