IM2 Final Exam Review Packet – Calc Inactive | Name:

1. Simplify each of the following and express your answer in lowest terms (if applicable).

(6 marks)

a. $2^{-2} \times 8^{2} =$

b. $(-5)^{0} - \frac{1}{4^{-2}} =$

c. $\frac{2^{-2}}{2^{-3} \times 2^{-4}} =$

2. Expand the following quadratic expressions:

a. $5x(2x-3)$ **(2M)**

b. $-2(x-4)^{2}$ **(3M)**

c. $(2-5x)(3x-8)$ **(3M)**

3. Evaluate the following exponential functions for the given values of x.

(6 marks)

a. Evaluate $f(x) = 2 + \frac{1}{2}(2)^{x+1}$ if x = 2

b. Evaluate $f(-1)$ if $f(x) = 4\left(\frac{1}{2}\right)^{x}$

4. Factor the following quadratic expressions:

d. $9x - 36x^{2}$ **(2M)**

e. $x^{2} - 18x + 32$ **(2M)**

f. $x^{2} - 49$ **(2M)**

g. $4x^{2} + 5x - 6$ **(3M)**

5. Write the following numbers in scientific notation.

(4 marks)

a. 310,600

b. 0.0000675

6. The following numbers are written in scientific notation. Rewrite each number in non-scientific notation.

(4 marks)

a. 1.61303×10^{-3}

b. $1.25E8$

7. Simplify $\frac{\left(9\times10^{-3}\right)\left(5\times10^{6}\right)}{3\times10^{-2}}$. Your final answer must be expressed in proper scientific notation.

(3 marks)

8. Solve the following equations:

h. $2x\left(x-4\right)=0$

(2M)

i. $x^2+5x-36=0$

(3M)

j. $2x^2-15x=-28$

(4M)

9. Solve the following equations for x. Show the keys steps in your solutions or show your justification/verification for any that you solved using a guess & check method.

(6 marks)

a. $3^{x-1}=\frac{1}{9}$

b. $5^{x+1}=\left(\frac{1}{5}\right)^{2x+5}$

10. Solve and verify $\left(\frac{1}{8}\right)^{-x-2}=32^{\,2x-3}$. (HINT: Can you re-express the bases using a common base?)

(6 marks)

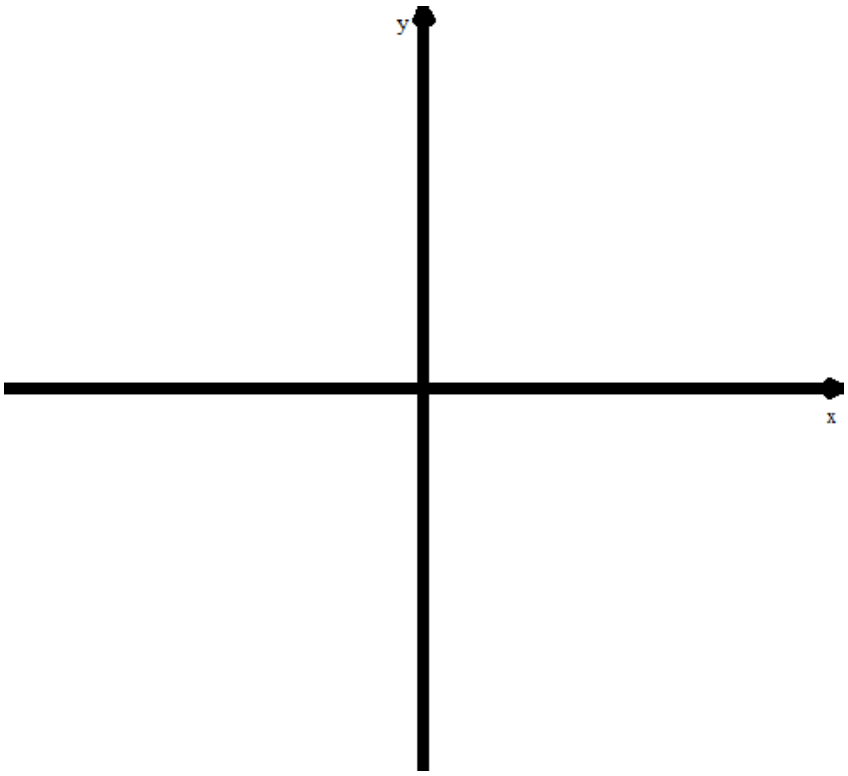
11. Graph the following exponential equation: $y = -(2)^x + 4$. You are required to identify the (i) state the equation of the asymptote, (ii) y intercept, (iii) range of the function. You MAY produce a data table from the equation and include two additional points on the graph.

