

1. Factor: $121n^2 + 100$

$$(11n + 10i)(11n - 10i)$$

2. Factor: $8x^2yz^3 - 4xy^5z + 20x^3y^2z$

$$4xyz(2xz^2 - y^4 + 5x^2y)$$

3. Identify the interval on which $3x^2 - 6x - 24 > 0$

$$(-\infty, -2) \cup (4, \infty)$$

4. Solve: $-3(x+2)^2 - 6 = -18$

$$x = 0 \\ x = -4$$

5. Solve the quadratic: $2x^2 - 3x = -2$

$$\frac{3 \pm i\sqrt{7}}{4}$$

6. Over what interval is the graph decreasing?
 $-x^2 + 2x + 48 = 0$

$$(1, \infty)$$

7. Solve $x^3 - 5x = 0$ and classify the solutions.

3 real soln.

$$x = 0 \quad x = \pm\sqrt{5}$$

whole # irrational

8. If $f(x) = -3(x+2)^2$ and $g(x) = x^2 - 2x - 3$,
then find $-3f(2) - 2g(-1)$.

$$144$$

9. Classify by degree and number of terms:
 $14x^3 - x^5 + 3x^2$

quintic trinomial

10. $(x^3 - 2x + 1) \div (x - 3)$ has a remainder of?

$$22$$

11. Use Pascal's triangle to expand: $(3x-2)^4$

$$81x^4 - 216x^3 + 216x^2 - 96x + 16$$

12. Factor $(2x^3 + 16)$ completely:

$$2(x+2)(x^2-2x+4)$$

13. If a quartic polynomial has the following roots: $7i$, and $-3+\sqrt{7}$, then what are the other roots?

$$-7i + -3-\sqrt{7}$$

14. Find all the zeros of the polynomial function:
 $3x^4 - 6x^3 + 9x^2 - 18x$

$$\begin{aligned}x &= 0 \\x &= 2 \\x &= \pm i\sqrt{3}\end{aligned}$$

15. What will a graph do if there is an even amount of the same solutions? An odd amount of the same solutions?

even - graph will bounce at that pt.
odd - graph will go through that pt

16. If $f(-2) = 0$, then what is a factor that we know? An x-intercept that we know?

factor $x+2$
xint $(-2, 0)$

17. Simplify: $\frac{2x^2 + 13x + 20}{2x^2 + 17x + 30}$

$$\frac{x+4}{x+6}$$

18. Simplify: $\frac{-3}{x-2} + \frac{17}{2x^2-4x}$

$$\frac{-6x+17}{2x(x-2)}$$

19. Simplify: $\frac{x^2+2x-15}{2x^2-8x-90} \div \frac{x^2-25}{2x^3}$

$$\frac{x^3(x-3)}{(x-9)(x+5)(x-5)}$$

20. Solve: $x+2 = \sqrt{2x+12}$

$$x=2 \quad x=\cancel{-4}$$

21. Solve $3(x-5)^{\frac{1}{3}} = -9$

$x = -22$

22. Find the coordinates of the hole from:

$$f(x) = \frac{x^2 + x - 6}{x^2 - 4}$$

$(2, \frac{5}{4})$

23. Find the x-intercept and y-intercept from:

$$\frac{x^2 - x - 6}{x + 6}$$

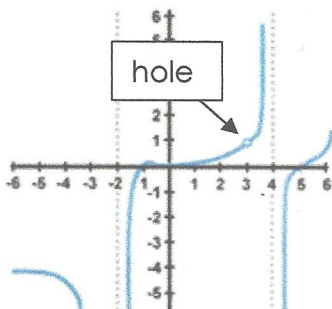
x-int $(3, 0)$ $(-2, 0)$
y-int $(0, -1)$

