

6. Find $p(-3)$ if $p(x) = x^5 + 3x^2$.

⑥

7. Solve $x^4 + 200 = 102x^2$.

⑦

$$(x^2 - 100)(x^2 - 2) = 0$$
$$(x+10)(x-10)$$

6. -216

$$x^4 - 102x^2 + 200 = 0$$

7. _____

$$x^2 - 2 = 0$$
$$+2 \quad +2$$

$$x^2 = 2$$

⑥

$$p(-3) = (-3)^5 + 3(-3)^2$$
$$-243 + 27 = -216$$

$$\sqrt{x^2 = 100}$$
$$x = \pm 10$$

$$x = \pm \sqrt{2}$$
$$x = \pm 10$$

6. Find $p(-3)$ if $p(x) = x^5 + 3x^2$.

7. Solve $x^4 + 200 = 102x^2$.

8. Use synthetic substitution to find $f(-3)$ for $f(x) = 2x^3 - 6x^2 - 5x + 7$.

9. One factor of $f(x) = x^3 + x^2 - 22x - 40$ is $x + 4$. Find the other factors.

$$\begin{array}{r|rrrrr} -3 & 2 & -6 & -5 & 7 & \\ & & -6 & 36 & -93 & \\ \hline & 2 & -12 & 31 & -86 & \end{array}$$

6. _____

7. _____

8. $f(-3) = -86$

9. _____

$$\begin{array}{r|rrrrr} -4 & 1 & 1 & -22 & -40 & \\ & & -4 & 12 & 40 & \\ \hline & 1 & -3 & -10 & 0 & \end{array}$$

$(x+4)(x^2-3x-10)$

$(x-5)(x+2)$

$$2. \frac{(2+i)(1+3i)}{(1-3i)(1+3i)} = \frac{2+i+6i+3i^2}{1-9i^2}$$

$$(a-b)(a+b) = a^2 - b^2$$

$$i^2 = -1$$

$$= \frac{2+7i-3}{1+9}$$

$$= \frac{-1+7i}{10}$$

$$= \frac{-1}{10} + \frac{7i}{10}$$

or

$$2. \frac{(2+i)(1+3i)}{(1-3i)(1+3i)} = \frac{2+i+6i+3i^2}{1-9i^2}$$

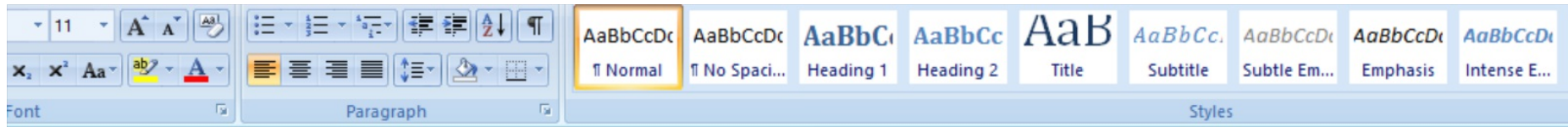
$$(a-b)(a+b) = a^2 - b^2$$

$$i^2 = -1$$

$$= \frac{2+7i-3}{1+9}$$

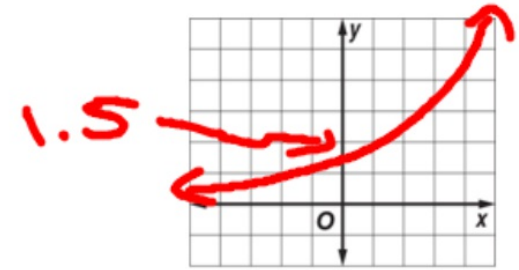
$$= \frac{-1+7i}{10}$$

$$= \frac{-1}{10} + \frac{7i}{10}$$



19. Sketch the graph of $y = 1.5(2)^x$. Then state the function's domain and range.

$D: \mathbb{R} \quad R: y > 0$



20. Determine whether $y = 1.5\left(\frac{1}{6}\right)^x$ represents exponential growth or decay.

20. decay

$f = -1$

For Questions 21-25, solve each equation or inequality. Round to four decimal places if necessary.

21. $\left(\frac{1}{5}\right)^{t-2} = 125$

Handwritten solution for Q21:
 $(5^{-1})^{t-2} = 5^3$
 $-t + 2 = 3$
 $-t = 1$
 $t = -1$

22. $\log_4(x - 9) = 2$

25. $e^{3x} \geq 21$

Handwritten solution for Q25:
 $\ln e^{3x} \geq \ln 21$
 $3x \geq \ln 21$

Handwritten solution for Q25:
 $(5)_{x \geq \frac{\ln 21}{3}}$

19. _____

20. _____

21. _____

22. _____

25. _____

For Questions 21-25, solve each equation or inequality.
Round to four decimal places if necessary.

23. $\log_4 z + \log_4(z - 3) = 1$

$z(z-3)$

$\log_4 z^2 - 3z = 1$

$z^2 - 3z = 4$

$z^2 - 3z - 4 = 0$

$(z-4)(z+1) = 0$

$z=4$, $z=-1$

extraneous

21. _____

22. _____

$z=4$

$z=-1$

18. Solve $\frac{8}{t+5} = \frac{t-3}{t+5} + \frac{1}{3}$.

19. $\frac{8}{t+5} = \frac{t-3}{t+5} + \frac{1}{3}$ LCD: $3(t+5)$

$$24 = 3(t-3) + (t+5)$$

$$24 = 3t - 9 + t + 5$$

$$24 = 4t - 4$$

$$\begin{array}{r} 24 \\ +4 \\ \hline 28 = 4t \end{array}$$

$$t = 7$$

26. Use $\log_5 2 \approx 0.4307$ and $\log_5 3 \approx 0.6826$ to approximate the value of $\log_5 12$.

$$\begin{aligned} & \log_5 (2 \cdot 2 \cdot 3) \\ & + \log_5 2 + \log_5 2 + \log_5 3 \end{aligned}$$