(7 marks)

EQN to be graphed: $y = -(2)^x + 4$

(i) Equation of Asymptote:

(ii) y – intercept:



(iii) Range:

12. A parabola has a vertex at (6,10) and it has a zero x = -3. Where is the second zero?

(2M)

13. Youssef thinks he knows that the quadratic function $y = 4(3-x)(2-x)$ has a maximum value. Explain how he knows that this is TRUE OR explain why you think that he is WRONG!

(2M)

14. Ms. A is standing on top of a building and throws a softball upward and forward to Mr. S, who is standing on the ground. The height of the ball above the ground is modeled by the quadratic equation $h = 120 + 10\,t - 5t^2$, where ***h*** represents height, in meters, above the ground and ***t*** represents the time in seconds since Ms. A released the ball.

You could make a sketch to visualize the information provided

a. How high is the building? **(1M)**

b. What is the maximum height of the ball? **(3M)**

c. At what time(s) is the ball 120 m above the ground? **(3M)**

d. Determine the zeroes and explain what they mean in the context of this question. **(3M)**

e. How long is the ball in flight? **(1M)**

15. Here is some information about a parabola, whose equation in factored form is $y = a\left(x - R\right)\left(x - S\right)$.
The points (-7,0) and (4,0) lie on the curve of this parabola, as does the point (-4,-48).

a. Determine the equation of the axis of symmetry of the parabola. **(1M)**

b. Sketch a graph, so you can visualize the information provided above. **(3M)**

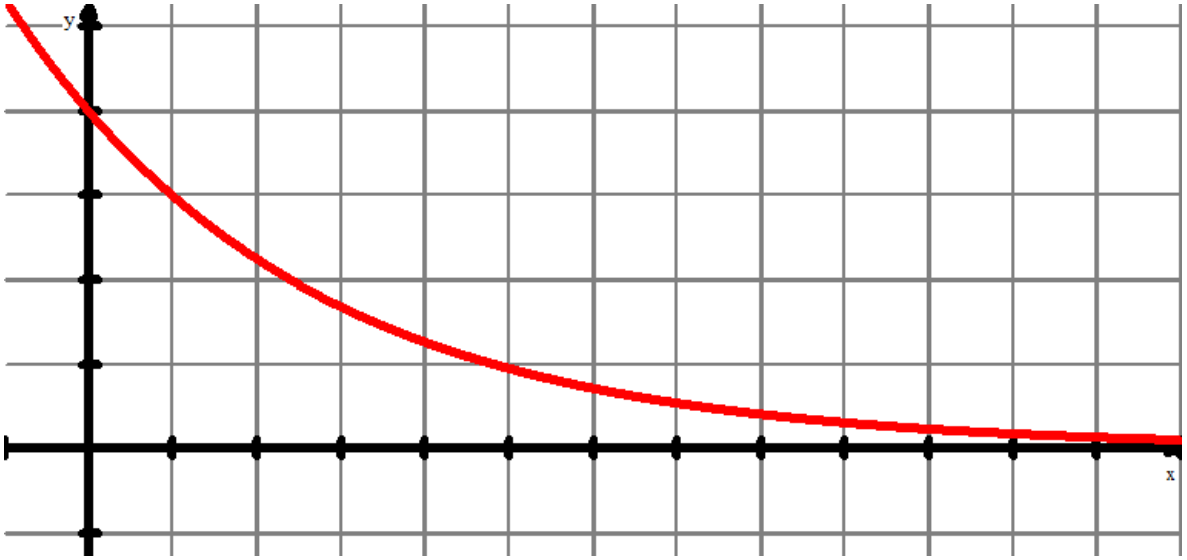
c. Determine the equation of the parabola. Write the equation in factored form. **(3M)**

d. Write the equation in standard form. **(2M)**

e. Use your equation to solve for the value(s) of x that give y = 24. BRIEFLY, explain the meaning of your solution. **(4M)**

16. Here is a graph of an exponential function, $y = c(1 + r)^x$.

(6 marks)



a. This graph shows (a) exponential growth, (b) linear growth, (c) a constant negative slope, (d) exponential decay. (circle one choice)

b. In this graph, the value of r COULD be: (a) r = 0.25, (b) r = -0.25, (c) r = 25, (d) r = -25. (circle one choice.) Explain your reasoning.

c. On the same graph, you are going to make a second sketch of a function. In this second function, the value of c must be LESS THAN the original value of c and the value of (1 + r) must be GREATER than that of the original function, although the nature/shape of the graph of your function MUST still be consistent with your answer from Qa.