24. Determine the horizontal and vertical asymptotes for:

$$f(x) = \frac{-4x + 9}{x^2 - 4}$$

HA: $y = 0$
VA: $x = 2$ $x = -2$

25. Find the domain and the range of the function



D: $(-\infty, -2)$ $(-2, 3)$
 $(3, 4)$ $(4, \infty)$
R: $(-\infty, \infty)$

26. State the domain and range of:

$$f(x) = \frac{2}{3}\sqrt{2x-5} - 7$$

D: $[\frac{5}{2}, \infty)$
R: $[-7, \infty)$

27. Describe the transformations of:

$$f(x) = \frac{1}{2}\sqrt[3]{-3(x+4)}$$

- reflect over y-axis • left 4
- hor. shrink by $\frac{1}{3}$ • vert shrink by $\frac{1}{2}$

28. Condense: $3\log x + \log 4 - \log x - \frac{1}{2}\log 6$

$\log \frac{4x^2}{\sqrt{6}}$

29. Determine the range of: $f(x) = -\left(\frac{2}{3}\right)^x - 3$

$(-\infty, -3)$

30. If you deposited \$2500 into an account that is compounded continuously at 3.8%. How long would it take for it to reach \$5400?

$t = 20.27$ yrs

31. Solve: $\log_2(x+2) + \log_2 3 = \log_2 27$

$x = 7$

32. Find the inverse of $f(x) = -\ln(x-1) + 3$

$f^{-1}(x) = e^{-x+3} + 1$

33. You deposited \$1628 at a rate of 4% in a savings account compounded monthly. Find the balance after 15 years.

$$\boxed{\$2963.44}$$

34. Write the equation of the natural logarithm that has a domain of $(-\infty, -3)$, and is reflected over the y-axis.

$$\boxed{f(x) = \ln(-x-3)}$$

35. $f(x) = 5x^3$; $g(x) = -2x + 7$; $h(x) = 4x^2 - 3x$
Find $h(g(x))$

$$\boxed{16x^2 - 106x + 175}$$

36. A travel agent can arrange for at most 36 people to go on a trip. The trip needs at least 10 men and 12 women committed. The agent will make \$22 profit per man and \$18 profit per woman. Find the constraints and objective function.

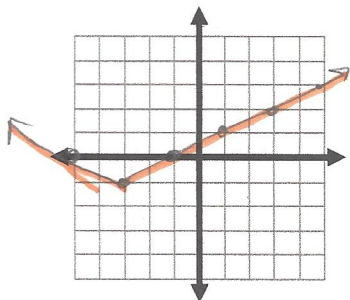
$$\boxed{P(x, y) = 22x + 18y}$$

Constraints

$$\begin{aligned} x + y &\leq 36 \\ x &\geq 10 \\ y &\geq 12 \end{aligned}$$

37. Graph

$$f(x) = \frac{1}{2}|x+3| - 1$$

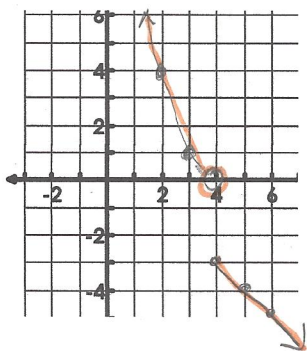


38. Find the sum of the first 12 terms of the geometric sequence if $a_1 = 10$ and $r = \frac{1}{2}$.

$$\boxed{S_{12} = 19.9951}$$

39. Graph:

$$f(x) = \begin{cases} (x-4)^2, & x < 4 \\ -x+1, & x \geq 4 \end{cases}$$



40. A normal distribution of ACT scores has a mean score of 18 and a standard deviation of 6. Find the probability that you scored higher than a 25

$$\boxed{.1217}$$

41. Suppose test scores on an exam show a normal distribution with a mean of an 80 and a standard deviation of 4. Within what range do about 68% of the scores fall?

$$\boxed{[76, 84]}$$

42. List the 6 types of sampling methods and be able to give an example of each.

- Systematic
- self-selected
- convenience
- random
- stratified
- clustered